The Appeasement Effect of a UN Climate Summit on the German Public

- Final accepted manuscript-

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Keywords:

climate change, media event, media effects, knowledge gains, Paris climate summit

Statement of individual contributions to the paper:

MB and FDSS wrote and revised the paper with inputs and feedback from all co-authors; all authors contributed to the design of the study; FDSS and IH conducted the data analyses and compiled the presentation of the data, supported by DA and JS.

Statement of interest:

The authors declare no conflict of interests.

The Appeasement Effect of a UN Climate Summit on the German Public

The annual UN climate summits receive intense global media coverage[1–3], and as such could engage local publics around the world, stimulate debate and knowledge about climate politics, and, ultimately, mobilize people to combat climate change. Here we show that, in contrast to these hopes, although the German public were exposed to news about the 2015 Paris summit, they did not engage with it in a more active way. Comparing knowledge and attitudes before, during and after the summit using a three-wave online panel survey (quota sample, N = 1121), we find that respondents learnt a few basic facts about the conference but they continue to lack basic background knowledge about climate policy. Trust in global climate policy increased a little, but citizens were less inclined to support a leading role for Germany in climate politics. Moreover, they were not more likely to engage personally in climate protection. These results suggest that this global media event had a modest appeasing rather than mobilizing effect.

The 21st COP (Conference of the Parties of the United Nations Framework Convention on Climate Change) held in Paris from 30th November to 12th December 2015 drew substantial coverage from newspapers around the world that was only topped by the media attention paid to the epic failure of the climate summit in Copenhagen in 2009[4–6]. Intense media coverage of the Paris summit could be expected, as it was the biggest COP ever, with more than 30,000 official participants[7], and it resulted in a global agreement to fight climate change.

The Paris summit as an outstanding COP summit that brought a global climate agreement may thus be understood as a global media event. This concept implies an extraordinary focus of media attention across national borders but also includes the assumption that publics at large engage with the event. In the original formulation of the concept, this would imply a ritual function: people celebrate and positively identify with, in this case, global climate politics[8]. More recent approaches also ascribe a discursive dimension to media events, expecting people to engage in a political and critical debate[2,9–11]. Thus, one might hope that a climate summit could enhance understanding of climate politics or mobilize people for political and personal action.

Past research has analysed climate summits mainly in terms of the content of media coverage and the production of this content through the interaction of non-governmental organisations, journalists and politicians[12–14]. The question of whether climate summits as media events actually get audiences involved has not yet been researched. Our study therefore explores whether climate summits serve as transnational political media events that engage national publics in a way that affects their knowledge and attitudes towards climate politics.

A basis for engagement with summit news is taking notice of the climate summit through media reporting. More active communicative involvement includes seeking information or talking about the conference, which arguably would make stronger climate summit effects more likely[15].

Normative theories of the media expect journalists to provide critical scrutiny and background knowledge on politics so as to enable audiences to participate actively in political life (see Supplementary Discussion 1). Yet, empirical studies find that media coverage does not automatically enhance understanding and mobilize people. Depending on the content, it may also disengage and confuse them[19, 20]. Reporting on climate change has been criticized for lacking to provide the necessary context for enhancing understanding[21]. Also, past research suggests that media exposure to climate coverage is far more likely to increase climate change awareness and knowledge than to change behavioural intentions, let alone to mobilize for climate protection[20, 22-24].

So far, there is a lack of studies that examine the effects of intense media coverage of a climate-related event in a real-world setting such as a climate conference, rather than in an experimental setting[25]. Existing survey studies mostly look at correlations (e.g. between media use and knowledge, attitudes etc.) at one point in time rather than exploring whether an intensely covered event made a difference[2, 20, 22-24].

We take Germany as a likely case for intensive audience engagement with the climate summit, as many German journalists attended the conference and the national government is highly engaged in global climate governance as part of the group of "ambitious" countries. The green movement is also well established in German parliaments. Finally, news value research has identified cultural and geographical proximity as one of the most powerful

predictors of news coverage[26], and the summit took place in a neighbouring country with close cultural ties to Germany. For all of these reasons, the German case is likely to be characterized by intense media coverage and audience engagement with the climate summit. However, the results of a three-wave online panel survey (two weeks before, during and four weeks after COP 21, see Methods) show that the climate summit had no or a fairly limited public impact. This limited effect is not due to an absence of media coverage reaching the audience.

Communicative Engagement with the Climate Conference

Most respondents noticed coverage of the climate summit at least once a week, mostly on television (see Figure 1). Almost every second respondent remembered hearing about the COP on the radio, every third had noticed coverage in a newspaper. Online newspapers were mentioned less often, and social networks provided even less news on the climate summit. Almost one in four respondents did not notice coverage of the COP in any of these media during the summit.

While most of the population reports being exposed to media coverage on the summit, much less people engaged more actively with the summit by talking about it with family, friends or colleagues (see Figure 2). Also, lower shares of respondents actively searched for information or commented online. Almost 70 percent of all respondents from the survey did not engage with information from the climate summit in any of these more active ways: being exposed to climate summit news did not translate into communicative engagement.

Impact on Knowledge and Attitudes

We explore potential changes in attitudes and knowledge along six dimensions. The first dimension is climate change awareness, a concept that includes both the cognitive element of knowing that anthropogenic climate change exists and the affective element of feeling that it constitutes a relevant problem[16–18]. The second and third dimensions explore knowledge gains on event-related information about the Paris summit and on climate policy in general. We explored the understanding of basic terms and contexts (e.g. mitigation, different levels of per capita emissions in different countries, 2-degree target) as this is a precondition for understanding the negotiations and results of COP21. Further dimensions concern different kinds of attitudes related to climate policy: watching or reading about

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climate politics might affect beliefs in the efficacy of action at the individual, national or global level. Related to these beliefs are attributions of responsibility to act directed to either the national government or to other countries. The final dimension examines intentions to personally take action. Such actions encompass becoming more active as a citizen (political action) or as a consumer through consumption choices. Thus, analytically, we consider a range of public responses from merely taking note of the summit to fully engaging with the challenge of climate change (see Methods and Supplementary Tables 1-12 for a full description of the measures and descriptive results).

Significant changes over time along the above mentioned five dimensions were identified by calculating *t*-tests for paired samples. Because large samples increase the Type I error rate, and thus increase the chances of achieving statistical significance, we only mention and interpret those changes that are both highly significant (p < .001) and also account for a change of at least 4 to 5 percent.

Following the modest level of active communicative engagement with the climate summit, its impact on knowledge and attitudes was fairly limited as well. We find stable levels of climate change awareness. Across all three waves of the survey, only nine percent of respondents doubted the scientific consensus (see Table 1), a much lower share than, for example, in the United States[27]. More than two-thirds reported that climate change is an important problem, yet only 30 percent believe it is very important, in line with other surveys in Germany that show climate change is recognized as a relevant problem, but not of very high personal concern[28]. These basic attitudes seem settled already before the summit and not subject to influence from the subsequent coverage. This is likely to be different when we look at climate policy, where people still are confronted with new ideas, information and arguments.

Public knowledge of climate politics is fairly limited, and so are learning effects during the summit. We asked seven multiple-choice questions of varying levels of difficulty, on different aspects of climate policy. A closer look at the different questions reveals that learning effects only concern items immediately related to the event while not much background knowledge is acquired.

Table 1: Comparing knowledge and attitudes before, during and after the summit

Dimension		Scale	Number of items	T1 in %	T2 in %	T3 in %
Climate Change Awareness	adhering to the scientific consensus (i)	5-point Likert	4	62%	61%	64%
	personal relevance of topic	5-point Likert	1	67%	67%	65%
General Knowledge about Climate Politics	Kyoto protocol	correct/incorrect	1	56%	58%	57%
	worldwide emission reductions	correct/incorrect	1	20%	20%	20%
	emission trading	correct/incorrect	1	65%	67%	67%
	mitigation	correct/incorrect	1	48%	49%	50%
	lowest CO_2 emissions per capita	correct/incorrect	1	11%	13%	14%
Event-Related Knowledge	key objective of COP 21	correct/incorrect	1	**28%**	**36%**	**36%**
	2-degree limit	correct/incorrect	1	**14%**	**21%**	**21%**
Efficacy of Actions	personal self-efficacy	5-point Likert	1	47%	45%	44%
	collective efficacy	5-point Likert	1	41%	41%	40%
	efficacy of global climate change agreement	5-point Likert	1	**25%**	**26%**	**30%**
Attribution of Responsibility	industrial nations are responsible	5-point Likert	1	73%	71%	72%
	emerging countries are responsible	5-point Likert	1	86%	84%	85%
	Germany should play a leading role	5-point Likert	1	**61%**	**56%**	**56%**
Behavioural Intentions	future political engagement (i)	5-point (bipolar)	2	28%	24%	27%
	future food choices	5-point (bipolar)	1	49%	46%	51%
	future mobility	5-point (bipolar)	1	47%	45%	47%

Notes: (i) stands for "index"; f*or the wording of the questions and scales see Supplementary Tables 3-12. Percentages show the share of responses that agreed "somewhat" or "strongly". For knowledge questions, the table shows the share of correct responses.*

In order to evaluate climate policy making, citizens arguably should have a rough knowledge of different levels and trends of emitting CO_2. Yet, a stable share of around 80 percent of the respondents did not know that humanity has so far failed to reduce global average emissions. Actual levels of knowledge may be even lower, as multiple choice questions can be answered correctly by chance. Also, by asking the same question three times, our survey might have encouraged learning effects.

Table 2 (see also Supplementary Table 13 for additional statistical measures) shows significant learning effects on information that is very closely tied to the climate summit as an event, such as the key objective of the conference, and the explanation of the two-degree limit – with the share of correct answers increasing for both questions by seven percentage points. This finding shows that people do learn basic event-related information, yet their knowledge with regards to relevant background facts remains limited (for a discussion of different learning effects between media users and non-users, see Supplementary Discussion 2, Supplementary Figures 1-3, Supplementary Tables 15,16). This learning pattern is in line with studies on political knowledge[29].

Turning towards attitudes with regards to climate policy, beliefs in the efficacy of action differ depending on whether they apply to the personal or the political level. People rather believe that they can personally make a difference (above 40 percent, see Table 1) than in the efficacy of a global climate agreement (below 30 percent). When allocating responsibility at the national level, respondents rather stress the responsibility of other countries, specifically emerging economies, to join climate protection measures than demanding a leading role for their own country, Germany. We found consistently even less willingness to take personal action than to attribute responsibility at the collective, national or global level. There is also a striking difference between intentions to act politically and as a consumer: while almost half of the participants expressed an intention to choose more climate-friendly food and transportation, only a quarter wanted to engage with climate change politically, consistent with previous literature[30].

Table 2: Changes in knowledge and attitudes

Dimension		T1 M (SD)	T2 M (SD)	T3 M (SD)	Changes (Δ T1 → T2)	Changes (Δ T2 → T3)	Changes (Δ T1 → T3)
Climate Change Awareness	adhering to the scientific consensus (i)	3.8 (0.8)	3.8 (0.9)	3.8 (0.9)	0.0	0.0	0.0
	personal relevance of topic	3.8 (1.0)	3.8 (1.0)	3.8 (1.0)	0.0	0.0	0.0
General Knowledge about Climate Politics	Kyoto protocol	56.0%	58.2%	57.4%	+2.2%	-0.6%	+1.4%
	Worldwide emission reductions	19.8%	19.8%	19.7%	0.0%	-0.1%	-0.1%
	emission trading	65.4%	66.6%	67.3%	+1.2%	+0.7%	+1.9%
	mitigation	48.0%	49.5%	50.0%	+1.5%	+0.5%	+2.0%
	lowest CO_2 emissions per capita	11.0%	13.0%	14.3%	+2.0%	+1.3%	+3.3%**
Event-Related Knowledge	key objective of COP 21	28.4%	36.1%	35.6%	**+7.7%***	-0.5%	**+7.2%***
	2-degree limit	13.9%	21.1%	20.6%	**+7.2%***	-0.5%	**+6.7%***
Efficacy of Actions	personal self-efficacy	3.4 (1.1)	3.4 (1.1)	3.3 (1.1)	-0.1*	0.0	-0.1**
	collective efficacy	3.2 (1.1)	3.2 (1.1)	3.2 (1.1)	0.0	0.0	0.0
	efficacy of global climate change agreement	2.9 (1.1)	2.9 (1.0)	3.0 (1.0)	0.0	**+0.1***	**+0.2***
Attribution of Responsibility	industrial nations are responsible	4.1 (1.0)	4.0 (1.0)	4.0 (1.0)	-0.1*	0.0	-0.1*
	emerging countries are responsible	4.5 (0.9)	4.5 (0.9)	4.5 (0.9)	0.0	0.0	0.0
	Germany should play a leading role	3.7 (1.1)	3.6 (1.1)	3.6 (1.1)	**-0.1***	0.0	**-0.1***
Behavioural Intentions	future political engagement (i)	2.7 (1.1)	2.5 (1.1)	2.6 (1.2)	**-0.1***	+0.1**	-0.1
	future food choices	3.4 (1.2)	3.3 (1.2)	3.3 (1.2)	-0.1*	+0.1*	0.0
	future mobility	3.4 (1.3)	3.3 (1.2)	3.3 (1.3)	-0.1*	0.0	-0.1*

Notes: (i) stands for "index"; ***p < .001, ** p < .01, * p < .05. For the t-tests, n_{min}= 1023, n_{max} = 1121. For exact *p*-values, *t*-values, N and df, see Supplementary Table 13.

Changes of attitudes are small and can be detected only for a few variables (for a measure of effect sizes see Supplementary Table 13): we find an increase in the belief that global climate agreements are effective at fighting climate change, probably due to the fact that the Paris conference actually resulted in a global agreement. At the same time, a pioneer role of Germany receives less average support after the summit and we see that the summit has a temporary discouraging effect on intentions to take personal political action against climate change (Wave 2 as compared to Wave 1).

Discussion

Two overarching findings evolve from this analysis. First, national audiences where reached by media coverage about the summit and this does have a modest effect: knowledge very closely related to the summit has increased slightly, as has belief in the efficacy of global climate agreements. Yet, second, a large majority of the national audience did not engage more actively with climate news. They did not learn background knowledge on climate politics. The summit reduced the feeling that one's own country (in this case: Germany) should take a leading role and it did not encourage personal climate-friendly engagement. In short, the summit rather had an appeasing than mobilizing effect, decreasing rather than increasing the motivation to take the lead as a country, as a citizen or as a consumer.

From an analytical perspective, these findings are very much in line with the original conception of media events as celebrations that affirm the status quo[8], in our case the belief in a global climate agreement. From a normative perspective of public sphere theory that values citizens' communicative engagement in democracy, these findings are worrying: People are appeased rather than encouraged to take action and put pressure on their national government to take a leading role in climate protection. Citizens seem satisfied that a global deal has been negotiated and seem to infer that no increased engagement on their own part is necessary. Yet, given that the Paris agreement is based on voluntary pledges from governments that still await implementation, civic engagement would be needed more than ever.

A number of questions await careful explanation in future research. Is the lack of active engagement with climate policy news and the absence of learning relevant background knowledge a failure of journalism to provide content that engages the public and also

provides the necessary contextual information? What other factors can explain the appeasement effect on national audiences? And, how do different segments of the audience vary in this respect? Answering these questions will not only advance our understanding of the impact of transnational media events but also generate conclusions about how to better involve citizens in the global debate on climate change.

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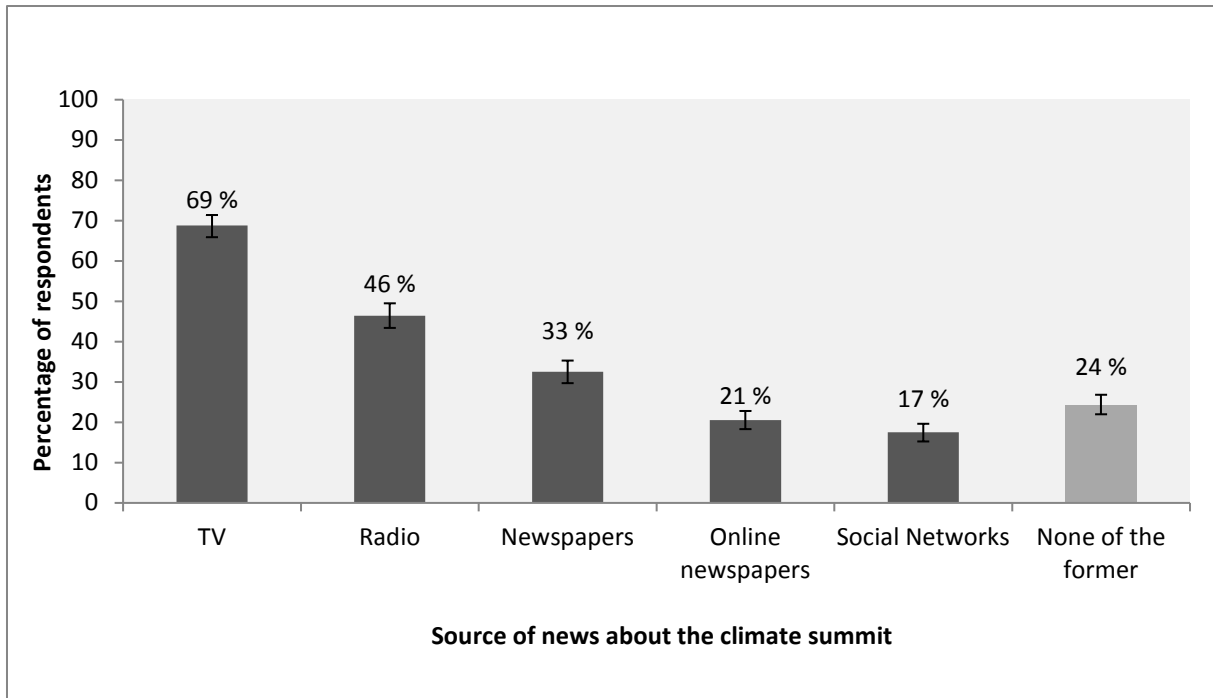
Figure 1: Source of news about the climate summit. The percentage of respondents who reported receiving news about the climate summit at least once a week from each media source based on the sum up the scale points "once a week" to "several times daily", asked during Wave 2 (n = 1121). Error bars show 95% confidence intervals: P ± 1,96 * √(P*(100-P)/n), where P is the respective percentage value und 1,96 is the z-value from the standard normal distribution for the desired confidence level.
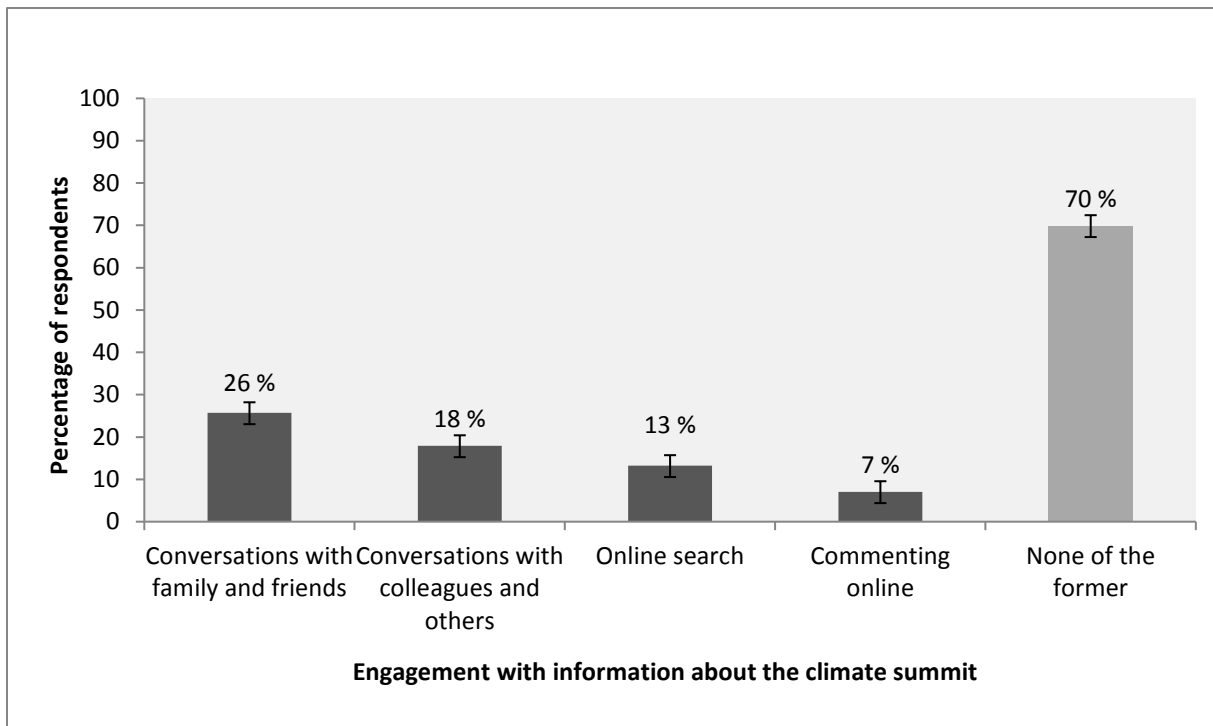
Figure 2: Engagement with information about the climate summit. The percentage of respondents who reported engaging with news about the climate summit at least once a week for each avenue of engagement based on the sum up the scale points "once a week" to "several times daily", asked during Wave 2 (n = 1121). Error bars show 95% confidence intervals (as in Figure 1).

METHODS

Panel Survey. We conducted a three-wave online panel survey, two weeks before, during and four weeks after the UN climate conference 2015 (COP 21). The respondents were recruited via an online access panel of the external panel provider *respondi*, which is certified according to Global ISO 26362, a member of the European Society for Opinion and Market Research and of the German Society for Online Research (DGOF). The online access panel comprises 100,000 respondents in Germany, from which participants were randomly invited to participate in the survey. In a second step, the first-wave sample was quoted for age and sex, federal state and formal education to represent the distribution of these variables within the German population aged 18–69. The final sample comprised n = 1121 participants who participated in all three surveys. A detailed description of the time frame, number of respondents and sociodemographic data of each wave are presented in Supplementary Table 1.

Testing for educational bias. Online access panels tend to suffer from educational bias[31]. To test for this, we compared our data to the micro-census data of the German Federal Bureau of Statistics for 2015 (see Supplementary Table 2). Small differences can be explained by the fact that our survey included people aged 18 and older while the micro-census data include adolescents from 15 years. Consequently, our data included less respondents without a school diploma and a slightly higher share in all other educational groups. Yet, particularly in the two most educated groups, we find almost no deviations from the official micro-census data. In the following, we will provide an overview of the measures used in the survey. The concrete wording of the survey questions is provided in the Supplementary Tables 2-12.

Taking note of news from COP 21. In the second wave of the panel survey, which took place during the climate summit, we asked the respondents how frequently they had noticed news about COP 21 in five media sources (television news and informational programs, radio, printed newspapers and magazines, online newspapers and social networks) on a seven-point scale ranging from 0 ("never") to 6 ("several times daily").

Engagement with information about COP 21. In addition to the passive reception of news about the climate conference, we were also interested in whether the respondents engaged actively with information about the COP 21 – either in personal discussions with family, friends and colleagues, or online in the form of searching for further information or writing online comments. These four items were also measured using a seven-point scale from 0 ("never") to 6 ("several times daily").

The following measures were included in all three waves in order to map changes on six dimensions: climate change awareness, general knowledge about climate politics, event-related knowledge, efficacy of actions, attribution of responsibility, and behavioural intentions.

Climate change awareness. The concept of climate change awareness is an established idea in social science that summarizes two kinds of attitudes towards climate change. It comprises a cognitive element (knowing and accepting that anthropogenic climate change exists), and an affective element (feeling that it constitutes a relevant problem)[32, 33–35]. Thus, our study contains two different measures for awareness: Adhering to the scientific consensus and personal relevance of climate change. Adherence to scientific consensus was measured using items that covered the main points of the Intergovernmental Panel on Climate Change consensus: the existence of a global warming trend, its anthropogenity, its potentially serious consequences – and the claim that scientific statements are true. The first three items were adapted from a study on climate scepticism among journalists[36]. Agreement with the scientific consensus was measured from 1 ("strongly disagree") to 5 ("strongly agree"). It was possible to decline to answer a question. For each wave, all four items were combined into a mean index (Cronbach's $\alpha = 0.78$). Personal relevance of climate change was assessed with one item in which respondents were asked to evaluate the personal importance of the issue on a five-point scale from 1 ("not important at all") to 5 ("very important").

Knowledge. We measure knowledge with regards to two dimensions that are both relevant for understanding the discussions around COP 21. One dimension concerns basic background knowledge, the other dimension concerns knowledge that is more closely related to the specific summit. Since current studies of climate-related knowledge do not cover knowledge regarding climate politics[37-40], the items were only partly based on extant literature. Two items (concerning the Kyoto Protocol and emissions trading) were modified from a study on political knowledge[41], the other items were developed for the current study. We consider our knowledge test an explorative measure since we cover aspects of climate policy that have not yet been analysed in previous surveys. The questions were designed to vary in their level of difficulty and include event-specific information (such as the aim of the conference) as well as important background knowledge that is necessary to understand climate politics. The questions do not aspire to cover all relevant aspects of the field. The knowledge test was qualitatively pre-tested by a group of graduate students of journalism and validated by an independent expert from the Climate Service Center Germany of the Helmholtz-Zentrum Geesthacht. Each item provided four alternative answers plus the option to respond with "don't know". The items and answer options were rotated randomly. For the analysis presented in this paper, correct answers were coded as 1, while incorrect and "don't know" answers were coded as 0.

General knowledge about climate politics. We measured people's general factual knowledge using five multiple choice items concerning the Kyoto Protocol, the development of CO_2 emissions over the last two decades, emissions trading, mitigation, and different countries' per capita CO_2 emissions. These items are important, as citizens arguably should have a rough knowledge of different levels and trends of emitting CO_2 in different countries in order to assess the respective roles assigned to e.g. emerging economies and Western industrialized countries. Also, people need to understand terms like mitigation or the Kyoto protocol in order to make sense of the debate around COP 21.

Event-related knowledge. We measured the respondents' factual knowledge closely related to the political event COP 21 with two multiple choice items asking for the main goal of the summit and for the correct explication of the two-degree target. The latter was one of the main issues during the Paris conference and thus a recurring topic in media reporting on COP 21. The questions were posed in the same way as the general knowledge items.

Belief in efficacy of actions. Confidence in personal and collective efficacy as well as belief in the efficacy of a global climate agreement were each measured with one item[42, 43]. Agreement was measured on a five-point scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"), including the option not to specify an answer.

Attribution of responsibility. We assessed who the respondents saw as responsible for combatting climate change using three items. Two items were newly developed; the item referring to Germany's national responsibility was taken from a previous survey[44]. The items measured agreement with the responsibility of emerging countries, industrial nations and Germany to serve as a leading actor, again on a five-point scale with the option to refuse an answer.

Behavioural intentions. People's intentions to take personal responsibility in the form of future actions against climate change were measured for political actions and consumer choices: one item covered climate-friendly food choices, another item asked about climate-friendly transportation (similar items are used e.g. in the Eurobarometer[45]) and two items related to engaging politically in climate matters (through online petitions or engaging in environmental grassroots initiatives; both items have been tested in a previous study[46]). The five-point scale ranged from 1 ("I would not like to do this in the future") to 5 ("I would like to do more of this in the future"). Both items regarding the willingness to participate in future political engagement were combined into a mean index (Cronbach's α = 0.74). The other behavioural intentions were treated as single items.

Ethics statement. The study was conducted in compliance with the Guidelines for Safeguarding Good Scientific Practice at Universität Hamburg. Informed consent was obtained from all respondents in the survey.

Data availability. The full survey questionnaire and further information about the study is available at URL: www.climatematters.hamburg. The datasets generated during the current study are available to the scientific community from the corresponding author upon reasonable request.

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<u>Supplementary Information for the article in Nature Climate Change:</u>

<u>"The Appeasement Effect of a UN Climate Summit on the German Public"</u>

For more information on the related research project "Down to Earth":

www.climatematters.hamburg

Supplementary Discussion 1: The Conceptual Approach of the Study Explained

The study has a conceptual background both in normative and analytic theory that can only briefly be explained within the limits of the main text. We therefore use this appendix to elaborate a little further on the conceptual background. This leads us to formulate both normative and empirical expectations towards the effect of a climate summit on national audiences. Analytically, we draw on the concept of transnational political media events and on research of media effects. Normatively, we draw on a theory of democracy that emphasizes the importance of a public sphere in order to integrate citizens into the political process.

The public sphere approach is closely connected to the German scholar Jürgen Habermas[1,2] and has been very influential not only in the German context but also internationally[3]. The basic idea goes back much further to Immanuel Kant and the enlightenment: Democratic legitimacy is thus rooted in the participation of the citizens in political life and this means that political processes taking place in the political institutions of government should be linked back to society. This also applies to transnational governance such as the European Union[4] and the United Nations Framework Convention on Climate Change (UNFCCC) process. Democratic order at both the national and transnational level can thus only perform well if the political processes become transparent and are debated and evaluated in public discussions that include relevant voices not only from the political elites but also from different parts of civil society[5]. Citizens can follow and participate in this through the public sphere that includes traditional media as the master forum[6], which is however open and connected to other arenas (today e.g. social media), where direct participation of citizens is more easily possible. Journalists become thus central moderators of public discourse that informs and controls public policy making. Now applied to climate politics, citizens would need to be able to make up their minds on how to deal with the challenge posed by climate change: Who is supposed to deal with the problem and how? Should we have a global agreement to mitigate climate change and what should it be like?

Against this background, a climate summit could serve as an occasion where the necessary debate and contextual information is provided to citizens. And at this point, the normative argument is connected to an analytical argument drawing on the concept of the particular role of transnational media events. The media events approach goes back to Dayan and Katz (1992). In the original formulation the concept, media events meant watching "contests, conquests and coronations" on TV and creating a common experience of celebration and community[7]. From this perspective, media events would have mainly affirmative effects, stabilizing support for the status quo of society. The concept has been extended to reflect the global dimension of media events[8] and to include also

international policy events such as climate summits[9]. Researchers have stressed that media events may not only have a ritual functions of community building but also create "moments of global public spheres"[10], thus providing opportunities for deliberation and opinion formation. Brüggemann and Wessler (2014) have built on this and posit that media events have a ritual dimension, a discursive dimension and a strategic dimension as sites of international public relations activities[11]. As a discursive media event, COP 21 would thus also raise awareness and understanding of climate politics and contribute to the formation of public opinion.

So what are the reasons why we expect COP 21 to have such effects? The event is an occasion of focused public and media attention to one single issue – international climate change politics – that is, in routine times, buried below more salient current events that grasp media attention, as long-term analyses show[12–14]. Media effects research, especially agenda setting research, shows that media coverage on climate change related topics (e.g. IPCC-Reports) enhances climate change awareness[15] and can catalyse knowledge gains[16,17]. Yet, the results of media effects research warn us that often media effects can be expected as a gradual, long-term process affecting only some people under certain conditions[18,19]. A current meta-study shows that climate change awareness is interacting with ideologies, worldviews and value orientations much more than it is influenced by education, age or gender[20]. Moreover, even opposite effects may occur: by following the media coverage on conflicts in climate policy, feelings of being disillusioned and frustrated can evolve[17,21].

The normative expectations raised above might therefore not be met by actual changes in people's knowledge and attitudes. Yet, there is to our knowledge no study that explores the effect of a large scale political event on an issue that is otherwise not very prominent in media coverage. For this reason, we are cautious to formulate any hypotheses and restrict ourselves to formulating a research question: Do climate summits serve as transnational political media events that engage national audiences in a way that affects their knowledge and attitudes towards climate politics?

Supplementary Table 1: Detailed description of the sample

Wave	Time frame	n	Sociodemographic indicators
1	November 10, 2015 - November 18, 2015	2098	sex: 1031 male, 1067 female; age: M = 44.2 years, SD = 13.9
2	December 6, 2015 - December 10, 2015	1477	sex: 760 male, 717 female; age: M = 46.2 years, SD = 13.4
3	January 11, 2016 - January 18, 2016	1121	sex: 590 male, 531 female; age: M = 47.9 years, SD = 13.0

Supplementary Table 2: Testing for educational bias in the online access panel

Formal Education	General population in 2015, 15 years and older[23]	Sample n = 1121, 18-69 years
1 - no school diploma (yet), still a student	3.6 %	0.9 %
2 - low-level school diploma, completion of elementary school	32.9 %	35.6 %
3 - secondary school without Abitur (highest German school diploma) i.e. medium-level or higher school or equivalent diploma	29.4 %	33.2 %
4 - Abitur (highest German school diploma), advanced technical college certificate	13.2 %	13.7 %
5 - university degree (university, technical college, polytechnic school)	16.3 %	16.6 %

Supplementary Table 3: Getting news from the climate summit

Medium	M (SD)	(7) several times daily	(6) daily	(5) several times a week	(4) once a week	(3) several times a month	(2) less often	(1) never
"How frequently did you obtain information on this year's climate conference in Paris from news and information programs on TV/radio/newspapers/online newspapers/social networks?" (n=1121)								
TV	**4.1** (1.6)	2.9 %	18.1 %	32.2 %	15.5 %	7.0 %	16.9 %	7.3 %
radio	**3.2** (1.9)	2.6 %	12.6 %	21.0 %	10.3 %	4.2 %	21.8 %	27.7 %
printed newspapers	**2.6** (1.8)	0.4 %	8.9%	14.3 %	8.9 %	3.8 %	18.7 %	45.0 %
online newspapers	**2.0** (1.6)	0.5%	4.7 %	10.0 %	5.3 %	3.7 %	11.5 %	64.2 %
social networks	**1.9** (1.7)	2.7 %	5.8 %	5.4 %	3.6 %	3.2 %	10.4 %	68.9 %

Supplementary Table 4: Communicative engagement with the climate summit

Activity	M (SD)	(7) several times daily	(6) daily	(5) several times a week	(4) once a week	(3) several times a month	(2) less often	(1) never
"Please specify how often you have done the following actions concerning this year's world climate conference in Paris. I have …" (n=1121)								
online search	**1.8** (1.4)	0.7 %	1.8 %	5.5 %	5.2 %	5.5 %	15.6 %	65.7 %
commenting online	**1.4** (1.1)	0.2 %	1.2 %	2.9 %	2.7 %	3.1 %	7.4 %	82.4 %
conversations with family and friends	**2.3** (1.6)	0.5 %	3.5 %	10.7 %	11.0 %	6.2 %	25.4 %	42.6 %
conversations with colleagues and others	**2.0** (1.5)	0.4 %	2.9 %	7.1 %	7.5 %	6.3 %	19.2 %	56.6 %

Supplementary Table 5: Adhering to the scientific consensus

T	M (SD)	(1) strongly disagree	(2) somewhat disagree	(3) neither agree nor disagree	(4) somewhat agree	(5) strongly agree	(6) not specified
"There is no certain evidence that a long-term warming trend exists." (later inversed for the index) (n=1121)							
T1	**2.5** (1.2)	22.4 %	30.3 %	24.0 %	13.2 %	7.7 %	2.4 %
T2	**2.4** (1.2)	25.6 %	27.5 %	24.2 %	11.0 %	6.6 %	5.2 %
T3	**2.4** (1.2)	25.4 %	29.3 %	23.5 %	12.1 %	6.4 %	3.3 %
"The main reason for the current climate change is human activities." (n=1121)							
T1	**3.9** (1.1)	2.9 %	5.6 %	26.9 %	27.6 %	35.7 %	1.3 %
T2	**3.9** (1.1)	3.3 %	6.4 %	25.2 %	26.6 %	33.8 %	4.7 %
T3	**3.9** (1.1)	3.2 %	5.6 %	24.2 %	27.7 %	37.5 %	1.8 %
"Climate change has serious consequences for people and nature." (n=1121)							
T1	**4.3** (0.9)	1.6 %	2.1 %	17.3 %	25.4 %	51.6 %	2.1 %
T2	**4.3** (0.9)	1.0 %	3.4 %	17.0 %	22.0 %	51.7 %	4.8 %
T3	**4.3** (0.9)	1.2 %	2.7 %	16.5 %	25.5 %	52.2 %	1.9 %
"Scientists exaggerate the dangers of climate change." (later inversed for the index) (n=1121)							
T1	**2.7** (1.1)	22.6 %	30.9 %	28.0 %	10.9 %	6.0 %	1.7 %
T2	**2.4** (1.1)	24.8 %	31.0 %	24.7 %	10.3 %	5.4 %	3.8 %
T3	**2.4** (1.1)	23.7 %	33.5 %	24.7 %	10.8 %	5.4 %	2.0 %

Note: The index (n=1121) for all items has the following values: T1 (M=3.8; SD=0.9); T2 (M=3.8; SD=0.9), T3 (M=3.8; SD=0.9).

Supplementary Table 6: Personal relevance of the topic

T	M (SD)	(1) not important at all	(2) not very important	(3) somewhat important	(4) rather important	(5) very important
"How important to you are the problems due to climate change?" (n=1121)						
T1	**3.8** (1.0)	2.4 %	7.5 %	23.1 %	37.2 %	29.8 %
T2	**3.9** (1.0)	2.6 %	6.2 %	23.7 %	38.8 %	28.6 %
T3	**3.8** (1.1)	3.2 %	7.9 %	23.7 %	34.7 %	30.5 %

Supplementary Table 7: Factual knowledge (general and event-related)

Question (*n*=1121)	correct in %	T1 M (SD)	CI	correct in%	T2 M (SD)	CI	correct in%	T3 M (SD)	CI
To protect the climate, many countries have signed an agreement which limits the greenhouse gas emission levels (e.g. CO_2). What is the name of this agreement?	56.0 %	0.6 (0.5)	53.2-58.9	58.2 %	0.6 (0.5)	55.3-61.2	57.4 %	0.6 (0.5)	54.5-60.3
International climate policy is aimed at decreasing greenhouse gas emissions. Have carbon dioxide (CO_2) emissions actually been reduced?	19.8 %	0.2 (0.4)	17.5-22.2	19.8 %	0.2 (0.4)	17.5-22.0	19.7 %	0.2 (0.4)	17.4-22.0
What is the name of an economic instrument with which politics currently attempts to achieve climate protection goals?	65.4 %	0.7 (0.5)	62.6-68.1	66.6 %	0.7 (0.5)	63.6-69.5	67.3 %	0.7 (0.5)	64.7-69.8
What does the term mitigation mean? Measures that...	48.0 %	0.5 (0.5)	45.1-50.9	49.5 %	0.5 (0.5)	46.6-52.5	50.0 %	0.5 (0.5)	47.1-52.8
What is the key objective of this year's climate conference in Paris? The goal is...	28.4 %	0.3 (0.5)	25.7-31.1	36.1 %	0.4 (0.5)	33.4-39.0	35.6 %	0.4 (0.5)	33.0-38.5
The so-called two degree objective describes the goal...	13.9 %	0.1 (0.4)	11.9-16	21.1 %	0.2 (0.4)	18.9-23.5	20.6 %	0.2 (0.4)	18.4-23.1
The CO_2 emission is one of the main causes of climate change. Which of the following countries has the lowest level of CO_2 emissions per capita?	11.0 %	0.1 (0.3)	9.1-12.7	13.0 %	0.1 (0.4)	11-15.1	14.3 %	0.1 (0.4)	12.2-16.4

Note: Incorrect answers and "do not know" were coded as 0 ("incorrect"). CI = confidence interval (95%).

Supplementary Table 8: Personal self-efficacy

	M (SD)	(1) strongly disagree	(2) somewhat disagree	(3) neither agree nor disagree	(4) somewhat agree	(5) strongly agree	(6) not specified
				"I am convinced that I can do something against climate change." (*n*=1121)			
T1	**3.4** (1.1)	5.9 %	10.4 %	35.1 %	29.4 %	16.9 %	2.1 %
T2	**3.4** (1.1)	6.0 %	12.1 %	35.0 %	27.2 %	15.3 %	4.5 %
T3	**3.3** (1.1)	6.7 %	11.9 %	35.7 %	27.4 %	15.3 %	3.1 %

Supplementary Table 9: Collective efficacy

	M (SD)	(1) strongly disagree	(2) somewhat disagree	(3) neither agree nor disagree	(4) somewhat agree	(5) strongly agree	(6) not specified
				"I am convinced that we as a community will still be able to stop climate change." (*n*=1121)			
T1	**3.2** (1.1)	6.9 %	16.9 %	33.6 %	28.2 %	12.0 %	2.4 %
T2	**3.2** (1.1)	6.7 %	15.8 %	33.1 %	27.6 %	11.3 %	5.5 %
T3	**3.2** (1.1)	6.8 %	16.1 %	35.0 %	27.7 %	11.0 %	3.4 %

Supplementary Table 10: Efficacy of global agreement

	M (SD)	(1) strongly disagree	(2) somewhat disagree	(3) neither agree nor disagree	(4) somewhat agree	(5) strongly agree	(6) not specified
"The governments of the world will succeed in slowing down the changes in the climate through an internationally binding climate agreement." (*n*=1121)							
T1	**2.9** (1.0)	10.4 %	22.7 %	39.0 %	17.0 %	6.9 %	4.0 %
T2	**2.9** (1.0)	9.7 %	21.1 %	38.9 %	18.6 %	6.2 %	5.4 %
T3	**3.0** (1.0)	6.9 %	18.1 %	41.0 %	21.1 %	7.5 %	5.4 %

Supplementary Table 11: Attribution of responsibility

	M (SD)	(1) strongly disagree	(2) somewhat disagree	(3) neither agree nor disagree	(4) somewhat agree	(5) strongly agree	(6) not specified
"Important emerging countries (such as China and India) need to participate in an international climate agreement." (*n*=1121)							
T1	**4.8** (0.9)	1.5 %	1.2 %	10.8 %	19.4 %	63.3 %	3.7 %
T2	**4.6** (0.9)	1.3 %	0.8 %	12.8 %	17.9 %	60.7 %	6.4 %
T3	**4.6** (0.9)	1.2 %	1.2 %	12.4 %	19.2 %	61.4 %	4.7 %
"Industrial nations need to take on more responsibility because it is they who have substantially contributed to the climate change." (*n*=1121)							
T1	**4.1** (0.9)	1.8 %	3.7 %	20.2 %	30.1 %	40.7 %	3.7 %
T2	**4.0** (1.0)	2.2 %	4.3 %	20.4 %	30.2 %	37.1 %	5.7 %
T3	**4.0** (1.0)	2.0 %	4.5 %	20.6 %	31.5 %	37.8 %	3.6 %
"Germany should take on a leading role in international climate protection." (*n*=1121)							
T1	**3.7** (1.1)	4.5 %	6.2 %	26.9 %	32.7 %	25.8 %	3.8 %
T2	**3.6** (1.1)	5.0 %	6.8 %	29.6 %	31.2 %	22.2 %	5.2 %
T3	**3.6** (1.1)	4.7 %	8.7 %	28.7 %	30.6 %	22.6 %	4.6 %

Supplementary Table 12: Behavioural intentions for the future

	M (SD)	(1) -- I would not like to do in the future.	(2) -	(3) 0	(4) +	(5) ++ I would like to do more in the future.
"Limiting my food shopping (e.g. tropical fruit, meat, ...) in favour of climate protection, or changing it by consuming CO2-neutral products, is something…" (*n*=1121)					
T1	**3.4** (1.2)	12.8 %	5.4 %	32.4 %	32.1 %	17.3 %
T2	**3.3** (1.2)	13.6 %	6.2 %	33.8 %	30.8 %	15.5 %
T3	**3.4** (1.2)	12.8 %	7.0 %	29.0 %	34.9 %	16.3 %
	"Limiting my air travel and automobile usage in favour of climate protection, or using climate-friendly transportation more often, is something…" (*n*=1.121)					
T1	**3.4** (1.3)	12.7 %	5.9 %	33.9 %	25.1 %	22.5 %
T2	**3.3** (1.3)	14.3 %	5.5 %	34.8 %	26.3 %	19.1 %
T3	**3.3** (1.3)	13.6 %	7.3 %	32.4 %	27.3 %	19.4 %
	"Supporting online actions (such as signing an online petition) in order to increase the pressure on politics in favour of a stronger climate protection is something…" (*n*=1121)					
T1	**3.0** (1.3)	22.7 %	10.0 %	30.4 %	23.5 %	13.4 %
T2	**2.8** (1.3)	26.3 %	8.7 %	31.8 %	23.3 %	9.9 %
T3	**2.9** (1.3)	24.8 %	8.1 %	31.5 %	23.9 %	11.7 %
	"Actively committing myself by contributing to environmental protection organizations or citizens' initiatives against climate change is something..." (*n*=1121)					
T1	**2.4** (1.2)	35.2 %	12.9 %	32.7 %	14.2 %	4.9 %
T2	**2.3** (1.2)	38.6 %	13.2 %	32.8 %	12.3 %	3.0 %
T3	**2.4** (1.2)	37.8 %	11.6 %	32.8 %	13.4 %	4.4 %

Note: The index (n=1121) for the last two items (political engagement) has the following values: T1 (M=2.7; SD=1.2); T2 (M=2.6; SD=1.1), T3 (M=2.6; SD=1.1).

Supplementary Table 13a: T-Tests for changes between T1 and T2 (detailed version of Table 2 in the paper)

Variable	T1	T2	Δ T1 →T2	p	n	T	df	|Cohen's dz|
adhering to the scientific consensus (i)	3.8	3.8	0.0	0.181	1.084	-1.339	1083	0.0
personal relevance of topic	3.8	3.8	0.0	0.942	1.121	-0.073	1120	0.0
general knowledge - Kyoto Protocol	0.6	0.6	0.0	0.066	1.121	-1.843	1120	0.1
general knowledge - emission reductions	0.2	0.2	0.0	1.000	1.121	0.000	1120	0.0
general knowledge - emissions trade	0.7	0.7	0.0	0.376	1.121	-0.885	1120	0.0
general knowledge - mitigation	0.5	0.5	0.0	0.378	1.121	-0.883	1120	0.0
general knowledge - per capita emissions	0.1	0.1	0.0	0.070	1.121	-1.815	1120	0.1
event-related knowledge - aim of COP 21	0.3	0.4	**0.1**	**0.000**	1.121	-4.953	1120	**0.1**
event-related knowledge - 2-degree limit	0.1	0.2	**0.1**	**0.000**	1.121	-5.546	1120	**0.2**
personal self-efficacy	3.4	3.4	**-0.1**	**0.010**	1.059	2.587	1058	**0.1**
collective efficacy	3.2	3.2	0.0	0.764	1.044	0.300	1043	0.0
efficacy of global climate change agreement	2.9	2.9	0.0	0.465	1.036	-0.732	1035	0.0
industrial nations are responsible	4.1	4.0	**-0.1**	**0.014**	**1.031**	**2.449**	**1030**	**0.1**
emerging countries are responsible	4.5	4.5	-0.1	0.065	1.024	1.850	1023	0.1
Germany should play a leading role	3.8	3.6	**-0.1**	**0.000**	**1.035**	**4.215**	**1034**	**0.1**
future political engagement (i)	2.7	2.5	**-0.1**	**0.000**	**1.121**	**4.506**	**1120**	**0.1**
future food choices	3.4	3.3	**-0.1**	**0.024**	**1.121**	**2.259**	**1120**	**0.1**
future mobility	3.4	3.3	**-0.1**	**0.016**	**1.121**	**2.410**	**1120**	**0.1**

Note: The t-tests were two-tailed. Significant changes are marked bold. Cohen's dz measures effect sizes for paired t-tests: values of 0.1 and 0.2 are interpreted as small differences[22, 23].

Supplementary Table 13b: T-Tests for changes between T2 and T3 (detailed version of Table 2 in the paper)

Variable	T2	T3	Δ T2 →T3	p	n	T	df	|Cohen's dz|
adhering to the scientific consensus (i)	3.8	3.8	0.0	0.512	1080	-0.656	1079	0.0
personal relevance of topic	3.8	3.8	0.0	0.196	1121	1.294	1120	0.0
general knowledge - Kyoto Protocol	0.6	0.6	0.0	0.486	1121	0.696	1120	0.0
general knowledge - emission reductions	0.2	0.2	0.0	0.949	1121	0.064	1120	0.0
general knowledge - emissions trade	0.7	0.7	0.0	0.642	1121	-0.464	1120	0.0
general knowledge - mitigation	0.5	0.5	0.0	0.734	1121	-0.340	1120	0.0
general knowledge - per capita emissions	0.1	0.1	0.0	0.277	1121	-1.087	1120	0.0
event-related knowledge - aim of COP 21	0.4	0.4	0.0	0.718	1121	0.361	1120	0.0
event-related knowledge - 2-degree limit	0.2	0.2	0.0	0.676	1121	0.418	1120	0.0
personal self-efficacy	3.4	3.3	0.0	0.579	1054	0.555	1053	0.0
collective efficacy	3.2	3.2	0.0	0.880	1040	0.151	1039	0.0
efficacy of global climate change agreement	2.9	3.1	**0.2**	**0.000**	1023	-4.744	1022	**0.1**
industrial nations are responsible	4.0	4.0	0.0	0.386	1043	-0.867	1042	0.0
emerging countries are responsible	4.5	4.5	0.0	0.665	1023	-0.433	1022	0.0
Germany should play a leading role	3.6	3.6	0.0	0.651	1036	0.452	1035	0.0
future political engagement (i)	2.5	2.6	**0.1**	**0.005**	1121	-2.787	1120	**0.1**
future food choices	3.3	3.3	**0.1**	**0.034**	1121	-2.118	1120	**0.1**
future mobility	3.3	3.3	0.0	0.769	1121	-0.293	1120	0.0

Note: The t-tests were two-tailed. Significant changes are marked bold.

Supplementary Table 13c: T-Tests for changes between T1 and T3 (detailed version of Table 2 in the paper)

Variable	T1	T3	Δ T2 →T3	p	n	T	df	|Cohen's dz|
adhering to the scientific consensus (i)	3.8	3.8	**0.0**	**0.019**	1.104	-2.348	1103	**0.1**
personal relevance of topic	3.8	3.8	0.0	0.218	1.121	1.232	1120	0.0
general knowledge - Kyoto Protocol	0.6	0.6	0.0	0.265	1.121	-1.115	1120	0.0
general knowledge - emission reductions	0.2	0.2	0.0	0.949	1.121	0.064	1120	0.0
general knowledge - emissions trade	0.7	0.7	0.0	0.171	1.121	-1.370	1120	0.0
general knowledge - mitigation	0.5	0.5	0.0	0.231	1.121	-1.198	1120	0.0
general knowledge - per capita emissions	0.1	0.1	**0.0**	**0.004**	1.121	-2.890	1120	**0.1**
event-related knowledge - aim of COP 21	0.3	0.4	**0.1**	**0.000**	1.121	-4.371	1120	**0.1**
event-related knowledge - 2-degree limit	0.1	0.2	**0.1**	**0.000**	1.121	-4.799	1120	**0.1**
personal self-efficacy	3.4	3.3	**-0.1**	**0.002**	1.069	3.110	1068	**0.1**
collective efficacy	3.2	3.2	0.0	0.571	1.063	0.567	1062	0.0
efficacy of global climate change agreement	2.9	3.1	**0.2**	**0.000**	1.030	-5.337	1029	**0.2**
industrial nations are responsible	4.0	4.0	**-0.1**	**0.031**	1.050	2.159	1049	**0.1**
emerging countries are responsible	4.5	4.5	0.0	0.153	1.040	1.429	1039	0.0
Germany should play a leading role	3.7	3.6	**-0.1**	**0.000**	1.038	4.338	1037	**0.1**
future political engagement (i)	2.7	2.6	0.0	0.058	1.121	1.894	1120	0.1
future food choices	3.4	3.3	0.0	0.792	1.121	-0.264	1120	0.0
future mobility	3.4	3.3	**-0.1**	**0.030**	1.121	2.169	1120	**0.1**

Note: The t-tests were two-tailed. Significant changes are marked bold.

Supplementary Discussion 2: Contrasting Knowledge Gains of Media Users versus Non-users

In addition to the analyses discussed in the main paper, we have explored whether people who have received information through the media have learned more than the relatively small group of people who have claimed not to have heard about the climate summit through the media at all. This way, we can further explore the role of media coverage concerning knowledge gains (in a second step, this analysis should be extended to all variables where the study finds substantial changes). We focus on those knowledge variables where the study found significant differences before, during and after the summit.

To analyse the learning effect through the conference concerning these variables, we calculated a new sum index. It indicates changes on whether a person answered questions 5 (lowest per capita emissions), 6 (key objective of COP 21) and 7 (2-degree limit) correctly. The index also shows whether a person performed better or worse during and after the climate summit than before. The latter may occur if the person has forgotten something, but it is also plausible that a respondent just responded correctly the first time by guessing the right answer, which is easily possible with multiple-choice questions. The index ranges from 1 (meaning the person previously answered all three items correctly and afterwards none) to 7 (meaning the person answered all three items correctly at a later time, having no correct answers before). Thus, only scale points 5 to 7 indicate a learning effect.

Supplementary Table 14: Distribution of learning effects

Sum Index (learning effect Q5/Q6/Q7)	Changes (Δ T1→T2)	Changes (Δ T2→T3)	Changes (Δ T1→T3)
Three formerly correct answers false (1)	0.1 %	0.1 %	0.2 %
Two formerly correct answers false (2)	1.5 %	2.5 %	1.6 %
One formerly correct answer false (3)	14.0 %	17.8 %	15.5 %
Same number of answers correct (4)	55.8 %	59.4 %	52.9 %
One formerly false answer correct (5)	23.4 %	17.2 %	23.5 %
Two formerly false answers correct (6)	4.8 %	2.8 %	6.0 %
Three formerly false answers correct (7)	0.4 %	0.2 %	0.4 %

The table above shows that there is a substantial rise in correct answers. Almost 30 percent of respondents learnt something in the course of the summit – but at the same time about 17 percent 'un-learnt' something. This puts the presumed knowledge acquisition into perspective: a substantive

share of people have probably guessed the right answer by chance, just as some respondents got it wrong in the second or third wave. The share of people who have actually learnt something is probably much smaller than 30 percent.

It remains an open question whether the respondents gained knowledge as a consequence of consuming media coverage. When comparing people who have heard about the summit in the media with the small group of people who claim that they have not received any news from the summit, we do *not* find a clear pattern that people who stated having received information on the summit via media learn more.

In the table below, we see that the mean values for both groups on the new index for changes in knowledge are very similar and the *t*-test reveals only one highly significant difference in learning (Δ T1 → T2): Only from before the summit as compared to during the summit, recipients of climate policy information from the media have learnt more than people who claimed that they did not get climate summit information from the media. Apparently, the media provided some useful information in the early phase of the summit that made a difference – but if we compare the time before and after the summit, differences are less significant (only at p < .05 level).

Supplementary Table 15: Differences in learning of media users and non-users

Knowledge/ learning effects	Changes (Δ T1 → T2)		Changes (Δ T2 → T3)		Changes (Δ T1 → T3)	
	M (SD) group A	M (SD) group B	M (SD) group A	M (SD) group B	M (SD) group A	M (SD) group B
Summated Index[1]	4.0 (0.7)***	4.2 (0.8)***	4.0 (0.7)	4.0 (0.8)	4.1 (0.7)*	4.2 (0.8)*

*Note: Group (A): received no information via media on COP 21, n = 272; Group (B): received information via media on COP 21, n = 849; ***p < .001, ** p < .01, * p < .05.) 1) The summated index includes three items, concerning the lowest CO_2 emissions per capita, the key objective of COP 21 and the 2-degree limit*

Supplementary Table 16: Detailed results for the *t*-tests between both groups

Changes	*n*	*p*	T	df
(Δ T1 → T2)	1.121	0.000	-3,58	1119
(Δ T2 → T3)	1.121	0.296	1,05	1119
(Δ T1 → T3)	1.121	0.022	-2,49	1119

Still, this does not indicate that media use is irrelevant to knowledge gains. Rather than learning more from the media, media users in our study have a higher knowledge from the outset (see the Supplementary Figures 1-3, below).

Supplementary Figure 1:

Knowledge of media users vs. non-users regarding the question on per capita emissions

The CO_2 emissions are one of the main causes of climate change. Which of the following countries has the lowest level of CO_2 emissions per capita? (% of correct answers)

- media users
- non-users

	T1	T2	T3
media users	13 %	15 %	15 %
non-users	6 %	7 %	11 %
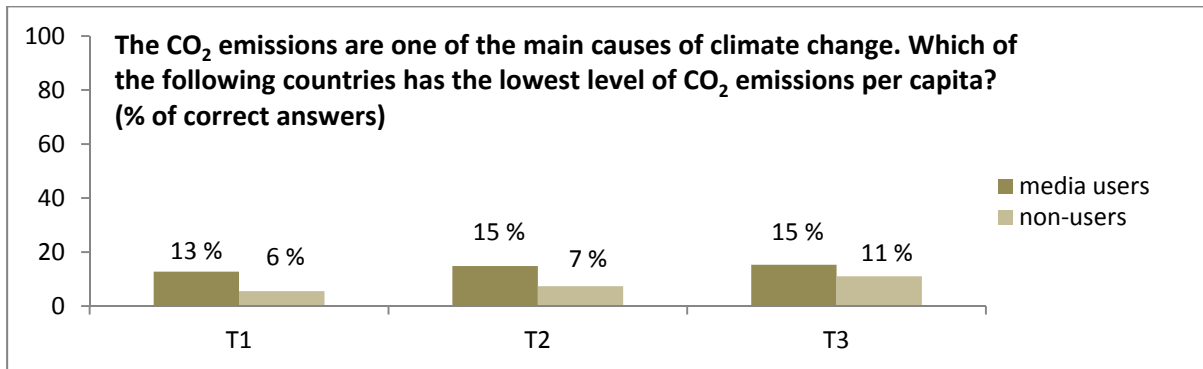
Note: n=1121

Supplementary Figure 2:

Knowledge of media users vs. non-users regarding the key objective of COP21

What is the key objective of this year's climate conference in Paris? (% of correct answers)

- media users
- non-users

	T1	T2	T3
media users	32 %	42 %	41 %
non-users	17 %	18 %	18 %
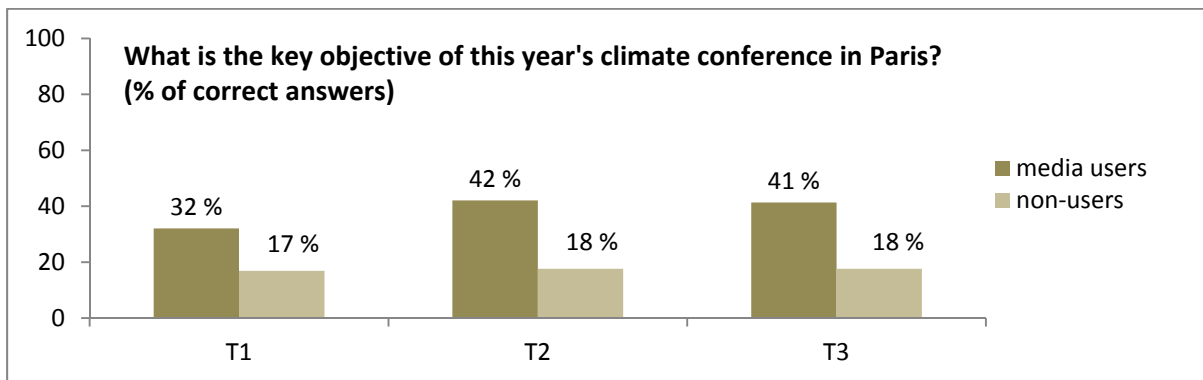
Note: n=1121

Supplementary Figure 3:

Knowledge of media users vs. non-users regarding the key objective of COP21

The so-called two degree objective describes the goal to limit the increase in the worldwide average temperature…

- media users
- non-users

	T1	T2	T3
media users	15 %	25 %	24 %
non-users	9 %	10 %	10 %
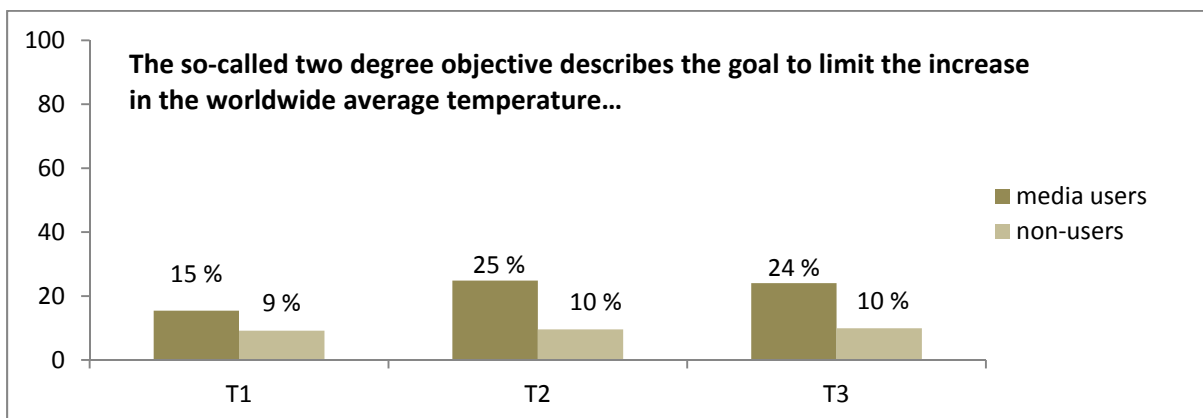
Note: n=1121

This means the respondents learnt more about climate politics at some point in the past than the group of people who claimed that they did not receive information from the media. It is possible and likely that this learning has to do with the media content they used. This explains the complex findings of this study that media users have higher levels of knowledge about climate policy but that they did not necessarily learn much more during the time span of our survey. The slight increase of knowledge among people who claim that they did not receive information from the media can be explained either by a learning effect from direct communication with other people or by false responses to the respective survey question: they might have received relevant information from the media, but they did not recall this.

This supplementary analysis, therefore, leads to the following two conclusions: First, short-term learning from the media can be expected only on items very closely related to the respective event (such as "goal of the conference"). Second, media teach background knowledge only in the long-term and to a somewhat limited degree. Correlations between knowledge and media use represent the cumulated effect of past media use and of other influence factors. Taking items on event-related and background information together, learning effects observed during the climate summit among media users are only a little bit bigger than in the group of non-media users. This also draws attention to the methodological limits of studying media effects on knowledge with the kind of survey approach pursued here. These limits concern both the problem of guessing the right multiple choice answer, learning through participation in the survey and not remembering media use correctly. Future studies should combine the study of short-term effects, medium and long-term effects and combine surveys with more qualitative studies to provide a fuller picture of how different factors interact over time to produce better or less informed citizens.

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