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To cite this article: Viktoria Cologna *et al* 2025 *Environ. Res. Lett.* **20** 014043

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RECEIVED
3 May 2024REVISED
5 November 2024ACCEPTED FOR PUBLICATION
28 November 2024PUBLISHED
20 December 2024

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How scientists' collective climate advocacy affects public trust in scientists and voting behavior

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E-mail: cologna@collegium.ethz.ch**Keywords:** advocacy, trust in scientists, voting behavior, climate policySupplementary material for this article is available [online](#)

Abstract

Scientists increasingly engage in policy advocacy, especially on climate change. Does this advocacy undermine—or bolster—public trust in scientists and support for scientists' recommendations? We leveraged a unique opportunity to answer this question in a real-world setting: the 2023 referendum for the Swiss climate protection law (CPL), which was supported by a public statement of 252 renowned scientists across disciplines. We conducted a pre-registered, two-wave, quasi-field experiment ($n_{\text{pre-vote}} = 1,622$, $n_{\text{post-vote}} = 891$) to test how scientists' collective support for the law affected public trust in scientists and voting behavior. We found that scientists' advocacy was associated with greater public trust, particularly among left-leaning individuals; only a minority viewed these scientists as not objective. However, perceptions of scientists' role in society and policymaking and voting behavior remained largely unaffected when participants were reminded of the CPL advocacy. Although we studied a restrained form of policy advocacy in a somewhat unique setting, our study challenges the widespread assumption that policy advocacy undermines public trust in scientists.

1. Introduction

The world is still far from a pathway towards the climate change thresholds agreed in the Paris Agreement (Rogelj *et al* 2023). What role should scientists play, in light of this divergence between climate science and climate action? Given their expertise on the topic, some argue that climate scientists are obligated to warn the public about the threats of climate change, but not necessarily to advocate for specific policies (e.g. Oreskes 2020). Others go further, arguing that scientists should step out beyond their traditional roles and act as advocates for particular policies and

actions, or even engage in civil disobedience (e.g. Gardner and Wordley 2019, Bennett *et al* 2020, Green 2020, Gardner *et al* 2021, Capstick *et al* 2022, Racimo *et al* 2022). But beyond mere recommendations, what are scientists currently doing, and what are the effects of these actions?

A sizeable share of climate scientists already engage in advocacy (Tollefson 2021), 'the act of persuading or arguing in support of a specific cause, policy, idea or set of values' (Cox 2010, p 226). For example, 66% of scientists on the Intergovernmental Panel on Climate Change (IPCC) stated that they had engaged in advocacy related to climate change, with

40% of those who engaged having contacted lawmakers or government officials to advocate specific climate policies (Tollefson 2021). Although a sizeable share, this is far less than the share of climate scientists who believe that climate scientists *should* engage in advocacy, which ranges between 59% (in the United States) to 73% (in Germany; Cologna et al 2021) and reaches even 81% in the aforementioned study on IPCC scientists (Tollefson 2021). A large-scale 115-country survey of over 9000 scientists across all fields found that 29% of scientists had engaged in climate change-related advocacy, while 51% believed that scientists should be more engaged in advocacy (Dablander et al 2024). Scientists' hesitation to engage in advocacy as much as they perceive they should has been termed a 'perception-engagement gap' (Cologna et al 2021).

One reason for the perception-engagement gap may be scientists' lack of knowledge about the public's normative perceptions of the role of scientists in policymaking (Cologna et al 2021), i.e. the extent to which they think that scientists should be involved in society and policymaking. For example, scientists may be unaware of public opinion on whether scientists should advocate for policies or closely work with policymakers. Previous public opinion surveys indicate that citizens largely support scientists' political engagement, including policy advocacy and policy design and implementation (American Academy of Arts & Sciences 2018, Cologna et al 2021, 2024b, Bertson 2022). However, scientists' advocacy can impact their trustworthiness and their perceived role in policymaking in the eyes of the public, with potential longer-term consequences (Nelkin 1977, Lackey 2007, Nelson and Vucetich 2009). Despite the importance of this question, only recently have researchers begun to study the public's normative perceptions of scientists in policymaking (Cologna et al 2024b) and the effects of scientists' advocacy on public trust in scientists (for a review see Cologna et al 2024a).

While this emerging research suggests that scientists are not perceived as less trustworthy when they advocate for climate policies in general (Kotcher et al 2017, Cologna et al 2021), the level of trust in advocating scientists may depend on the specific policy in question (Beall et al 2017, Kotcher et al 2017), public support for the advocated policy (Cologna et al 2022, Post and Bienzeisler 2024), as well as individuals' political orientations (Kotcher et al 2017). For example, following the March for Science, liberals' perceptions of scientists' trustworthiness in the United States became more positive, but conservatives' perceptions became more negative (Motta 2018). Kotcher et al (2017) further found that compared to liberals and moderates, conservative participants in the United States rated advocating scientists as

less credible, less motivated by scientific evidence, and more motivated by their political views. The effects of scientists' advocacy on perceived trustworthiness therefore likely also depend on people's political views.

Previous studies of scientists' advocacy were often generated via surveys involving advocacy messages by fictional scientists in hypothetical scenarios (Beall et al 2017, Elliott et al 2017, Kotcher et al 2017, Cologna et al 2021, 2022). Thus, they lack external validity—and possibly also internal validity if participants doubted the truthfulness of the message. Furthermore, these studies analyze the effects of advocacy by *one fictional scientist*, overlooking the potential effects of advocacy by a group of scientists, or most scientists in a field (i.e. collective advocacy) on scientists' perceived trustworthiness. Furthermore, to the best of our knowledge, no study has investigated whether scientists' policy advocacy affects self-reported voting behavior, a key contribution of our study. This is important as scientists' hesitancy to advocate could be due to a lack of research on the public's behavioral responses to advocacy, including self-reported voting behavior.

Positive effects of advocacy on perceived trustworthiness of scientists are often driven by public perceptions that advocating scientists act in the best interest of the public and desire to serve the public (Beall et al 2017, Cologna et al 2021). As 1 of the 4 core facets of trustworthiness (Mayer et al 1995), perceived benevolence is an important predictor of public perceptions of scientists' trustworthiness (Besley et al 2021). Next to benevolence, perceptions of scientists' trustworthiness are driven by perceived competence, integrity, and openness (Mayer et al 1995, Besley and Tiffany 2023). Yet, previous studies have mostly focused on single dimensions of trustworthiness when studying the effects of advocacy (e.g. Motta 2018), limiting our understanding of how advocacy affects the *different dimensions of trust* (e.g. integrity, benevolence, and competence).

Here, we build on and extend this existing knowledge on how scientists' advocacy affects public reactions with three key contributions. First, we provide the first real-world, longitudinal, large-scale assessment of scientists' collective policy advocacy by studying scientists' collective advocacy for the climate protection law (CPL) in Switzerland and its impact on public trust in scientists and voting behavior. Second, we study the effects of collective advocacy, 'the act of persuading or arguing in support of a specific policy' by a group of scientists (Cox 2010, p 226)—not just single scientists or fictional characters described as scientists. Third, we use a more holistic concept of trust including the four dimensions: perceived competence, benevolence, integrity, and openness (Besley et al 2021, Besley and Tiffany 2023).

To do so, we leverage a unique field setting to examine the effects of a restrained form of collective advocacy by scientists; it is distinguishable from other forms of activism such as joining protests and civil disobedience, which involve ‘public acts of conscience that seek to disrupt and resist business as usual and/or to effect changes in laws and practices’ (Capstick *et al* 2022, p 773). On 18 June 2023, the Swiss public voted on the Federal Act on Climate Protection Targets, Innovation and Strengthening Energy Security (the ‘Climate Protection Law’). The bill called for Switzerland to gradually reduce its consumption of mineral oil and natural gas, with a net-zero greenhouse gas goal for Switzerland by 2050. The CPL also introduced measures to reduce energy consumption and provide financial assistance to those who replace their oil, gas, and electric heating. It was supported by a majority of the Swiss electorate (59.1%). Before the national vote, in April 2023, 252 scientists in Switzerland organized to advocate in its favor, by issuing a public statement of support. The statement was signed by scientists across disciplines, including climate science, impacts, energy, economics, law, and political and communication science. We conducted a pre-registered, online survey experiment with a Swiss sample (representative for age and gender) 10 days before and three weeks after the vote to provide longitudinal evidence on how scientists’ collective advocacy for the CPL influenced public trust and voting behavior.

1.1. Pre-registered research questions and hypotheses

We examined the effects of individual predictors and our experimental treatment on key outcomes such as voting intentions (RQ1; RQ2e–2f), trust in scientists (RQ2a–2b; RQ3a–3b), and normative perceptions of scientists in policymaking (RQ2c–2d; RQ3c–3d).

Based on previous studies that assessed predictors of climate policy support (Cologna and Siegrist 2020, Bergquist *et al* 2022, Todorova *et al* 2024), we hypothesized that trust in scientists, political orientation, climate change concern, experimental condition, and demographic variables relate to voting intentions (H1, H2e). We further hypothesized a negative effect of the treatment (vs control) on voting intentions among supporters of the Swiss right-wing political party (Schweizerische Volkspartei [Swiss People’s Party] or (SVP)) and more right-leaning individuals pre-vote (H2f).

As previous studies have found that scientists’ advocacy can have positive effects on trust (Beall *et al* 2017), we hypothesized that trust in scientists will be higher in the treatment (vs control) pre-vote (H2a) and post-vote (H3a). Given that trust in advocating scientists has been shown to relate to political orientation (Kotcher *et al* 2017, Motta 2018), we hypothesized a negative effect of treatment (vs

control) on trust in scientists among SVP supporters and more right-leaning individuals pre-vote (H2b). We also hypothesized a negative effect of the treatment (vs control) on trust in scientists for participants who voted against the CPL post-vote (H3b).

Since the effect of advocacy on normative perceptions of scientists in policymaking has not been investigated yet, our hypotheses were speculative and based on the assumption that the effect of advocacy on normative perceptions would be similar to the effect of advocacy on trust in scientists. We therefore hypothesized that normative perceptions of scientists in policymaking will be significantly higher in the treatment group than in the control group both pre-vote (H2c) and post-vote (H3c). Further, we hypothesized a negative effect of the treatment (vs control) on normative perceptions among SVP supporters and more right-leaning individuals pre-vote (H2d). Lastly, we hypothesized a negative effect of the treatment (vs control) on normative perceptions for participants who voted against the CPL post-vote (H3d). A detailed overview of our pre-registered research questions, hypotheses, and deviations from the pre-registration can be found in table S1.

2. Methods

2.1. Sampling method

To determine our minimum target sample size, we conducted a power analysis with G*Power (Faul *et al* 2007). It showed that a sample of $n = 788$ is needed to have 80% power to detect a small effect size $d = 0.20$ in independent t-tests (two-tailed). To reach $n = 788$ post-vote, we aimed to recruit at least $n = 1,650$ for our pre-vote survey (expecting a 60% recall rate and a 10% attention check fail rate in the pre- and post-vote survey). We pre-registered all research questions, hypotheses, and analyses on OSF: <https://osf.io/fd9vs>

Samples with balanced quotas for age (five categories: 20% 18–29 years, 20% 30–39 years, 20% 40–49 years, 20% 50–59 years, 20% 60 years and older) and gender (two categories: 50% male, 50% female) were recruited by the market research company Bilendi & respondi with the use of online questionnaires programmed in Qualtrics 10 days before and three weeks after the voting on 18 June 2023 (see figure S1). Pre-vote, we collected a sample of $n = 1897$ participants. In the pre-vote survey, participants were randomly split into a control group (which received an explanatory text on popular initiatives) and a treatment group (which was informed that over 230 scientists advocated for the CPL, including original excerpts from the letter). The survey included two attention checks. 2.74% of respondents failed the first attention check and 12.57% failed the second attention check. We only retained participants that passed both attention checks and completed the survey, resulting in a final sample of $n = 1,622$

participants ($n = 815$ in the control group and $n = 807$ in the treatment group). 49.6% of our pre-vote sample identified as female with a mean age of 44 years.

Three weeks after the vote, we reinvited all participants who had completed the pre-vote survey, resulting in a sample of $n = 961$ participants and a resampling rate of 59.25%. Participants were reassigned to the same conditions they were assigned to in the pre-vote survey. Our post-vote survey had one attention check which 4.02% of participants failed. Again, we only retained responses of participants who passed the attention check, deleted duplicate responses ($n = 48$), and completed the survey, resulting in a final sample size of $n = 891$ participants ($n = 489$ in the control group and $n = 402$ in the treatment group). 46% of our sample identified as female with a mean age of 47 years. In table S12 we provide information about the representativeness of both samples with respect to age, gender, education, and income. As noted in table S12, the pre- and post-vote samples are similar in terms of representativeness across demographic variables. Our sample is also representative of the Swiss population for all variables except for income, where our sample is below the national median income. Since we surveyed participants about their median household income but did not ask how many people live in their household, we are unable to ensure an appropriate reference group to properly assess the representativeness.

2.2. Questionnaire

After providing consent and answering socio-demographic questions, in the pre-vote survey, all participants were asked about their levels of climate change concern: 'How concerned are you about climate change?' (1 = Not at all, 5 = Very much). Participants were then asked to read a short description of the CPL. We used parts of the original description provided by the Swiss government. Participants in the control group then read an explanatory text about popular initiatives, while participants in the treatment group were informed that over 230 scientists in Switzerland had issued a statement in support of the CPL and asked to read excerpts from the statement. Both groups then had to answer an attention check related to the text they had just read. Participants in the treatment group were additionally asked to answer the following two questions: 'To what extent do you believe that these over 230 scientists represent the opinions of the Swiss scientific community?' (1 = Not at all, 5 = Very strongly) and 'To what extent do you believe that these over 230 scientists are objective in their assessment of this law?' (1 = Not at all, 5 = Very strongly). All participants were then asked to state their voting intention for the CPL (1 = Yes, 2 = No, 3 = I would abstain, 4 = I do

not know). Before completing the survey, participants were asked to indicate their political orientation on a scale from 1 = Strongly left-leaning to 5 = Strongly right-leaning. 'I do not know' responses were coded as missing.

In the post-vote survey, participants were asked whether they had voted (1 = Yes, 2 = No) and if they had voted, what they had voted for (1 = I voted YES, 2 = I voted NO, 3 = I prefer not to say). Participants were then informed about the voting outcome in their canton of residence. Participants in the treatment group were additionally shown a short statement that reminded them of the advocacy statement they had read in the previous survey and mentioned that advocating scientists were therefore representing the majority opinion of the Swiss electorate.

The following measures were assessed in both pre- and post-vote surveys. Trust in scientists was assessed with a 12-item index ($\alpha_{\text{pre}} = .92$, $\alpha_{\text{post}} = .93$; 1 = Strongly disagree, 5 = Strongly agree) that measures four well-established dimensions of trustworthiness: perceived competence, benevolence, integrity, and openness (Besley et al 2021, Besley and Tiffany 2023). These items are based on a comprehensive review of the literature on trust measures of public perceptions of scientists (Besley et al 2021). Normative perceptions of scientists' role in society and policy-making were assessed with a 5-item index that has recently been validated across 68 countries (Mede et al 2024), including items such as 'Scientists should be more involved in the policymaking process' ($\alpha_{\text{pre}} = .82$, $\alpha_{\text{post}} = .84$; 1 = Strongly disagree, 5 = Strongly agree). The full questionnaires are available on OSF: <https://osf.io/tpx97>

2.3. Analyses

We used Welch independent samples t-tests to examine mean differences between treatment and control conditions and paired sample t-tests for within-subjects mean differences. To estimate the predictors of trust in scientists and normative perceptions of scientists, we used linear regressions. The variable political orientation (right) was centered for models with interaction effects with the treatment condition. The income variable (in CHF) was standardized to facilitate its interpretation. To estimate the predictors of voting intentions and actual voting behavior we used logistic regressions. The robustness of the condition on trust across time was assessed with a multilevel linear regression with random intercepts across participants given the within-subjects design. All analyses were conducted in R version 4.3.1. The analysis code is available on OSF: <https://osf.io/tpx97>

3. Results

In the following section, we report the effects of advocacy on trust in scientists (pre- and post-vote)

and normative perceptions of scientists in society and policymaking (pre- and post-vote). We then present results on the predictors of positive voting intentions pre-vote, and self-reported voting behavior post-vote, including the effect of advocacy on CPL support.

3.1. Effects of advocacy on trust in scientists

3.1.1. Pre-vote

We first report the results of the pre-vote survey, i.e. before participants learned about the outcome of the vote. We hypothesized that trust in scientists would be higher for the treatment (vs control) group (H2a), and that political orientation and political party preference (SVP) would moderate the relation between the treatment and trust in scientists (H2b). Prior to the vote, but after the treatment, there was no difference in trust in scientists between the treatment ($M = 3.51$, $SD = 0.65$) and control groups ($M = 3.46$, $SD = 0.64$; $t(1618) = -1.580$, $p = .114$). However, a small and significant effect emerged after controlling for political orientation and socio-demographic variables (table 1): participants exposed to the advocacy statement trusted scientists more than those in the control group (exploratory linear regression analyses for individual trust dimensions can be found in tables S4–S7). H2a is therefore partially supported.

More than half (55.51%) of participants in the treatment condition believed the advocating scientists were objective (14.37% believed they were not objective; 30.11% were neutral). The interaction effect of the treatment (vs control) condition and right-leaning political orientation on trust showed that the positive effect of the treatment on trust was significantly stronger for left- (vs right-) leaning participants (figure 1)¹⁰, supporting H2b. A simple slope analysis can help visually represent the statistically significant coefficient for the interaction term. We therefore conducted a simple slope analysis to examine the moderation effect of political orientation at -1 SD (more left-leaning), the mean, and $+1$ SD (more right-leaning). This allowed us to analyze whether more right-leaning individuals in the treatment condition had lower trust in scientists than those in the control condition. We found a non-significant, small negative effect of treatment on trust among more right-leaning individuals ($+1$ SD; $b = -.02$, $p = .68$). Thus, we find no evidence that the treatment backfired on right-leaning participants' trust; rather, it appeared to have no effect.

¹⁰ Additional pre-registered analyses using respondents' support for the Swiss right-wing political party (Schweizerische Volkspartei [Swiss People's Party] or SVP) as an alternative measure of political orientation are presented in the SI, table S2 and S3. However, the results were not statistically significant and thus do not support H2b.

3.1.2. Post-vote

How did attitudes and perceptions change after observing the outcome of the vote? In the post-vote survey, participants in both conditions were informed about whether the bill had been accepted or rejected in their canton/voting district of residence. Participants in the treatment condition were reminded about the scientists' collective statement supporting the CPL that they saw in the first survey. Because the majority of the Swiss electorate voted in favor of the CPL, participants in the treatment condition were also informed that the advocating scientists represented the majority opinion of the electorate: '59.1% of Swiss voters approved the CPL. In a previous survey, we showed you a statement issued by 230+ scientists. In this statement, scientists publicly supported the CPL. These scientists were therefore **representing the majority opinion** of the Swiss electorate.' Participants in the control condition did not receive an additional statement. We hypothesized that trust in scientists would be higher for participants exposed to the advocacy statement in the treatment (vs the control) group. However, we found no significant differences in the levels of trust in scientists between the treatment ($M = 3.49$, $SD = 0.68$) and the control groups ($M = 3.42$, $SD = 0.68$; $t(857) = -1.577$, $p = .115$) after the vote. However, similar to the pre-vote data, exploratory analyses revealed a small, positive effect of the treatment on trust in scientists when controlling for political orientation and other socio-demographic variables ($\beta = 0.12$, $p = .018$; table 2), partially supporting H3a. Exploratory paired t-tests showed no significant differences in trust in scientists pre- and post-vote within the control ($t_{\text{paired}}(488) = 1.426$, $p = .154$) and treatment ($t_{\text{paired}}(390) = 1.952$, $p = .052$) groups. Exploratory, non-preregistered analyses assessing the robustness of effects over time can be found in table S13.

3.2. Effects of advocacy on normative perceptions of scientists in society and policymaking

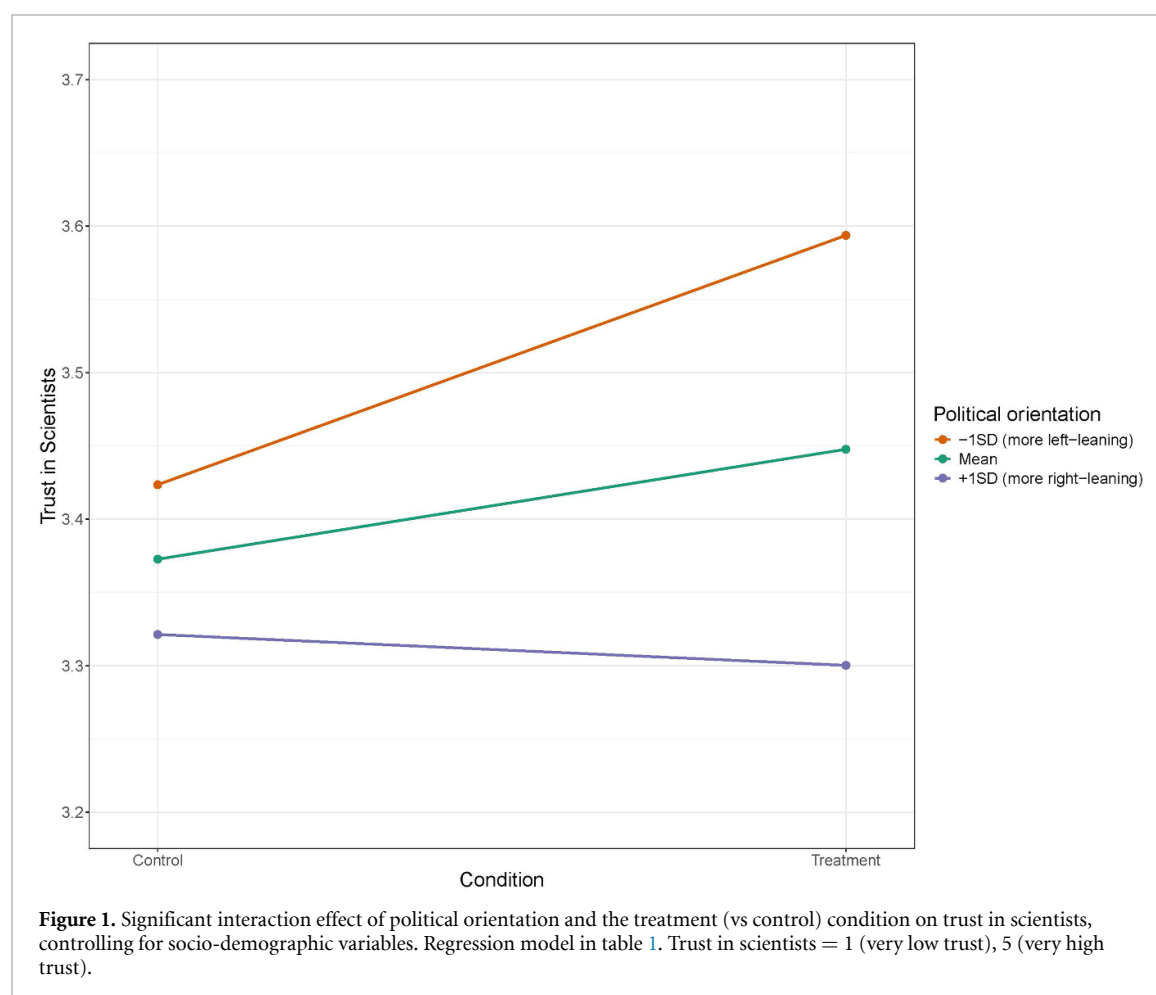
3.2.1. Pre-vote

Normative perceptions of scientists' role in society and policymaking describe the extent to which people believe that scientists should be involved in society and policymaking. We hypothesized that these normative perceptions would be significantly higher in the treatment (vs control) group and that political orientation and political party preference would moderate this effect. We found no significant difference in these normative perceptions between the treatment ($M = 3.79$, $SD = 0.84$) and control groups ($M = 3.74$, $SD = 0.80$; $t(1615) = -1.280$, $p = .201$)—even after controlling for political orientation and socio-demographic variables (table 3). This suggests

Table 1. Blockwise linear regression on trust in scientists (pre-vote).

Predictors	Trust in scientists							
	β	CI	Statistic	p	β	CI	Statistic	p
(Intercept)	3.49	3.44–3.54	145.06	<.001	3.39	3.26–3.52	52.69	<.001
Advocacy letter treatment	0.07	0.00–0.13	1.99	.047	0.08	0.01–0.15	2.11	.035
Political orientation (right)	–0.05	–0.10–0.00	–2.07	.039	–0.05	–0.10–0.00	–2.01	.045
Treatment * political orientation (right)	–0.09	–0.16–0.02	–2.51	.012	–0.10	–0.17–0.03	–2.66	.008
Male					0.05	–0.02–0.12	1.33	.185
Language region: Italian					–0.04	–0.17–0.09	–0.63	.527
Language region: French					0.04	–0.04–0.12	0.93	.351
Residence: urban					0.17	0.10–0.25	4.72	<.001
Age (in years)					0.00	–0.00–0.00	–0.36	.719
Income (in CHF)					0.04	0.00–0.08	2.04	.042
Observations		1392				1242		
R^2/R^2 adjusted		0.027/0.025				0.056/0.049		

Note: Language regions are compared to German. Residence: 1 = Urban, 0 = Rural. Gender: 1 = Male, 0 = Female, other responses were coded as missing. Political orientation = 1 (strongly left-leaning), 5 (strongly right-leaning). Baseline is placebo letter treatment. Income was standardized. Pre-vote survey wave.



that public perceptions of scientists' role in society and policymaking were unaffected by the treatment, failing to support H2c. We also found that political orientation, but not party preference (table S3), moderated the effect of the treatment on normative perceptions. However, we only found this effect for

the model without covariates, only partially supporting H2d.

3.2.2. Post-vote

We found a small significant difference in normative perceptions of scientists' role in society and

Table 2. Linear regression predicting trust in scientists post-voting.

Predictors	Trust in scientists post-voting			
	β	CI	Statistic	<i>p</i>
(Intercept)	3.37	3.19–3.56	35.98	<.001
Advocacy letter treatment	0.12	0.02–0.22	2.38	.018
Political orientation (right)	−0.09	−0.16–0.02	−2.56	.011
Gender: male	0.09	−0.02–0.19	1.65	.099
Language region: Italian	0.03	−0.15–0.21	0.33	.739
Language region: French	0.09	−0.02–0.20	1.61	.108
Residence: urban	0.21	0.11–0.31	4.17	<.001
Age (in years)	−0.00	−0.01–0.00	−1.65	.099
Income (in CHF)	0.04	−0.01–0.09	1.45	.148
Treatment * political orientation (right)	−0.03	−0.13–0.07	−0.66	.512
Observations	698			
R^2/R^2 adjusted	0.071/0.059			

Note: Language regions are compared to German. Residence: 1 = urban, 0 = rural. We included the non-preregistered interaction term treatment * political orientation to be able to compare results with the pre-vote survey. Income was standardized.

Table 3. Blockwise linear regression on normative perceptions (pre-vote).

Predictors	Normative perceptions of scientists in society and policymaking							
	β	CI	Statistic	<i>p</i>	β	CI	Statistic	<i>p</i>
(Intercept)	3.75	3.69–3.81	124.46	<.001	3.79	3.64–3.95	47.29	<.001
Advocacy letter treatment	0.08	−0.01–0.16	1.82	.069	0.07	−0.02–0.16	1.52	.128
Political orientation (right)	−0.13	−0.19–0.06	−4.03	<.001	−0.13	−0.20–0.07	−4.09	<.001
Treatment * political orientation (right)	−0.10	−0.19–0.01	−2.30	.022	−0.09	−0.18–0.00	−1.92	.055
Male					−0.02	−0.11–0.07	−0.37	.714
Language region: Italian					0.10	−0.06–0.26	1.22	.223
Language region: French					−0.04	−0.13–0.06	−0.70	.484
Residence: urban					0.18	0.09–0.27	3.99	<.001
Age (in years)					0.00	−0.01–0.00	−1.61	.107
Income (in CHF)					0.02	−0.03–0.07	0.80	.421
Observations	1392				1242			
R^2/R^2 adjusted	0.048/0.046				0.070/0.063			

Note: Language regions are compared to German. Residence: 1 = urban, 0 = rural. Gender: 1 = male, 0 = female, other responses were coded as missing. Political orientation = 1 (strongly left-leaning), 5 (strongly right-leaning). Baseline is placebo letter treatment. Income was standardized. Pre-vote survey wave.

policy making between the treatment ($M = 3.80$, $SD = 0.85$) and the control ($M = 3.62$, $SD = 0.87$; $t(863) = -3.161$, $p = .002$), supporting H3c. However, this small difference was not driven by higher levels of normative perceptions in the treatment group, but rather by lower levels in the control group ($t_{\text{paired}}(488) = 2.984$, $p = .003$).

3.3. Effects of advocacy on CPL support

3.3.1. Voting intentions pre-vote

About half (53.3%) of our participants indicated that they planned to vote in favor of the CPL in the pre-vote survey (25.2% intended to vote against, 8.8% to abstain, and 12.8% did not know). However, afterward, 61.7% reported that they actually voted in favor

of the law¹¹, slightly more than the actual voting outcome (59.1%). In contrast to H2e, participants exposed to the advocacy statement in the treatment condition were not more likely than participants in the control condition to have positive voting intentions or self-reported voting behavior in favor of the CPL (tables 4 and 5). We found that trust in scientists, party preference (SVP), living in an urban (vs rural area), being younger, and being concerned about climate change correlate with intentions to vote in favor of the law (table 4). This partially supports our hypothesized correlates (H1b) of favorable voting intentions.

¹¹ Note that the samples in the pre-and post-vote survey differ, which could explain this difference.

Table 4. Logistic regression predicting voting intentions pre-vote.

Predictors	Voting intention (yes vs no)			
	Odds ratios	CI	Statistic	<i>p</i>
(Intercept)	0.00	0.00–0.03	−5.07	<.001
Advocacy letter treatment	0.94	0.59–1.52	−0.25	.803
Trust in scientists	5.09	3.24–8.25	6.83	<.001
Political orientation (right)	0.76	0.57–1.01	−1.89	.058
Political party: SVP	0.23	0.12–0.42	−4.70	<.001
Gender: male	0.79	0.47–1.35	−0.86	.390
Language region: Italian	0.86	0.33–2.32	−0.31	.757
Language region: French	0.65	0.36–1.15	−1.50	.135
Residence: urban	1.93	1.18–3.21	2.58	.010
Income (in CHF)	1.01	0.81–1.31	0.10	.919
Age (in years)	0.97	0.96–0.99	−3.29	.001
Climate change concern	2.33	1.81–3.06	6.35	<.001
Father of girl: Yes	1.83	0.80–4.36	1.40	.161
Observations	613			
R^2 Tjur	0.476			

Note: Voting intentions: 1 = yes, 0 = no. Model excludes participants who selected the response options 'I would abstain' ($n = 142$) and 'I do not know' ($n = 208$). Language regions are compared to German. Residence: 1 = urban, 0 = rural. Income was standardized.

Table 5. Logistic regression predicting self-reported voting behavior post-vote.

Predictors	Self-reported voting behavior (yes vs no)			
	Odds ratios	CI	Statistic	<i>p</i>
(Intercept)	0.00	0.00–0.03	−4.81	<.001
Advocacy letter treatment	0.66	0.39–1.13	−1.50	.133
Trust in scientists	5.74	3.63–9.43	7.20	<.001
Political orientation (right)	0.57	0.42–0.77	−3.58	<.001
Political party: SVP	0.64	0.32–1.30	−1.24	.214
Gender: male	0.96	0.55–1.68	−0.14	.891
Language region: Italian	4.58	1.37–18.09	2.32	.020
Language region: French	1.30	0.72–2.37	0.86	.392
Residence: urban	0.89	0.52–1.52	−0.42	.678
Income (in CHF)	1.01	0.81–1.30	0.07	.944
Age (in years)	0.98	0.97–1.00	−1.92	.055
Climate change concern	2.41	1.82–3.24	5.99	<.001
Observations	454			
R^2 Tjur	0.438			

Note: Self-reported voting behavior: 1 = yes, 0 = no. Model excludes participants who did not vote ($n = 209$) and selected the response options 'Prefer not to say' ($n = 32$). Language regions are compared to German. Residence: 1 = Urban, 0 = Rural. Income was standardized.

3.3.2. Self-reported voting behavior post-vote

We also conducted an exploratory linear regression analysis to assess the correlates of self-reported voting behavior *post vote*. This analysis was not pre-registered; however, we believe that the findings are of interest. We found that trust in scientists was positively associated with voting 'yes', as was concern about climate change, and living in Switzerland's Italian- (vs German-) speaking region (table 5). Right-leaning political orientation was negatively associated with voting in favor of the law. Thus, overall, we found that trust in scientists is significantly and positively correlated with both the intention to vote 'yes' and reporting to have voted 'yes' in the referendum. However,

our data do not allow us to draw conclusions on the causality of trust in scientists and self-reported voting behavior.

4. Discussion

We used a real-world field setting to test the effects of scientists' collective advocacy on public trust in scientists, support for the advocated policy, and voting behavior. In line with previous research, scientists' advocacy for policies with high public support can increase trust in scientists—especially among left-leaning individuals. Importantly, we find no evidence that the treatment backfired on right-leaning

participants' trust. However, it should be noted that these effects are small. The finding that advocacy can increase trust in scientists is important, because we showed that trust in scientists is a strong predictor of both favorable voting intentions and favorable voting behavior. We also supported previous findings (Azevedo and Jost 2021, Cologna *et al* 2024b) that residents of urban (vs rural) regions, as well as participants with left-leaning political orientations, tend to have higher trust in scientists. The correlation with income is small and in line with previous research (Cologna *et al* 2024b). The relation between income and trust should be interpreted with caution since our sample was not representative for income (see table S12). Furthermore, residents of urban (vs. rural) regions as well as people with more right-leaning political views tended to have stronger normative perceptions regarding scientists' involvement in society and policymaking (Cologna *et al* 2024b). Thus, these two personal attributes seem to have substantial predictive power regarding views on scientists' advocacy. Interestingly, trust in scientists is also significantly correlated with the intention to vote 'yes' and reporting to have voted 'yes' in the referendum. However, given the structure of our data, we cannot say anything about the direction of this relation. Even though one might speculate that this is the case, we are therefore unable to state that this finding shows that people tend to trust scientists more if the advocacy message coincides with their own beliefs and policy preferences.

However, scientists' advocacy did not directly affect voting intentions nor self-reported voting behavior. Because the referendum was a topic of pronounced media interest, one may argue that our intervention—reading the advocacy statement 10 days before the vote—might not have been enough or too late to change people's voting intentions. One may also speculate that the effects of advocacy on trust over time are more indirect, thus gradually changing voting behavior; alternatively, advocacy could have changed the way media reported on the issue, how much money was raised for the campaign, and/or affected the willingness of certain parts of the population to go and vote. Further, a large majority of Swiss voters vote via mail before voting day. Thus, participants might have already cast their vote by the time of our survey. Taken together, our study offers a conservative test of scientists' advocacy on trust and voting behavior. We recommend future studies to take a broader approach in understanding the ways in which scientists' advocacy affects public opinion and political behavior, e.g., changes in media reporting or political donations following scientists' policy advocacy. We particularly encourage future research to employ mixed-method approaches, including qualitative interviews, to gain

deeper insights into behavioral responses to scientists' advocacy.

The negative effects of advocacy on scientists' perceived objectivity were negligible: Only a small minority perceived the advocating scientists as not objective. Critically, we also found no evidence of a backlash against the trustworthiness of advocating scientists among ideologically right-leaning individuals. This suggests that the hesitance of some scientists to engage in advocacy—for fear that it might compromise their perceived objectivity and therefore undermine public trust—is not supported by the results of this study. It is important to emphasize that advocacy here refers to a specific, restrained public intervention. Further, the advocacy statement was signed by a large and disciplinary diverse group of scientists, and the CPL was supported by the majority of the public. How and if the positive effects of policy advocacy on trust in scientists found in this case-study are generalizable to other situations and types of advocacy remains to be shown by future research. One limitation is that our results are specific to one country (Switzerland) where a majority of the public supported the advocated policy. The effects of advocacy on trust might be different if scientists were advocating for a policy that was not already supported by a majority of the public (e.g. carbon tax). Thus, it remains to be shown in future research how scientists' advocacy affects public opinion in other circumstances where the advocated policy is more controversial or may have negative effects for some parts of the population. While only a minority perceived advocating scientists not to be objective, future research should investigate how advocating scientists should best approach different groups, especially those who are opposed to the scientists' position. Overall, this study provides novel, causal evidence of scientists' advocacy in the critical context of climate change policy.

Data availability statement

The data that support the findings of this study are openly available at the following URL/DOI: https://osf.io/tpx97/?view_only=3c65da12b9414693acf57a9291f72d72. Data will be available from 01 May 2025.

Acknowledgment

The authors thank Eugenia Bajet Mestre (University of St. Gallen) for peer-reviewing the analysis code. V.C. acknowledges support from the Swiss National Science Foundation Postdoc Mobility fellowship (P500PS_202935) and the Harvard University Faculty Development Fund. Conceptualization: V.C., J.F., N.G.M., L.H., E.B., J.G., R.K., M.S.S.; Data curation: V.C.; Formal analysis: V.C., L.H.; Funding acquisition:

R..K., M.S.S.; Investigation: V.C., J.F., N.G.M., L.H., E.B., J.G.; Methodology: V.C., J.F., N.G.M., L.H., E.B., J.G.; Project administration: V.C.; Supervision: V.C.; Visualization: V.C.; Writing—original draft: V.C., J.F.; Writing—review & editing: V.C., J.F., N.G.M., L.H., J.G., E.B., R.K., N.O., M.S.S.

Conflict of interest

R.K. and M.S.S. are signatories of the public statement in support of the Climate Protection Law.

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