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## Climate delay discourses present in global mainstream television coverage of the IPCC's 2021 report

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Recent scholarship suggests that groups who oppose acting on climate change have shifted their emphasis from attacking the credibility of climate science itself to questioning the policies intended to address it, a position often called 'response skepticism'. As television is the platform most used by audiences around the world to receive climate information, we examine 30 news programmes on 20 channels in Australia, Brazil, Sweden, the UK and USA which included coverage of the 2021 report by the Intergovernmental Panel on Climate Change (IPCC) on the Physical Science. Using manual quantitative content analysis, we find that skepticism about the science of climate change is still prevalent in channels that we have classified as 'right-wing', but largely absent from channels classified as 'mainstream'. Forms of response skepticism are particularly common in 'right-wing' channels, but also present in some 'mainstream' coverage. Two of the most prominent discourses question the perceived economic costs of taking action and the personal sacrifices involved. We explore the implications of our findings for future research and climate communication.

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Since the 1980s, efforts to prevent action to address climate change have primarily focused on undermining public confidence in the scientific consensus that the climate is changing in response to human action, often by “manufacturing uncertainty”<sup>1,2</sup>. Many of these efforts have focused on denying the reality, anthropogenic causes, and/or seriousness of climate change—that is, promoting what many scholars have called trend skepticism, attribution skepticism, or impact skepticism, respectively<sup>3,4</sup>. However, recent research suggests that the emphasis may be shifting from questioning the scientific basis of climate change to undermining policy solutions deemed capable of addressing climate change<sup>5</sup>. Here, we assess the current manifestations of different types of climate skepticism through an examination of television coverage of the Intergovernmental Panel on Climate Change’s (IPCC) 2021 Working Group I (WGI) report on Physical Science in five countries around the world.

One strand of scholarship<sup>6</sup> has defined efforts to deny the reality of the physical phenomenon of climate change as “evidence skepticism,” and has contrasted this with two other forms of climate skepticism—“process” and “response skepticism”—which are “commensurate with but not dependent on evidence skepticism” (p. 6). Examples of “process skepticism” are suggestions that scientists are manipulating or hiding evidence, computer modeling is unreliable, media exaggeration is affecting public opinion, or that scientific institutions such as the IPCC lack integrity<sup>7</sup>.

“Response skepticism” dismisses or contests policies to address the climate challenge. It includes a variety of arguments, such as taking action will harm the economy and jobs, or that unilateral responses are not appropriate in the absence of a global agreement, or that a measured response is best<sup>6</sup>. We follow this broad taxonomy of skepticism, although we acknowledge that different categories of skepticism are possible<sup>8,9</sup>, and other scholars prefer different nomenclature such as “contrarianism” or “denialism”<sup>10</sup>. We also distinguish below between what we call general response skepticism, often advanced by organized skeptical groups<sup>11–13</sup>, and “directed” response skepticism, where a specific policy response is portrayed as inadequate for a variety of reasons.

While debating policy dimensions of climate action remains a legitimate and important societal discussion, this range of skeptical discourses has been promulgated in some countries by a well-funded and well-coordinated network of conservative advocacy organizations, foundations, and think tanks which scholars have argued is aimed at delaying climate action<sup>14–17</sup>. Although evidence skepticism has been notably prevalent in the media, since its beginnings, this network has not only cast doubt on the science of climate change but also made the argument that solutions would be expensive and/or ineffective<sup>1,17,18</sup>. In addition, businesses and corporate think tanks have at times signaled support for policies to address the changing climate, but in ways that maintain existing political and economic power relations or that do not address the scale of the problem, thereby delaying meaningful action by pushing non-transformative solutions<sup>19–21</sup>. Some scholars have called this “climate obstruction”<sup>22</sup> or “discourses of delay”<sup>19</sup>. Detailed typologies of the wide range of discourses and claims that underpin climate delay have been identified by previous research; they include the arguments that climate solutions would not work, someone else should take action first, or disruptive change is not necessary<sup>9,19</sup>.

Recent research has found signs that the relative prevalence of these arguments may be shifting among key portions of the climate change countermovement described above, with evidence skepticism declining and attempts to undercut solutions becoming more prominent among conservative think tanks and contrarian blogs<sup>9</sup>. Similarly, the prevalence of these arguments in US media sources may be shifting as well<sup>5</sup>. Moreover, by 2019 much

less space was being given to those denying the science of climate change in newspaper outlets in Australia, Canada, New Zealand, the UK and the USA, except in some titles researchers describe as having a right-leaning political orientation in their coverage<sup>23</sup>, and more context has been included to explain the lack of scientific support for their views<sup>24</sup>.

To examine the relative prevalence of these forms of skepticism in media treatments, we focus on the IPCC’s WGI Report, which was launched on August 9, 2021. The IPCC is widely regarded as the most authoritative source on climate change, its impacts, and options for tackling rising emissions<sup>25</sup>. IPCC reports play a central role in summarizing and presenting climate science, creating media coverage, and affecting public awareness, and exert a wide-ranging influence on how climate science interacts with policy<sup>26,27</sup>. However, research has highlighted that past IPCC Assessments, and particularly WGI reports on physical science, have been subject to various forms of contestation. For example, the 2013 WGI of the IPCC’s Fifth Assessment Report (AR5) was often contested and politicized in television and print reporting in the US and UK<sup>26</sup>. One of the main frames identified was “Uncertain Science,” which included uncertainty about aspects of the science, impacts and solutions, and another was “Political and Ideological Struggle” which included conflict over how to address climate change.

At the same time, there have been marked country differences in the extent of the various forms of skepticism both in general climate change coverage, and in response to previous IPCC reports. Evidence skeptics, defined above, have been notably present in the media in Anglosphere countries (such as the US, UK and Australia), but much less present in other countries in continental Europe and the Global South (including Brazil)<sup>28</sup>. A six-country study of the television coverage of the AR5 report showed a large presence of skeptics on air in some countries (the UK and Australia) but not in others (Brazil, China, Germany and India)<sup>29</sup>. In addition, the uncertainty frame was present in nearly 90% of the print media reporting of the IPCC’s 2007 AR4 reports, but countries varied in whether they featured the different types of skeptics<sup>30</sup>. The USA had the highest percentage of articles with skeptics in them (41% of all articles), followed by Australia (37%) and the UK (34%). By contrast, India had none, and Norway very few (3% of articles).

Whereas researchers have been able to map the geographic location of different types of skeptics accurately in the media, the main drivers of their presence or absence are less clear. It is likely to be an interaction between internal factors such as media systems, journalistic practice (such as balance), the influence of owners, and a media outlet’s ideology, and external political and cultural factors such as the presence of organized skepticism through lobbying groups or think tanks, the influence of companies with an interest in delaying climate action, and the presence of politicians or scientists, who have publicly expressed that they are skeptical of the science of climate change and who have access to the media<sup>31–35</sup>. However, it is clear that in most countries, it is in news outlets with a right-wing readership and/or a right-wing political slant to their coverage where the different forms of skepticism we have outlined above are much more prevalent<sup>36–40</sup>.

The IPCC AR6 WGI Report<sup>41</sup>, known formally as the “AR6 Climate Change 2021: The Physical Science Basis,” was based on 14,000 peer-reviewed articles giving updated research on the climate system. A total of 234 authors from 66 countries took part. In the headline statements from the Summary for Policymakers (SPM) the IPCC stressed the need to make “strong, rapid, and sustained reductions” in greenhouse gas emissions<sup>42</sup>.

We focus on television coverage of the report because it has historically been neglected in media studies of climate change

when compared to other platforms<sup>43</sup>, despite evidence from extensive survey work in over 40 countries that television programs are by far the most used source of information on climate compared to online news, print, or radio<sup>44</sup>. We also respond to the call for more comparative studies<sup>45</sup> particularly including countries in the Global South, by examining the presence and nature of skepticism in television coverage of the report in Australia, Brazil, Sweden, the UK and the USA. This gave us the opportunity both to enlarge the sample of programs and to add to the literature on the presence or absence of skeptics in coverage across different countries.

The target countries were selected to allow comparison of countries with diverse histories of skepticism and recent political shifts. Australia, the UK and the USA are three Anglosphere countries where forms of evidence skepticism have been consistently prevalent in the media and wider public sphere<sup>11,35,46</sup>. Brazil was chosen because, whereas in the past, there has been little evidence of any of the types of skepticism discussed above<sup>47</sup>, the overall political and media context changed with the election of President Jair Bolsonaro in January 2019<sup>48,49</sup>. Similarly, Sweden was included because historically the various forms of climate skepticism have not been present in the media or main political parties, but the Sweden Democrats have gained considerable electoral support since 2010. The party is usually described by scholars as radical right-wing or far-right because they espouse policies which are considerably to the right of Sweden's traditional conservative parties<sup>50</sup>. Representatives of the party have repeatedly made statements that fall into the category of evidence and response skepticism<sup>51</sup>. In addition, there has been a marked change in the Swedish media landscape with the emergence of what scholars describe as right-wing alternative digital media<sup>52</sup>, including an online web-based channel called SwebbTV, which regularly gives space to climate skepticism<sup>53</sup>.

We chose four television stations, networks or web-based channels for each of the five countries. In each country, we classified three as being broadly in the center of the political spectrum or non-aligned public service broadcasters governed and regulated for impartiality (see Table 1). Some we classified as “center-right” or “center-left” by which we meant that these stations leaned to the right or left of the political spectrum, by some criteria, but were closer to the center than “left-wing” or “right-wing” channels. For brevity, we call this group of stations “mainstream.” The fourth channel in each country we classified as “right-wing,” embracing a range of stations on the conservative end of the political spectrum, namely Sky News in Australia, Rede TV! in Brazil, SwebbTV in Sweden, GBTV news in the UK, and Fox News in the USA. The allocation of political labels was based on a variety of criteria outlined in detail in the Methods Section and described in the Supplementary Notes, but particularly the composition of viewers, the slant of news coverage, the regular presence or absence of voices or arguments expressing the different types of skepticism outlined above, and the political classifications of these channels in prior studies<sup>35,54,55</sup>. For purposes of brevity, we call these stations “right-wing.” We recognize our labels are approximations and can be contested.

For each of the mainstream channels, we first looked at news programs across three days, i.e., August 8, 9 and 10, and normally evening programs at peak viewing times. This gave us an initial total of nearly 70 programs across the five countries to examine, consisting of more than 40 h of content. For the right-wing channels, the selection method differed according to country and platform specifics (see Methods section). However, only a few of the initial sample of programs reported on the IPCC report, so following previous research<sup>26</sup>, we included only those programs which contained within them items that were substantively about the IPCC report. This selection method meant, for example, that

Brazil only had four programs to analyze, whereas Sky News in Australia alone had three different programs included in our sample.

Table 1 gives details of the 20 channels and 30 programs analyzed in the five countries, which included IPCC coverage. We defined 19 of the programs as “mainstream,” and 11 as “right-wing.” In all, 221 min of programming were included in our sample, which compares favorably with the volume and number of programs monitored in previous studies of IPCC television coverage<sup>26,29</sup>.

First, we assessed the newsworthiness of the IPCC report, measured by the volume of coverage. Then we concentrated on three key aspects of the contestation around it: the forms of contestation; the on-air presence of skeptics, including what type of skeptical views they presented such as evidence or response skepticism and which sector they came from (e.g., university scientist, lobbyist, media pundit); and the relative presence of contestation compared to other prominent discourses promoted by the IPCC and other UN bodies around the report (see Table 2). The forms of contestation are anchored in the distinctions outlined above between the various manifestations of “evidence skepticism” (such as questioning the trend of temperatures rising, attribution to human activities, or the magnitude of the impacts) and “response skepticism” (such as the high costs of taking action or the cost falling unfairly on lower-income groups) (see Table 3). We further divided the category of response skepticism into (a) “general response skepticism” where policy solutions appear to be criticized or deemed impossible to achieve in general without any clear alternatives pointed to or advanced, which scholars have characterized as “discourses of delay” often put forward by organized skeptical groups<sup>19</sup> and (b) “directed response skepticism” where a specific policy is critiqued for being insufficient in scope and scale to address the climate problem, or unrealistic due to political and other obstacles.

## Results

**Newsworthiness of report.** Most of the coverage (25 of the 30 programs) was focused on the day of the launch of the report (August 9), rather than the day before or after. The British channels we monitored covered the report the most on these dates (72 min), followed by Sweden (58), Australia (40) and USA (39). Brazil was the clear outlier with only 12 min across the four channels chosen. This relative silence was particularly apparent on some of Brazil's center-right and right-wing channels.

Of the mainstream channels in Australia, ABC was the only station to cover the report in some depth, whereas Channels 7 and 9 had very limited coverage in the programs we monitored; instead of the report itself, they concentrated on former Prime Minister Scott Morrison's speech on August 9 in response to the report, which focused primarily on climate policy. In the US, the amount of coverage of the report on Fox News was minimal, with 12 of the 14 programs we examined showing no coverage at all. These included some of the most-watched programs on cable news (Tucker Carlson Tonight and Hannity). The two programs which did contain coverage of the report had only relatively brief segments (about 3 min or less). One of the two shows that did cover the report, Fox News Primetime, began its reporting on August 9 at 4 pm Pacific time by framing climate change as unimportant, saying “Democrats are working hard to ignore real issues affecting Americans, instead choosing to focus on climate change.” These samples from Brazil and the USA in particular suggest a form of “denialism by silence,” discussed below.

**General contestation around the report.** General criticism of the IPCC report and contestation around the science was largely

**Table 1 Television channels and programs monitored, by country and political leaning.**

Country	Channel	Type of channel	Political leaning	Program	Date of transmission
Australia	ABC1 Sydney	Public sector broadcaster	Center-left	7.30 report	August 9
	Ch 7 Sydney	Commercial	Center-right	7 News	August 10
	Ch 9 Sydney	Commercial	Center-left	9 News	August 10
	Sky News	Cable, commercial	Right-wing	Sky News Extra	August 8
	Sky News	Cable, commercial	Right-wing	Credlin	August 9
Brazil	Sky News	Cable, commercial	Right-wing	Afternoon Agenda	August 10
	Globo	Commercial	Centrist	Jornal Nacional	August 9
	SBT	Commercial	Center-right	SBT Brasil	August 9
	Record	Commercial	Center-right	Jornal da Record	August 9
Sweden	Rede TV!	Commercial	Right-wing	Rede TV! News	August 9
	SVT1	Public sector broadcaster	Non-aligned	Rapport [Report]	August 9
	SVT1	Public sector broadcaster	Non-aligned	Rapport [Report]	August 10
	SVT2	Public sector broadcaster	Non-aligned	Aktuellt [Current]	August 9
	TV4	Commercial	Non-aligned	Nyheterna [News]	August 9
	SwebbTV	Web-based	Right-wing	SwebbTV Nyheter [SwebbTV News]	August 9
	SwebbTV	Web-based	Right-wing	Återpublicering med anledning av gårdagens skrämselpropaganda i SVT Rapport	August 10
UK	BBC1	Public sector broadcaster	Non-aligned	News at Ten	August 9
	ITV news	Commercial	Non-aligned	News at 6	August 9
	Channel 4	Public sector broadcaster	Non-aligned	Channel 4 News	August 9
	GBTV	Commercial	Right-wing	Farage	August 9
USA	GBTV	Commercial	Right-wing	The Clash	August 9
	GBTV	Commercial	Right-wing	GB News	August 9
	MSNBC	Cable, commercial	Center-left	The Rachel Maddow Show	August 9
	MSNBC	Cable, commercial	Center-left	The ReidOut	August 9
	MSNBC	Cable, commercial	Center-left	All In with Chris Hayes	August 9
	MSNBC	Cable, commercial	Center-left	Last Word with Lawrence O'Donnell	August 9
	NBC	Network	Centrist	NBC Nightly News	August 9
	ABC	Network	Centrist	World News Tonight	August 9
	Fox	Cable, commercial	Right-wing	Special Report with Bret Baier	August 9
	Fox	Cable, commercial	Right-wing	Fox News Primetime	August 9

**Table 2 Main IPCC messages coded.**

1. Stark warning from scientists/"code red," highlighting need for urgent action
2. (More) Certainty about the science
3. Climate change is happening now (in many parts of the world) and/or irreversible
4. Human influence is making extreme climate events, including heat waves, heavy rainfall, and droughts, more frequent and severe
5. Climate change is causing impacts other than extreme climate events, e.g., sea level rise
6. Uncertainty (possible ranges) about the scenarios, e.g., warming trajectories, sea level rise
7. Reasons for hope (general), such as the IPCC view that it is not too late to stop the worst effects of climate change
8. Opportunity for a better world/green recovery based on clean, renewable resources; or mention of specific examples of green alternatives
9. Role of methane in causing global warming
10. Other

absent from the mainstream media coverage, but strongly present in the right-wing coverage (see Fig. 1). The report was criticized only twice in the mainstream coverage, once on SVT1 on August 10 in Sweden for "underestimating the temperature rise," and once on Channel 4 in the UK, which mildly criticized the report (in the questioning by the presenter) for claiming that it "said nothing new." The same Channel 4 program also briefly contested the science by saying the IPCC report was overusing the most extreme (and least likely) scenarios. The SVT1 program mentioned above also criticized the science of the report, based on two interviews with climate scientists saying that a 1.5-degree

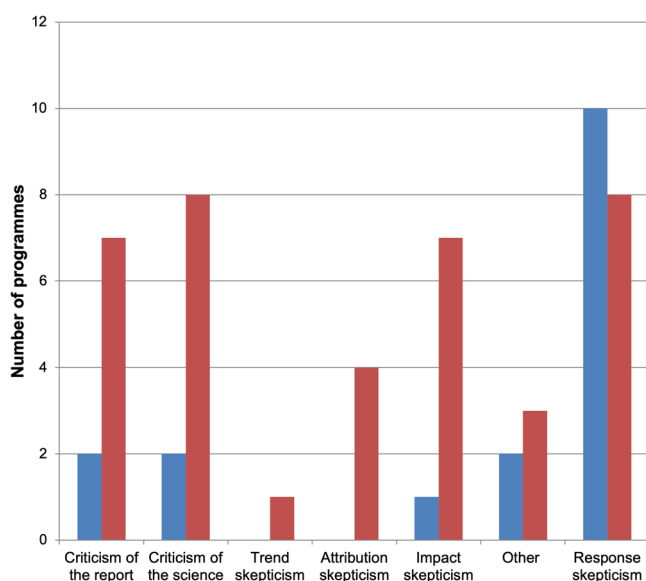
increase was inevitable due to feedback from melting permafrost and forest fires not included in the IPCC models, and that reliance on negative emissions was unwise. The argumentation here was that more up-to-date scientific results were available than those used by the IPCC, rather than that the IPCC had produced an inaccurate or invalid report.

By contrast, in right-wing coverage, 7 of the 11 programs we monitored included criticism of the report in general, and 8 included questioning of the science. Of these 8 (representing 73% of the right-wing programs), one included a denial of the warming trend, and four questioned the attribution to human



**Table 3 Types of response skepticism.**

Response skepticism in general questioning the need for strong regulatory policies or interventions
The impracticality of taking (urgent) action (in general, without specifying any details)
Questioning the economic costs of taking (urgent) action (in general)
Action to tackle climate change is already costing job losses or will do so in the future
Taking action would or could involve a lot of /too much personal sacrifice (e.g., reducing or not flying, not eating/reducing meat)
Solutions will hit lower-income groups the hardest
Solutions will outsource jobs, or hurt national competitiveness
Solutions will give too much power to governments (to impose new regulations and taxes)
Questioning the need to take action when other countries (e.g., China) are not doing enough (“whataboutism”)
Enough is already being done
Technology (including Carbon Capture and Storage) should be the main element of the solution (and not so much emphasis on moving away from fossil fuels)
Preferring adaptation to inevitable impacts rather than mitigation
Directed response skepticism, where a specific policy, often country-based, is seen as being insufficient in scope and scale to address the climate problem, or unrealistic due to political and other obstacles

**Fig. 1 Presence of forms of skepticism in mainstream and right-wing channels.** Mainstream channels in blue and right-wing channels in red.

action. The most common (7 mentions) was impact skepticism, in which scientists or NGOs were accused of “climate alarmism” in exaggerating the possible impacts (and in some cases “traumatizing children” according to a presenter on GBTV). On Sky News, the view was voiced that climate alarmism was causing more anxiety when Australians were already stressed over COVID, while on SwebbTV, one of the programs described a report on SVT (the public service channel) the previous night as being too alarmist about the impacts. On August 9, the day the report was published, SwebbTV ran a segment on climate science that did not mention the IPCC, but instead reported on new monthly data from the University of Alabama satellite measurement series, a series which has previously understated warming and has often been used in skeptical argumentation<sup>56</sup>. On Fox News Primetime there were explicit statements that the science underlying the IPCC was “corrupt” or “bureaucratic,” including the statement from a contributor that “over 50 percent of the report [was] based on implausible extreme model-based scenarios of doom, because they could not find current reality to scare people.”

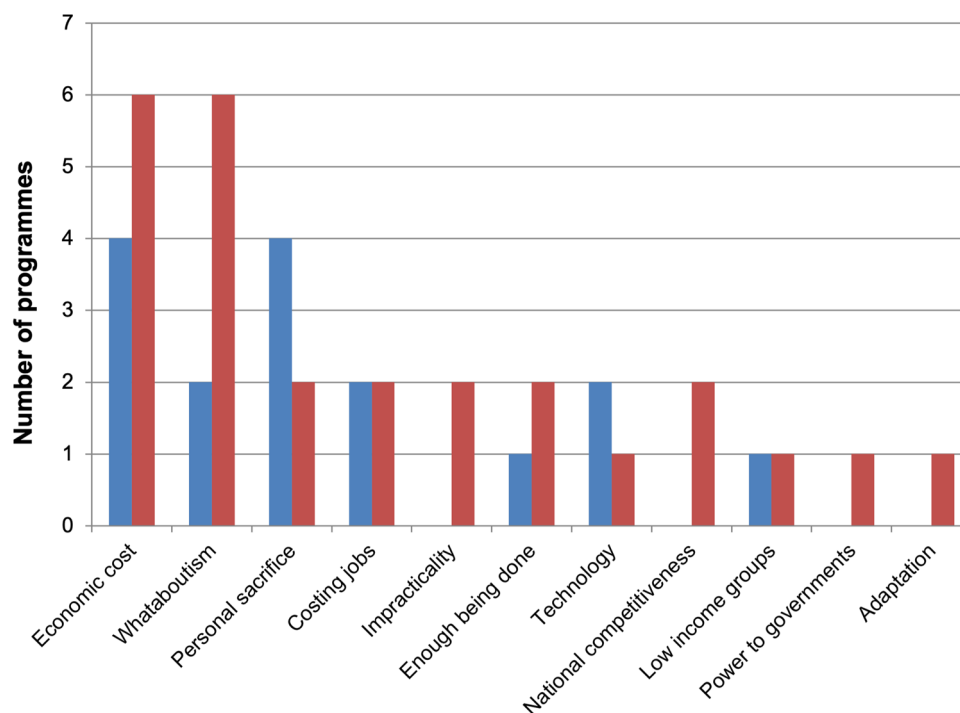
**Response skepticism.** Within the mainstream channels, the skeptical discourses that appeared were predominantly those

around response skepticism (10 of 19 programs—53%), but within the right-wing media, there was an equally strong presence of evidence skepticism and response skepticism (8 out of 11 programs each—73%). Of the ten times response skepticism was present within the mainstream media, eight were examples of “directed response skepticism,” where aspects of particular national policies were criticized, rather than a general rejection of taking climate action. In contrast, “directed response skepticism” was only present twice in the right-wing sample, meaning that response skepticism here instead mostly questioned the general plausibility and desirability of action rather than critiquing particular policy options.

The two discourses questioning (a) the economic costs of taking climate action (4 out of 19 programs—21%) and (b) whether climate action would involve too much personal sacrifice (4 out of 19 programs—21%) were the most commonly mentioned in the mainstream sample. The two main discourses on right-wing channels were economic cost (6 out of 11 programs—55%) and questioning the need to take action when other countries such as China were not doing enough (6 out of 11 programs—55%), often described colloquially as “whataboutism” (see Fig. 2).

Additional discourses identified in previous studies of response skepticism were present in low numbers or not at all. For example, we did not find any mention on mainstream channels of a preference for adaptation to inevitable impacts rather than mitigation, or claims that taking action would mean giving too much power to governments. The impracticality of taking climate action, such action hitting low-income groups the hardest, and claims that enough was already being done were each mentioned only once. For right-wing media, all varieties of response skepticism were mentioned, but discourses aside from economic costs and “whataboutism” were discussed on only one or two occasions.

There were also country-level differences. In Sweden, on SVT1 and 2, although the focus was on physical science, the challenges of adaptation and the risk of conflict around insurance and the cost for loss and damage were also mentioned. In the UK mainstream samples, there were brief mentions of the economic cost of taking action, that too much personal sacrifice is needed (giving up flying or eating meat), and that policies harm low-income groups. By contrast, in the GBTV sample, response skepticism arguments were expressed with more frequency and at greater length. For example, in segments aired on 9 August 2021, the presenter states that he does not necessarily dispute that climate change is occurring; however, he expresses a range of response skepticism arguments, including doubts about the need



**Fig. 2 Types of response skepticism in mainstream and right-wing channels.** Mainstream channels in blue and right-wing channels in red.

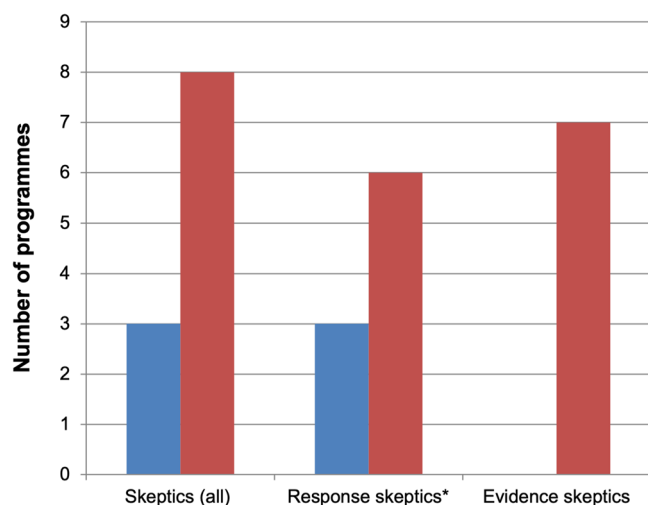
for the UK to take action when China has higher greenhouse gas emissions, the costs of taking action and that climate policies will disproportionately impact the poor (see: <https://www.youtube.com/watch?v=7kCyna3FlkQ>).

In Australia, the coverage of the then Prime Minister's policy speech meant that several examples of response skepticism were present on Channels 7 and 9. In that speech—popularly summarized as “technology not taxes”—Morrison's emphasis was on rejecting a “carbon tax” whilst promoting ‘technology breakthroughs’. This was in line with the Morrison government's Long-term Emissions Reduction Plan, which included diverse technologies like industrial-scale hydrogen, carbon capture and storage, and emerging technologies such as livestock feeds that aim to reduce methane emissions<sup>57</sup>. Mention was also made of the possible high economic and job costs of taking action, personal sacrifice, and ‘whataboutism’ by implying that China's and developing nations' emissions were the priority. The three sampled evening programs from Sky network illustrated diversity in their forms of skepticism, ranging from an attack on perceived alarmist rhetoric (criticizing a speech by the then New Zealand Prime Minister Jacinda Ardern) in one opinion program to a news broadcast that discussed policy responses while accepting the science. Again, a variety of response skepticism discourses were present.

In the US sample, both left and right-leaning outlets expressed response skepticism. However, the varieties found in left-leaning versus right-wing media were quite distinct. Left-leaning programs (on MSNBC) expressed doubt about both the appropriateness of particular measures included in current climate policy proposals (i.e., “directed skepticism”)—including whether they were sufficient to the scope and scale of the problem—as well as the inability to make policy happen due to partisanship and congressional gridlock. In contrast, right-wing programs (on Fox News) focused on the general lifestyle impediments that implementation of any climate policy would mean to Americans, such as loss of individual liberties (e.g., having to stop flying or eating meat). Taking climate action was also equated with Marxism, and parallels were drawn between

manufacturing fear of COVID with manufacturing fear of a climate disaster and using legislative measures implemented for the COVID crisis to covertly implement measures to address climate change. On ABC and NBC, there was no expression of either evidence or response skepticism. In Brazil, there was little evidence of any type of skeptical discourse, due mainly to the lack of airtime given to the report, except for two examples of “directed response skepticism” on O Globo where a Brazilian scientist and IPCC author criticized the government for its inadequate policies on green energy (and deforestation); and on SBT, the news reporter criticized governments and the public for not giving recycling policies enough attention as an important action to tackle climate change.

**Presence of skeptics on air.** Climate skeptical voices (explicitly expressing general response skepticism) were present on screen in only two of the mainstream programs. Both instances were of former Australian Prime Minister Morrison (on Channels 7 and 9), whose climate change mitigation policies illustrated response skepticism rather than climate science or evidence skepticism. His government focused on emissions reduction but avoided the need for new policies, and has persisted with fossil fuel energy sources despite expert advice highlighting the insufficiency of current emissions reduction policies<sup>58</sup>. In contrast, in the right-wing programs, evidence and response skepticism were expressed in 8 of 11 programs (73%) (see Fig. 3). Those expressing evidence skepticism were present on air in seven of these programs, and those expressing response skepticism were present in six programs. In most cases, it was the anchor or reporter who voiced skeptical discourses and not invited guests. Skeptical views were expressed by guests in only two programs in our sample, both of them on Fox News. In one program, this included evidence skepticism (questioning the role of climate change in extreme weather events) and response skepticism (suggesting taking action will hurt US competitiveness). In the other program, evidence skepticism was expressed.



**Fig. 3** Presence of skeptics on air in mainstream and right-wing channels.

Mainstream channels in blue and right-wing channels in red. \*Response skeptics here include only those expressing general response skepticism, and not directed response skepticism.

Measuring the mere presence of skeptical voices is only partially helpful. The ways they are contextualized are central to a fuller interpretation, and in particular, the degree to which their views are representative of mainstream science about climate change<sup>24</sup>. We found that in our sample from right-wing channels, only one included some brief context: the Fox News report described one of its guests as “having a minority view,” although he was given by far the most airtime.

**The presence of skepticism relative to other frames.** Figure 4 shows the presence of evidence and response skepticism compared to eight other discourses promulgated by the IPCC and other UN agencies (see Table 2). As can be seen, evidence and response skepticism were the two most common discourses found on right-wing channels, followed by the stark warning (“code red”) from the UN highlighting the need for urgent action, and the IPCC’s extreme weather statement that “human influence is making extreme climate events, including heat waves, heavy rainfall, and droughts, more frequent and severe.” In sharp contrast, for the mainstream channels, the two types of skepticism were among the least present, even as response skepticism was present in 10 of the 19 programs (53%), albeit usually in the sense of “directed skepticism.” The two most common discourses were “stark warning” (18 out of 19 programs—95%) and the IPCC discourse that climate change is happening now in many parts of the world and/or is irreversible (100%). The mainstream channels followed the main discourses of the IPCC report much more closely than the right-wing channels. The certainty discourse (i.e., phrases such as “It is indisputable that human activities are causing climate change” or “the IPCC is virtually certain about the key findings”) was much more present in these channels, as were the reasons for hope and the opportunity discourses.

## Discussion

These results suggest that evidence skepticism has virtually disappeared from mainstream channels, but there are still strong elements of it in our sample of right-wing channels in four of the five countries. Much of this consisted of impact skepticism, rather than a trend or attribution skepticism. In other words, evidence skepticism on right-wing channels tended not so much to dispute the reality of climate change, but to suggest that “the climate

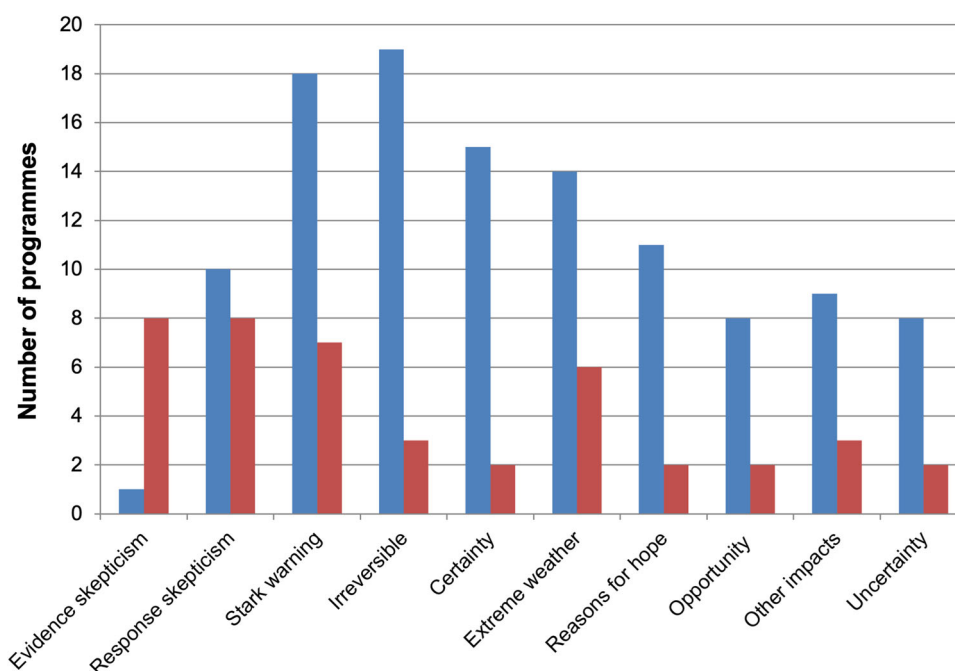
movement”—including scientists, environmentalists, politicians, and the mainstream media—were propagating an alarmist discourse. For example, SwebbTV in Sweden often focused their criticism on the mainstream media’s “scare propaganda,” rather than the science itself—a form of “process skepticism” mentioned above.

On mainstream channels, the presence of climate change skepticism or skeptics and general contestation around the IPCC’s WGI report was much less present in our sample than in the coverage of previous IPCC reports<sup>26,29</sup>. For example, previous research<sup>26</sup> found that the coverage of the IPCC’s WGI AR5 report on UK and US television was “contested and politicised” (p. 380), and that in the UK coverage, the Unsettled Science frame (i.e., questioning climate science or solutions prompted by the science) was “common” (p. 381). Our study suggests a noticeable shift away from the presence of evidence skepticism on mainstream channels’ coverage of the AR5 compared to the coverage of the AR6, at least in the Anglosphere countries of the UK, USA, and Australia. Moreover, other research<sup>29</sup> found a strong presence of skeptics on air in the UK and Australian coverage of the WGI report, but in our study, there were no evidence skeptics present in the UK mainstream coverage; and in the Australian coverage, it was a policy skeptic rather than an evidence skeptic. The absence of evidence skeptics and skepticism in the ABC and BBC coverage is due mainly to a change in company policy whereby the presence of evidence skeptics is largely to be avoided or reduced (see Supplementary Notes). In the USA, there is a sharp distinction between Fox and other channels, which is both a reflection and cause of increasing polarization in both news treatments and consumption of climate change news<sup>59–61</sup>.

In Sweden, a country not previously known for climate skepticism, there is evidence of forms of science and response skepticism across our sample and beyond it (for example, on the commercial channels TV4’s Nyhetsmorgon on August 13). However, the skepticism of the IPCC report that was expressed on SVT was voiced by climate scientists saying that the latest science proved a worse situation than in the report, while the skepticism on SwebbTV was downplaying the seriousness of climate change. This is in line with research showing that climate change has become an increasingly polarizing issue in Sweden<sup>62</sup>. In Brazil, another country not known in the past for different forms of climate skepticism, our sample suggests that most forms of skepticism, except for directed response skepticism, continue to be absent from television climate coverage there, at least as evidenced by the coverage of the IPCC report. However, as stated earlier, this may be explained by the scant coverage of the report, whereas a wider sample of climate coverage may well have shown the presence of some skeptics on Brazilian television.

As we have seen in our study, when evidence skepticism was present in mainstream media, it was usually in a mild form measured either by volume, strength of argumentation, or specific framing. However, more importantly, forms of response skepticism are present in a wider range of countries and media outlets than previous research has shown for evidence skepticism. Response skepticism is present in some of the coverage by mainstream channels, and not only the right-wing ones. Versions of it were found in coverage in the UK by the BBC, ITV, and Channel 4; in Sweden on SVT; in Australia on Channel 7 and 9; in Brazil on O Globo and SBT; and in the USA on MSNBC. In one case (SVT), criticism was directed at government policies in general for not being forceful enough. But in most cases, the examples of response skepticism were “directed,” where country-specific economic, social and political obstacles to enacting national climate policies were raised, rather than where climate action in general was dismissed or questioned. In contrast, there was more non-specific response skepticism on right-wing





**Fig. 4 Relative presence of discourses in mainstream and right-wing channels.** Mainstream channels in blue and right-wing channels in red.

channels such as a presenter on GBTV arguing that “whatever we do here [in the UK], it is China that needs to do far more than us,” or a contributor on Fox News suggesting that ‘only being able to fly when it is morally justifiable’ would lead to people having to entirely change their lifestyles.

The finding that many right-wing channels included evidence skepticism confirms a continuation of the trend whereby different forms of skepticism have been much more prevalent in right-wing than left-wing news outlets. Our (limited) sample suggests that they now combine evidence and response skepticism in roughly equal amounts (see Fig. 1). For example, Fox News continued its historical record of skepticism<sup>38,47,63</sup> by criticizing the report and hosting evidence skeptics, but they also included a wide range of examples of response skepticism (such as the infringement on civil liberties by taking climate action). On Sky News in Australia, there were examples of climate science impact skepticism and a range of examples of response skepticism. And on GBTV, one host expressed the view that the IPCC was over-alarmist and stressed the impracticality of taking action. Given the relatively narrow size of our sample and the absence of detailed, comparative data from the past breaking down the types of skepticism, it is hard to reach a definitive answer as to whether right-wing television channels in general have shifted to include more response skepticism in their coverage, but our results are in line with the findings from other research<sup>5,45</sup>. Nor is it possible to ascertain the extent to which our findings were driven by the nature of the IPCC report (based mainly on climate science or evidence but with some policy implications—see Table 2). However, research on the coverage of the Green New Deal (GND, i.e., a policy initiative) on Fox and CNN suggests that in both US media, skepticism of the GND was higher than skepticism of the science of climate change (although the latter was still present), and criticism of the GND was much more common on the right-wing channel, Fox<sup>59</sup>. This finding and our results would suggest that the balance between evidence and response skepticism is related to the type of climate topic the media are covering.

It is of note that right-wing media in four countries (Australia, Sweden, UK and USA) are combining evidence and response skepticism, while mainstream channels in three countries

(Australia, UK and USA) are moving away from evidence skepticism. This is occurring despite national differences in media and political contexts.

By focusing on the nature of response skepticism across a broad range of television channels, we are also able to show the multiple ways it appears on a popular, but little studied, media platform. Although the high cost of taking action and “whataboutism” were the most common, a wide variety of arguments was present. These different discourses are not dissimilar to those found in the classifications or taxonomies of response skepticism or obstructionism found in public statements by organized contrarian groups<sup>9,64</sup>, although an element of caution should be expressed as our coding of the different discourses was in part drawn deductively from this literature. It is also worth highlighting that Fox News unexpectedly displayed a relative absence of coverage. This finding is supported by other research<sup>63</sup>, which suggests that other right-wing media outlets in the USA were unusually quiet on the report. Qualitative (interview) work would be needed to corroborate whether this “denialism by silence” was an intentional editorial policy. Likewise, in Brazil, the reduced coverage might be explained not by a deliberate policy of downplaying the IPCC report but by the pressing newsworthiness of another story, in this case, the Brazilian Parliamentary Commission of Inquiry into alleged corruption surrounding COVID policies taking place in the same week as the report. All the primetime programs we analyzed spent much of their airtime covering the story about the corruption accusations against the former President Bolsonaro and his allies.

It is important not to overstate the significance of our findings for their potential or real impact on the general public. The audience for some of the right-wing channels we monitored is not substantial, or considerably lower than mainstream channels (see Supplementary Notes). GBTV attracts around 100,000 viewers for the Nigel Farage show, SwebbTV between 10,000 and 20,000 viewers on its own platform. In contrast, the three mainstream channels in the UK have audiences of between one and four million for their nightly news programs and the mainstream channels in Sweden have between 500,000 and one million. Fox News is the most-watched cable news network in the

US, and delivered an average primetime audience of 2.5 million viewers in November 2020, consisting mostly of audience segments already sympathetic to its editorial line (see Supplementary Notes). These figures, while still large, are considerably smaller than the average audience for network television during the evening news timeslot: 7.6 million for ABC and 6.5 million for NBC in 2020. Likewise, the cable TV station Sky News has a small share of the Australian audience compared to the main commercial and public service stations.

More broadly, our results need to be contextualized within a general shift in the media coverage of climate change from debating climate science to discussing climate policies. Recent research has identified a move away in the media across several countries from the science toward a debate about appropriate policies and societal implications<sup>45</sup>, more emphasis on sustainable futures and empowering solutions rather than apocalyptic visions<sup>65</sup>, and in UK editorials from skepticism about climate science to questioning the cost of action<sup>66</sup>. This shifting media context calls for more nuance in future media analysis, which incorporates (i) more definitional clarity of the terms surrounding obstructionism and their operationalization for content analysis<sup>67</sup>, (ii) more detailed methods to assess “legitimate” policy discussion as opposed to false claims from organized skeptical groups promoting response skepticism, (iii) attention to how the latter may be framed differently to previous types of skepticism, and (iv) attention to how any shift in skeptic argumentation is dependent on a range of contextual peculiarities including changing media landscapes and editorial priorities, the presence of organized skepticism, and wider political changes<sup>34</sup>. Much work has focused on the USA, but less is known about other countries.

If the trend toward more response skepticism being present across all types of media outlets continues, it represents an important new challenge to climate action, and requires new research in order to chart its presence and formulate effective, evidence-based responses. As others have argued<sup>9</sup>, a level of specificity is needed to be able to counter the range of policy-skeptic arguments. A complementary analysis with a wider sample of media outlets over a longer period including a variety of popular and fringe media outlets, and social media platforms, is also necessary and urgent. Television news programs, while important for reaching large publics, are restricted in their range of options for climate stories by the ephemeral and event-based nature of the editorial drivers, and by the time constraints on their reports compared to online news coverage, and responses on Twitter, Facebook and others, which often enjoy a longer duration of attention.

In all five countries we selected, the political context alone over the next few years will entail growing media coverage of climate solutions, especially Net Zero policies<sup>68</sup>. In the UK, in early 2022, the Net Zero Scrutiny Group, a small group of right-wing politicians, emerged with an active presence in the right-wing media, putting forward the argument that they do not deny the science or the need to decarbonize, but question the economic and social costs falling unevenly on lower-income groups. In the US, the Heartland Institute has focused its attacks on President Biden’s climate policies as causing higher fuel and food prices and fewer jobs. Australian conservative politicians regularly raise the issue of jobs and costs for individuals to sway the public against taking action.

Within this context, more research is needed to identify the presence and taxonomies in the media of counter-arguments such as the (lower) costs of action versus the high costs of inaction, the health co-benefits, the transformative potential for tackling inequity, improved energy security, green job creation, more efficient and cleaner transport, and new technologies—and how strongly these rebuttals to response skepticism are voiced, and by

whom. Complementary audience and focus group work are also needed to assess how such arguments and counter-arguments are received by different audiences with different values in different countries and media contexts. “Prebunking” may also help prepare audiences to critically assess misleading claims when exposed to them<sup>69</sup>. Understanding, monitoring, and responding to changing forms of climate skepticism remain a pressing priority for research and action.

## Methods

We took account of the various methods and concepts scholars have used to measure the political identity of media outlets (e.g., story treatments, editorials and opinion pieces, ownership, support for governments or political parties/individuals, support for policy options, viewership/readership profiles, newsroom ideologies), particularly across different countries<sup>38,54,55,70–72</sup>. Labeling is not straightforward: a channel can be seen as “center-left” or “left-wing” because the general media landscape is biased toward the right; or a media outlet, such as Globo TV in Brazil, can be left-wing or progressive on social issues or the environment, but conservative on economic issues or opposition to left-wing political parties. We recognize our labels are approximations. For Australia, the three channels we classified as mainstream were ABC1 Sydney, Channel 7 Sydney, and Channel 9 Sydney; for Brazil, Globo, Record, and SBT; for Sweden, SVT1, SVT2 and TV4; for the UK, BBC1, ITV and Channel 4; and for the USA, ABC, NBC and MSNBC (see Table 1). In most cases, their reach and trust levels were very high compared to other media brands. These are described in detail in the Supplementary Notes, as is their general climate coverage.

Next, one “right-wing” channel was chosen for each country applying the criteria of one or some of the following: the presence on air of regular right-wing commentators, ownership by a known right-wing figure or organization, evidence for consistent support for a particular right-wing party, policy or president, or a right-wing composition to the channel’s audience. The reasons for our choice of the five channels as “right-wing” can be found in the Supplementary Notes. The nature of these right-wing channels, and their platforms, vary from country to country due to the differing media environments and variety of platforms, and so span a range where they could be placed along the spectrum of right-wing leanings. The case of Brazil was complex, due to there being three major channels that offer strong support for the former right-wing President, Jair Bolsonaro (namely, SBT, Rede TV! and Record). However, we chose Rede TV! as our example of a right-wing station due to the presence of a right-wing climate science skeptic who hosts a regular opinion program.

We collected programs in all five countries on the day before the release of the IPCC report (August 8, 2021), the day of the release (August 9), and the day after (August 10). Several channels did not have any coverage on August 8 or 10. There were some examples of very brief mentions of the report on August 8, but we excluded these for being less than a minute. As far as we are aware, few programs included much coverage of the IPCC report outside of these three dates. The exception was three programs in Sweden on August 11, 13 and 23.

The full USA sample size for the three dates was 27 programs across the four channels, equivalent to more than 20 h of programming. However, of these 27 programs, only 7 included coverage of the report (MSNBC: 3 out of 7 shows; NBC and ABC, one of three shows each; Fox News 2 out of 14 shows), which were the seven we analyzed. In the UK, we examined 9 evening news programs on BBC, ITV, and C4, of which only 3 included coverage. In Brazil, we looked initially at 21 programs on 7 channels, but these were reduced to 12 programs on 4 channels of which 4 had coverage; and in Sweden, 9 programs of which 4 were analyzed. So, for these four countries, we looked at 66 programs on the main linear or cable channels (a rough estimate would be 50 h of program content), before selecting those which were substantively about the IPCC (at least a minute of coverage). The method was slightly different for Australia due to the city-based nature of the media, and the data collection tool chosen (Meltwater). Here, we chose three Sydney-based channels (as having the largest population) where there was coverage of the report on the same three days, but we did not include all mention of the reports on those channels, just those which mentioned the IPCC during the programs near or during the peak evening viewing. Sky news was monitored separately, and only those programs which mentioned the report were included. For GBTV, we used relevant keywords via YouTube search to uncover relevant clips from that time period as GBTV programs are not archived or accessible in the database we used for the mainstream channels. For SwabbTV, we looked at the programs that were explicitly about climate change on its website, as well as viewing all regular news shows including those that covered climate.

Some were news-based programs, while others combined news and opinion. In most cases, we chose programs broadcast at popular viewing times such as evening news shows that command large audiences. For example, BBC News at Ten regularly has audiences of around 4 million, and is the second most-watched news bulletin on UK television after BBC News at Six; Jornal Nacional has the largest nightly audience of any station in Brazil at around 17 million in 2021, while Channel 7, Channel 9 and ABC News together command nearly 80% of the free-to-air television market in Australia.

We based our analysis on watching the broadcasts of the relevant programs, supported by transcripts if available. The codebook was divided into two introductory sections (A and B), then the three main areas of assessment mentioned above: the forms of contestation, the presence on air of skeptics (by type and sector), and the relative presence of contestation compared to other prominent discourses. It contained 44 binary variables (other than the formal variables giving details of each of the programs monitored). In part C, the areas of contestation and discourses of delay were based deductively on the typologies of climate delay discourses found in the literature discussed in the “Introduction” section, and particularly in Figure 1 found in refs. <sup>9</sup> and <sup>19</sup>, and then inductively on an initial assessment of the presence of different arguments found in our sample. These are found in Table 3.

In part D, in addition to the presence of skeptics, we assessed whether the mention of skeptical thinking or their inclusion was sufficiently contextualized, for example, by saying that these views were not representative of the global scientific consensus.

In part E, following the method used by previous studies<sup>7</sup>, the other discourses were based deductively on the key IPCC official “messages,” and then amended inductively based on a preliminary assessment of some of the programs. The term “messages” is not used as a value-laden term implying normative action, but in the sense of essential information for a journalist, policy maker or wider audience. The sources for these messages were (a) the official IPCC press release<sup>73</sup>, (b) the main messages highlighted in the prepared statement by the IPCC chair Hoe-Sung Lee at the press conference on August 9, and (c) the headline statements from the SPM<sup>42</sup>. In some cases, these messages are approximations rather than verbatim reproductions. The ten discourses assessed are found in Table 2.

Discourses 2, 3, 4, 5, and 7 were based closely on the IPCC official key messaging. Discourse 1 was based on the message from UN secretary-general, Antonio Guterres<sup>74</sup>. Discourse 6 about uncertainty was not highlighted in the key messaging, but was present in much of the SPM. It was included as this has been picked out by skeptical responses to IPCC reports in the past. Although WGI reports do not include discussions about policy opportunities (discourse 8), we wanted to assess the presence of such discourses given the debate in the communication literature about the advantages of including more hopeful messaging<sup>75</sup>. Examples of the phrases evidencing these discourses during the television coverage can be found in the codebook in the Supplementary Methods.

Eight coders (three for USA, two for the UK, and one each for the other three countries) were used to test the coding of the programs. Two rounds of pilot coding tests by all eight coders took place in order to reconcile any misunderstandings or disagreements between the coders. The codebook was amended at each stage to improve clarity and achieve more coder consistency. One program was then coded by the eight coders to check acceptable results for coder reliability. The website <http://dfreelon.org/utlis/recalfront/recal3/> was used. According to both Fleiss' Kappa and Krippendorff's Alpha, the overall score for the reliability test was 0.878 overall (and 95% for Kappa's pairwise), which is regarded as well over the acceptable levels for coder reliability. However, there were two variables (of the 44 where there was a binary option) that showed substantial disagreement. The first was variable 13 on the presence of general response skepticism and variable 13d on personal sacrifice (see Codebook in Supplementary Methods), which both scored <0.5 according to Fleiss' Kappa. In both cases, the text of the codebook was discussed, clarified and re-written to ensure more consistency in the coding on these two variables.

Despite these high scores for coder reliability, different country interpretations of some of the variables may have affected our results. Other limitations were that we assessed only the presence of the various discourses, and not their dominance or salience<sup>30</sup>. Also, an assessment of the images shown during the coverage of the IPCC report would have given a complete picture of how the dominant discourses were presented, but budgets and the limits on the length of articles submitted to journals did not allow for their inclusion. Computational methods assessing a greater number of program scripts in more countries could have given a wider sample on which to base our findings. However, such methods would not match the level of detail captured by the manual coding.

## Data availability

The data sets providing the basis for Figs. 1–4 (i.e., number of articles for each category along x-axis) can be found at [https://figshare.com/articles/dataset/Global\\_mainstream\\_television\\_coverage\\_of\\_IPCC\\_2021\\_report/21552780](https://figshare.com/articles/dataset/Global_mainstream_television_coverage_of_IPCC_2021_report/21552780).

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## References

- McCright, A. M. & Dunlap, R. E. Defeating Kyoto: the conservative movement's impact on US climate change policy. *Soc. Probl.* **50**, 348–373 (2003).
- Oreskes, N. & Conway, E. M. *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* (Bloomsbury Publishing, 2011).
- Poortinga, W., Spence, A., Whitmarsh, L., Capstick, S. & Pidgeon, N. F. Uncertain climate: an investigation into public scepticism about anthropogenic climate change. *Glob. Environ. Change* **21**, 1015–1024 (2011).
- Rahmstorf, S. *The Climate Sceptics* (Munich Re, 2005).
- Schmid-Petri, H., Adam, S., Schmucki, I. & Häussler, T. A changing climate of skepticism: the factors shaping climate change coverage in the US press. *Public Underst. Sci.* **26**, 498–513 (2015).
- Van Rensburg, W. Climate change scepticism: a conceptual re-evaluation. *SAGE Open*, **5**; <https://doi.org/10.1177/2158244015579723> (2015).
- Sanford, M. et al. Controversy around climate change reports: a case study of Twitter responses to the 2019 IPCC report on land. *Clim. Change* **167**, 59 (2021).
- Howarth, C. C. & Sharman, A. G. Labeling opinions in the climate debate: a critical review. *WIREs Clim. Change* **6**, 239–254 (2015).
- Coan, T. G., Boussalis, C., Cook, J. & Nanko, M. O. Computer-assisted classification of contrarian claims about climate change. *Sci. Rep.* **11**, 1–12 (2021).
- O'Neill, S. J. & Boykoff, M. T. Climate denier, skeptic, or contrarian? *Proc. Natl. Acad. Sci. USA* **107**, 151152–E151151 (2010).
- Boykoff, M., & Farrell, J. Climate change countermovement organizations and media attention in the United States. In *Climate Change Denial and Public Relations: Strategic Communication and Interest Groups in Climate Inaction* (eds Almiron, N. & Xifra, J.) 121–139 (Routledge, 2019).
- Busch, T. & Judick, L. Climate change—that is not real! A comparative analysis of climate-sceptic think tanks in the USA and Germany. *Clim. Change* **164**, 18 (2021).
- Dunlap, R., & McCright, A. Organized climate change denial. In *The Oxford Handbook of Climate Change and Society* (eds Dryzek, J.S., Norgaard, R.B. & Schlossberg, D.) 144–160 (Oxford University Press, 2011).
- Boussalis, C. & Coan, T. G. Text-mining the signals of climate change doubt. *Glob. Environ. Change* **36**, 89–100 (2016).
- Brulle, R. J. Institutionalizing delay: Foundation funding and the creation of us climate change counter-movement organizations. *Clim. Change* **122**, 681–694 (2014).
- Farrell, J. Corporate funding and ideological polarization about climate change. *Proc. Natl. Acad. Sci. USA* **113**, 92–97 (2016).
- Brulle, R. J. Advocating inaction: a historical analysis of the Global Climate Coalition. *Env. Polit.* <https://doi.org/10.1080/09644016.2022.2058815> (2022).
- Bonds, E. Beyond denialism: think tank approaches to climate change. *Sociol. Compass* **10**, 306–317 (2016).
- Lamb, W. et al. Discourses of climate delay. *Glob. Sustain.* **3**, e17 (2020).
- Sapinski, J. P. Climate capitalism and the global corporate elite network. *Environ. Sociol.* **1**, 268–279 (2015).
- Wetters, R. Models and morals: elite-oriented and value-neutral discourse dominates American organizations' framings of climate change. *Soc. Forces* **98**, 1339–1369 (2020).
- Brulle, R. J., Hall, G., Loy, L. & Schell-Smith, K. Obstructing action: foundation funding and US climate change counter-movement organizations. *Clim. Change* **166**, 17 (2021).
- McAllister, L. et al. Balance as bias, resolute on the retreat? Updates & analyses of newspaper coverage in the United States, United Kingdom, New Zealand, Australia and Canada over the past 15 years. *Environ. Res. Lett.* **16**, 094008 (2021).
- Brüggemann, M. & Engesser, S. Beyond false balance: how interpretive journalism shapes media coverage of climate change. *Glob. Environ. Change* **42**, 58–67 (2017).
- O'Neill, S. & Pidcock, R. Climate change communication and the IPCC. *Clim. Change* **169**, 19 (2021).
- O'Neill, S., Williams, H. T. P., Kurz, T., Wiersma, B. & Boykoff, M. Dominant frames in legacy and social media coverage of the IPCC Fifth Assessment Report. *Nat. Clim. Change* **5**, 380–385 (2015).
- Bjurström, A. & Polk, M. Physical and economic bias in climate change research: a scientometric study of IPCC Third Assessment Report. *Clim. Change* **108**, 1–22 (2011).
- Schäfer, M. S. & Painter, J. Climate journalism in a changing media ecosystem: assessing the production of climate change-related news around the world. *WIREs Clim. Change* **12**, e675 (2021).
- Painter, J. *Disaster Averted? Television Coverage of the 2013/14 IPCC's Climate Change Reports* <https://reutersinstitute.politics.ox.ac.uk/our-research/disaster-averted-television-coverage-201314-ipccs-climate-change-reports> (Reuters Institute for the Study of Journalism, 2014).
- Painter, J. *Climate Change in the Media: Reporting Risk and Uncertainty* (Tauris, 2013).
- Antilla, L. Climate of scepticism: US newspaper coverage of the science of climate change. *Glob. Environ. Change* **15**, 338–352 (2005).
- Boykoff, M. T. & Boykoff, J. M. Balance as bias: global warming and the US prestige press. *Glob. Environ. Change* **14**, 125–136 (2004).
- Oreskes, N. The scientific consensus on climate change. *Science* **306**, 1686–1686 (2004).



34. Painter, J. Journalistic depictions of uncertainty about climate change. In *Oxford Research Encyclopedia of Climate Science* (eds Nisbet, M. C., Ho, S. S., Markowitz, E., O'Neill, S., Schäfer, M. S. & Thaker, J.) (Oxford University Press, 2016).
35. Painter, J. & Ashe, T. Cross-national comparison of the presence of climate scepticism in the print media in six countries, 2007–10. *Environ. Res. Lett.* **7**, 044005 (2012).
36. Carvalho, A. Ideological cultures and media discourses on scientific knowledge: re-reading news on climate change. *Public Underst. Sci.* **16**, 223–243 (2007).
37. Elsasser, S. W. & Dunlap, R. E. Leading voices in the denier choir: conservative columnists' dismissal of global warming and denigration of climate science. *Am. Behav. Sci.* **57**, 754–776 (2013).
38. Feldman, L., Maibach, E. W., Roser-Renouf, C. & Leiserowitz, A. Climate on cable: the nature and impact of global warming coverage on Fox News, CNN, and MSNBC. *Int. J. Press Polit.* **17**, 3–31 (2012).
39. Petersen, A. M., Vincent, E. M. & Westerling, A. L. Discrepancy in scientific authority and media visibility of climate change scientists and contrarians. *Nat. Commun.* **10**, 1–14 (2019).
40. Wetts, R. In climate news, statements from large businesses and opponents of climate action receive heightened visibility. *Proc. Natl. Acad. Sci. USA* **117**, 19054–19060 (2020).
41. IPCC. *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the sixth assessment report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2021).
42. IPCC. *Summary for Policymakers in Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* 1–39 (Cambridge University Press, 2022).
43. Comfort, S. E. & Park, Y. E. On the field of environmental communication: a systematic review of the peer-reviewed literature. *Environ. Comm.* **12**, 862–875 (2018).
44. Newman, N., Fletcher, R., Schulz, A., Andi, S. & Nielsen, R. K. *Reuters Institute Digital News Report 2020*. [https://reutersinstitute.politics.ox.ac.uk/sites/default/files/2020-06/DNR\\_2020\\_FINAL.pdf](https://reutersinstitute.politics.ox.ac.uk/sites/default/files/2020-06/DNR_2020_FINAL.pdf) (Reuters Institute for the Study of Journalism, 2020).
45. Painter, J. & Schäfer, M. S. Global similarities and persistent differences: a survey of comparative studies on climate change communication. In *Climate Change and the Media* (eds Brevini, B. & Lewis, J.) 39–58 (Peter Lang, 2018).
46. Holmes, D., & Star, C. Climate change communication in Australia: the politics, mainstream media and fossil fuel industry nexus. In *Handbook of Climate Change Communication: Vol. 1. Climate Change Management* (eds Leal Filho, W., Manolas, E., Azul, A., Azeiteiro, U. & McGhie, H.) 151–170 (Springer, 2018).
47. Painter, J. *Poles Apart: The International Reporting on Climate Scepticism* (Reuters Institute for the Study of Journalism, 2011).
48. Ferrante, L. & Fearnside, P. M. Brazil's new president and 'ruralists' threaten Amazonia's environment, traditional peoples and the global climate. *Environ. Conserv.* **46**, 261–263 (2019).
49. Miguel, J. C. H. A. “meada” do negacionismo climático e o impedimento da governamentalização ambiental no Brasil. *Sociedade E Estado* **37**, 293–315 (2022).
50. Rydgren, J. & van der Meiden, S. The radical right and the end of Swedish exceptionalism. *Eur. Political Sci.* **18**, 439–455 (2019).
51. Hultman, M., Björk, A., & Viinikka, T. Far-right and climate change denial. Denouncing environmental challenges via anti-establishment rhetoric, marketing of doubts, industrial/breadwinner masculinities, enactments and ethno-nationalism. In *The Far Right and the Environment* (ed. Forchtner, B.) 122–136 (Routledge, 2019).
52. Holt, K. Alternative media and the notion of anti-systemness: towards an analytical framework. *Media Commun.* **6**, 49 (2018).
53. Vowles, K. & Hultman, M. Scare-quoting climate: the rapid rise of climate denial in the Swedish far-right media ecosystem. *Nord. J. Media Stud.* **3**, 79–95 (2021).
54. Fletcher, R., Cornia, A. & Nielsen, R. K. How polarized are online and offline news audiences? A comparative analysis of twelve countries. *Int. J. Press Polit.* **25**, 169–195 (2020).
55. Feldman, L., Hart, P. S. & Milosevic, T. Climate change. *Public Underst. Sci.* **26**, 481–497 (2017).
56. Bedford, D. & Cook, J. *Climate Change: Examining the Facts* (ABC-CLIO, 2016).
57. Australian Government. *Australia's Long-term Emissions Reduction Plan: A Whole-of-Economy Plan to Achieve Net Zero Emissions by 2050* (Department of Industry, Science, Energy and Resources, 2021).
58. Crowley, K. Fighting the future: the politics of climate policy failure in Australia (2015–2020). *WIREs Clim. Change* **12**, e725 (2021).
59. Bhatti, S., Jones, B., Uppalapati, S. S. & Kristiansen, S. Major media outlets and climate change action: comparing US media coverage of the green new deal. *Environ. Commun.* <https://doi.org/10.1080/17524032.2021.1995457> (2021).
60. Chinn, S., Sol Hart, P. & Soroka, S. Politicization and polarization in climate change news content, 1985–2017. *Sci. Commun.* **42**, 112–129 (2020).
61. Tandoc, E. C. Jr, Takahashi, B. & Thomas, R. J. Bias vs bias. *Journal. Pract.* **12**, 834–849 (2018).
62. Rönnerstrand, B. Därför är personer till höger mindre oroad för klimatet. In *Du sköra nya värld* (eds Andersson, U., Oscarsson, H., Rönnerstrand, B., & Theorin, N.) 263–273 (Göteborgs universitet: SOM-institutet, 2022).
63. MacDonald, T. Right-wing media have been uncharacteristically quiet on the IPCC report. *Media Matters* <https://www.mediamatters.org/fox-news/right-wing-media-have-been-uncharacteristically-quiet-ippc-report> (2021).
64. McKie, R. E. Climate change counter movement neutralization techniques: a typology to examine the climate change counter movement. *Sociol. Inq.* **89**, 288–316 (2019).
65. Guenther, L., Brüggemann, M. & Elkobros, S. From global doom to sustainable solutions: international news magazines' multimodal framing of our future with climate change. *Journal. Stud.* **23**, 131–148 (2022).
66. Gabbatiss, J., Hayes, S., Goodman, J. & Prater T. Analysis: how UK newspapers changed their minds about climate change. *Carbon Brief*. <https://interactive.carbonbrief.org/how-uk-newspapers-changed-minds-climate-change> (2022).
67. Almiron, N. & Moreno, J. A. Beyond climate change denialism: conceptual challenges in communicating climate action obstruction. *Ámbitos Rev. Intl. Comun.* **55**, 9–23 (2022).
68. Fankhauser, S. et al. The meaning of net zero and how to get it right. *Nat. Clim. Change* **12**, 15–21 (2022).
69. Lewandowsky, S. & van der Linden, S. Countering misinformation and fake news through inoculation and prebunking. *Eur. Rev. Soc. Psychol.* **32**, 348–384 (2021).
70. Hassell, H. J. G., Miles, M. R., & Reuning, K. Does the ideology of the newsroom affect the provision of media slant? *Polit. Commun.* <https://doi.org/10.1080/10584609.2021.1986613> (2021).
71. Gentzkow, M. & Shapiro, J. M. What drives media slant? Evidence from U.S. daily newspapers. *Econometrica* **78**, 35–71 (2010).
72. Rydgren, J. The radical right: an introduction. In *The Oxford Handbook of the Radical Right* (ed. Rydgren, J.) 1–16; <https://doi.org/10.1093/oxfordhb/9780190274559.013.1> (Oxford University Press, 2018).
73. IPCC. *Climate Change Widespread, Rapid, and Intensifying – IPCC* (Press release) [https://www.ipcc.ch/site/assets/uploads/2021/08/IPCC\\_WGI-AR6-Press-Release\\_en.pdf](https://www.ipcc.ch/site/assets/uploads/2021/08/IPCC_WGI-AR6-Press-Release_en.pdf) (2021).
74. UN. Secretary-General's statement on the IPCC Working Group 1 Report on the Physical Science Basis of the Sixth Assessment. 9 August; <https://www.un.org/sg/en/content/secretary-generals-statement-the-ippc-working-group-1-report-the-physical-science-basis-of-the-sixth-assessment> (2021).
75. Ettinger, J. et al. Climate of hope or doom and gloom? Testing the climate change hope vs. fear communications debate through online videos. *Clim. Change* **164**, 19 (2021).

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## Author contributions

J. Painter: conceptualization; project administration; resources; data collection; visualization; writing—original draft. J.E.: conceptualization, visualization, coding, writing—original draft. D.H.: conceptualization; data collection. L.L.: conceptualization; data collection and coding, writing—original draft. J. Pinto: conceptualization, data collection and coding, writing—original draft. L.R.: conceptualization, data collection and coding, writing—original draft. L.T.-W.: conceptualization. K.V.: conceptualization, data collection and coding, writing—original draft. R.W.: conceptualization; project administration; data collection and coding; writing—original draft. All authors were involved in writing—review and editing.

## Competing interests

J. Painter has worked for the Intergovernmental Panel on Climate Change (IPCC) as an external consultant. All other authors declare no competing interests.

## Additional information

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