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The Honest Broker versus the Epistocrat: Attenuating Distrust in Science by Disentangling Science from Politics

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ABSTRACT

People's trust in science is generally high. Yet in public policy disputes invoking scientific issues, people's trust in science is typically polarized, aligned with their political preferences. Theorists of science and democracy have reasoned that a polarization of trust in scientific information could be mitigated by clearly disentangling scientific claims from political ones. We tested this proposition experimentally in three German public policy disputes: a) school closures versus openings during the COVID-19 pandemic, b) a ban on versus a continuation of domestic air traffic in view of climate change, and c) the shooting of wolves in residential areas or their protection. In each case study, we exposed participants to one of four versions of a news item citing a scientist reporting their research and giving policy advice. The scientist's quotes differed with regard to the direction and style of their policy advice. As an *epistocrat*, the scientist blurs the distinction between scientific and political claims, purporting to "prove" a policy and thereby precluding a societal debate over values and policy priorities. As an *honest broker*, the scientist distinguishes between scientific and political claims, presenting a policy option while acknowledging the limitations of their disciplinary scientific perspective of a broader societal problem. We find that public policy advice in the style of an honest broker versus that of an epistocrat can attenuate political polarization of trust in scientists and scientific findings by enhancing trust primarily among the most politically challenged.

KEYWORDS

Experimental research; motivated reasoning; polarization; science communication; science-policy interface; trust in science

In public policy disputes touching upon scientific issues, public actors frequently suggest that science functions as an imperative for political decision-making. For instance, environmental activists often demand policymakers to "follow the science." Medical scientists in several countries insisted that policymakers halt their plans or take particular actions in the COVID-19 pandemic (Clarke, 2021; Hirschi, 2021). Quite recently, UN Secretary-General Antonio Guterres thanked the Intergovernmental Panel on Climate Change (IPCC) "for showing the fact-based, science-grounded way out of the climate mess" (United Nations, 2023).

Scholars have dismissed the idea that political decisions can be made on purely scientific grounds as simplistic and potentially harmful. It is simplistic because political decisions

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cannot be derived unequivocally from scientific knowledge. Applying systematic methods, scientists produce reliable pieces of knowledge from a narrow disciplinary lens, thus contributing to a body of knowledge that can inform political decision-making. But scientific methods cannot solve resulting conflicts of values or interests due to stakeholders' diverging perspectives of multi-faceted social problems (Nowlin, 2021; Pielke, 2004; Weber, 1904). For example, school closures during the COVID-19 pandemic might have protected teachers but harmed students. And while some believe that climate change should be addressed by stimulating economic growth, others see a solution in curbing free markets. How societies balance the different societal interests, values, and ideologies is a matter of politics and not of science (Dietz, 2013; Grundmann & Rödder, 2019; Jasanoff, 1987; Pielke, 2004; Sarewitz, 2004).

Scholars have reasoned that failures to account for the value questions in scientifically informed policymaking might foster politically driven distrust in science. In short, the argument goes that when citizens are unhappy about the priorities that policymakers assign to individual policy options, they can participate in contestations over values and policy priorities. However, when value questions are precluded in cases where scientific knowledge is suggested to prescribe some policy, unhappy citizens are likely to direct their frustration toward science – as the apparent cause of the policy that they believe is faulty (Bogner, 2021; Druckman & Bolsen, 2011; Grundmann & Rödder, 2019; Lupia, 2023; Nisbet et al., 2015; Nowlin, 2021; Pielke, 2004). This can be detrimental not only for science but also for policymaking. For example, in order for a society to address a scientifically diagnosed problem such as climate change or a pandemic in a reasonable and ethically sound way, a common acceptance of the established scientific knowledge appears to be a minimum requirement.

To counteract the politically driven distrust of scientific information in public policy disputes, scholars have proposed disentangling scientific from political information (Bogner, 2021; Druckman & Bolsen, 2011; Grundmann & Rödder, 2019; Lupia, 2023; Nisbet et al., 2015; Nowlin, 2021; Pielke, 2004). We test this empirically in a series of experiments in three German controversies invoking scientific knowledge – on school closures during the COVID-19 pandemic, domestic air traffic in the face of climate change, and wolf management in residential areas. We test the effects of two styles of a scientist's public policy advice against one another. One, the "epistocrat" (e. g., Bogner, 2021), blurs the distinction between science and politics deriving a policy imperative from their research, thereby precluding a public debate over values and policy priorities. The other, the "honest broker" (Pielke, 2007), distinguishes between science and politics, deriving a policy option from their research, thereby including public debate on values and policy priorities. We find that the policy advice of an honest broker versus that of an epistocrat can mitigate a political polarization of trust in scientists and scientific findings by enhancing trust among the most politically challenged.

Political Polarization of Trust in Science

Science can serve as a source of rigorous, unbiased knowledge for informed political decision-making if people trust it regardless of their political preferences, prior values, attitudes, or ideologies (Lupia, 2023). In general, trust in science has been high in many Western democracies such as the U.S., Switzerland, and Germany (Bromme et al., 2022;

Krause et al., 2019). Yet in specific public policy debates invoking scientific issues, people's trust in scientists or scientific findings often aligns with their preexisting political preferences and ideological or cultural beliefs (Druckman & Bolsen, 2011; Kahan et al., 2011; Kraft et al., 2015; Nisbet et al., 2015). In numerous public policy disputes – for example, over climate change, nuclear energy, genetically modified organisms (GMOs), gun control, and violent video games – people's trust in scientists, scientific evidence, arguments, expertise, or scientific consensus is high when they see their prior attitudes, values, or beliefs confirmed, but low when they see them disconfirmed (Bolsen & Druckman, 2015; Cologna et al., 2022; Druckman & Bolsen, 2011; Hart & Nisbet, 2012; Kahan et al., 2009, 2011; Mothes, 2017; Nauroth et al., 2014; Nisbet et al., 2015; Pasek, 2018).

Authors have pointed to two possible explanations of an attitudinal or political divide of trust in scientific information. Traditionally, divergences of trust have been conceived as the result of directional motivated reasoning (Druckman & McGrath, 2019). According to this view, individuals process information essential to their socially or culturally shared belief systems in ways that allow them to maintain their beliefs and thus protect their social or cultural identities (Kahan et al., 2011; Kunda, 1990; Taber & Lodge, 2006). Therefore, their diverging interpretations and judgments of scientific information result from their motivations to affirm their respective belief systems – for example, by believing attitude-affirming and disbelieving counter-attitudinal information (Druckman & McGrath, 2019).

More recent studies have questioned the prevalence of people's directional motivated reasoning, demonstrating that most people do update their knowledge in the light of new factual information (e. g., Guess & Coppock, 2020; Nyhan, 2021; Rode et al., 2022). This has led some authors to consider whether people's polarization of trust in scientists or scientific findings results from their reliance on and learning from diverging informational repertoires (Druckman & McGrath, 2019). In public policy disputes involving scientific knowledge, people with diverging views use different sets of information sources that distribute different content and interpretations – for example, on the COVID-19 pandemic or climate change (Hetzel et al., 2022; Reinemann et al., 2022; Shehata et al., 2022). Therefore, people with different information repertoires are probably exposed to diverging information about the reliability of particular areas of scientific knowledge, since discreditations of science are frequent features of such public policy disputes (Brüggemann et al., 2020; Druckman, 2017).

Which of the two explanations – people's directionally motivated reasoning or their reliance on different sets of information sources – account for divides of trust in science in partisan or public policy disputes has yet to be determined. Most relevant for the present study is that from both explanations, it can be derived that a separation of science and politics in scientists' public policy advice might attenuate a polarization of trust in science. We develop this argument before we test this proposition.

Depolarizing Trust in Science by Disentangling Science from Politics

In partisan or public policy disputes touching upon scientific knowledge, scientific evidence is often perceived as political information and thus assessed on political grounds (Nisbet et al., 2015; Post, 2016, 2022; Scheufele, 2014). Such perceptions probably result from various actors' use of scientific information for political or ideological purposes (Bolsen & Druckman, 2015; Kraft et al., 2015; Nisbet et al., 2015; Post et al., 2021; Scheufele, 2014; Schmid-Petri et al., 2022; Schuldt et al., 2015). Policymakers and interest groups have been

criticized for their public use of scientific information or scientific uncertainty as political means to compel or delegitimize particular policy programs (Bolsen & Druckman, 2015; Druckman, 2017; Hirschi, 2021; Kraft et al., 2015; Nisbet et al., 2015). Journalists have been found to use information on science or technology selectively in line with their political preferences (Kepplinger & Lemke, 2016; Mothes, 2017). Scientists tend to weigh the potential political effects of their public communication in politicized science disputes (Alinejad & van Dijck, 2022; Post, 2016; Post & Ramirez, 2018). Moreover, significant parts of the public believe that scientific findings can be more or less directly translated into policy (Nowlin, 2021; Post et al., 2021). As a result, scientific information is often charged with a political meaning in public policy conflicts, and it might be difficult for scientists not to be perceived as political when communicating scientific evidence (e. g., Druckman, 2017; Nisbet et al., 2015).

Theorists of science and democracy have pointed out that by utilizing scientific information for political purposes, public actors equate scientific information with particular policy programs, suggesting that particular pieces of scientific knowledge compel particular lines of political action (Bogner, 2021; Hirschi, 2021; Münkler, 2020; Pielke, 2004; Popper, 1957; Sarewitz, 2004; Scheufele, 2014). Thereby, they shift the political debate from values and policy priorities – aspects to which citizens can legitimately and competently contribute – to the validity of scientific knowledge, a subject that laypeople can hardly assess (Bromme & Goldman, 2014). As a result, since it appears so interwoven with specific policies, science is likely to be contested on political grounds and thus politicized (Grundmann & Rödder, 2019; Nowlin, 2021). To counteract this effect, theorists have proposed transparency about the boundaries between science and politics, reasoning that this might enable citizens to accept or trust scientific information on the one hand while engaging in disputes over policy options and priorities on the other (Weber, 1904; see also Pielke, 2004).

The proposition that a separation of science and politics mitigates skepticism about science can also be derived from the two explanations that potentially account for a polarization of trust in science, namely directional motivated reasoning and reliance on diverging informational diets. To individuals motivated to maintain their belief systems, an inconvenient piece of scientific information might appear less threatening when it is explicitly detached from identity-relevant political aspects in public policy disputes. Empirical findings support this line of reasoning, differentiating between people's "problem aversion" (e.g., the finding of human-induced climate change) and "solution aversion" (i.e., the policy responses associated with the problem). For example, Republicans' skepticism about climate change is higher when associated with government regulation, while their skepticism about climate change is lower when associated with free market policies (Campbell & Kay, 2014). Further, after the decision by the scientific journal *Nature* to publish an endorsement of presidential candidate Joe Biden in the 2020 U.S. presidential election, an experimental study indicated a loss of trust among supporters of Donald Trump (Lupia, 2023; Zhang, 2023). Participants either read *Nature*'s endorsement of Joe Biden or, as a control condition, an article describing *Nature*'s plans to reformat its design. Compared with Trump supporters who read the endorsement, Trump supporters who read the article on *Nature*'s redesign perceived the journal as significantly more well informed "when it comes to providing advice on science-related issues facing the country" and as a more unbiased source on controversial societal issues (Zhang, 2023, p. 699). Results such as these suggest that scientific information may be perceived as less identity-threatening when it is

kept detached from identity-relevant value or policy questions that may resonate with it, thus mitigating a political polarization of trust in scientific information (cf. Druckman & McGrath, 2019; Kahan et al., 2015).

For individuals who distrust scientific information based on their exposure to specific information sources, a separation of scientific from political aspects might serve as a credibility cue. In public policy disputes invoking scientific knowledge, the perceived credibility of science is likely shaped by the attempts of interested actors to exalt or discredit specific scientific expertise for political purposes creating the impression that certain scientists are driven by ulterior political motives and not by a quest for truth (Druckman & McGrath, 2019; Elliott et al., 2017; Lupia, 2023). While studies have demonstrated that messages containing policy advice (Kotcher et al., 2017) or value judgments (Cologna et al., 2022; Elliott et al., 2017) do not mitigate scientists' perceived credibility, there are hints that people's trust declines when they suspect scientists or scientific organizations to be influenced by their political preferences (cf. Elliott et al., 2017; Lupia, 2023). Citing scientific evidence as a policy argument instead of an imperative might counteract impressions people gained from their news diets that scientists are driven by political motives, signaling to them that they are informing society and not instrumentalizing their scientific authority to gain political influence under the guise of science (Druckman & McGrath, 2019; Elliott et al., 2017; Lupia, 2023).

Hence, regardless of the exact explanation for a polarization of trust in science in public policy disputes, it can be deduced that an explicit separation of scientific from political aspects can have a depolarizing effect on people's trust by enhancing levels of trust among the most politically challenged. To test this proposition, we test two styles of a scientist's public policy advice against each other. Scientists typically blur the boundaries between science and politics when giving public policy advice in the style of an "epistocrat," "expertocrat," or "technocrat" – someone who taps into the authority of science purporting that their knowledge determines or "proves" a particular line of political action thereby precluding a societal debate (Bogner, 2021; Klocksiem, 2019; Moraro, 2018; Münkler, 2020; Nowlin, 2021). By contrast, scientists typically disentangle science from politics in the style of an "honest broker" – someone who presents scientific knowledge as a reasonable policy argument, while acknowledging that their scientific perspective considers only selective aspects of a multifaceted societal problem, thereby inviting a societal debate (Pielke, 2007).

Importantly, the impression that scientists appear as epistocrats might not result primarily from scientists themselves, but from the ways they are portrayed by journalists or interested actors in public policy disputes (Druckman & McGrath, 2019; Elliott et al., 2017; Lupia, 2023). We argue that whatever the origin of this impression, it can be detrimental to scientists' credibility. We propose that and test whether acting like an honest broker is an effective way to counteract these effects. Specifically, we propose that the style of an honest broker versus that of an epistocrat will mitigate a polarization of trust. To test this, we first need to establish that trust in scientific evidence is indeed polarized and dependent on subjects' prior policy preferences. We hypothesize that *the more people's prior policy preferences concur with a scientist's policy advice the more they trust the scientist and their evidence (H1).*

Our core assumption is that a scientist's style of policy advice will influence people's trust. Some authors imply that disentangling scientific from political aspects will enhance people's trust in scientific information (e. g., Duncan et al., 2020; Pielke, 2004). Further

research suggests that gains in trust are most likely among those whose policy preferences are most strongly challenged by a scientist's public policy advice (e. g., Kraft et al., 2015; Zhang, 2023). Hence, we expect that *when a scientist offers policy advice in the style of an honest broker rather than an epistocrat, people's trust in both the scientist and their evidence will increase (H2)*. Moreover, we expect this *increase in trust to be most pronounced among those whose prior policy preferences are most challenged by the scientist's policy advice (H3).*

Method

Overview

We conducted a series of online survey experiments in three German public policy disputes invoking scientific knowledge. These disputes related to a) schools in the third SARS-CoV-2 infection wave, b) domestic flights in the face of climate change, and c) managing the spreading of wolves. For each dispute, we first measured participants' policy preferences to determine their attitudinal congeniality in relation to a scientist's policy advice. We then randomly assigned them to one of four versions of a news item that quoted a scientist proposing one of two opposite measures in the respective dispute – school closures versus openings, a ban on versus a continuation of domestic flights, and shootings versus protection of wolves. In each version, the quoted scientist appeared as an honest broker or an epistocrat (see below). After exposure to the respective science news item, we measured participants' trust in the cited scientist and evidence.

General Procedure

For each case study, we drew on an online access panel consisting of voluntarily registered participants in social research administered by Bilendi, an established German market research company. We randomly drew a stratified sample of individuals aged 18 and above, representative of the German population with regard to their gender, age, and approximate levels of education. Since wolf management is not such a serious issue in some parts of Germany, we drew participants from eight out of sixteen German federal states for this case study (Bavaria, Berlin, Brandenburg, Lower Saxony, Mecklenburg-Western Pomerania, Saxony, Saxony-Anhalt, and Thuringia).

According to the ethical guidelines of our institution, our study was exempt from ethical review by the ethics committee. This was confirmed in a written note by the institutional review board on June 29, 2022. We informed participants that their responses would not be linked to their personal data and that they could terminate their participation at any time and at no cost. We then stated our interest in their attitudes and perceptions of news coverage in the respective controversy. After this, participants gave their informed consent. After providing certain sociodemographic information, as well as their policy preferences in the given controversy, they were randomly assigned to one of the versions of the four articles citing a scientist. After exposure to the articles, respondents indicated their levels of trust in the cited scientist and evidence. Upon completion, respondents were debriefed and informed that the scientist concerned had been cited in news coverage, but that we had adjusted the original material, for example by giving him a fictitious name.

We assured response reliability through three attention checks, removing all cases in which a participant failed on any of them. We also removed all cases in which a participant clicked straight lines on more than three item batteries (henceforth "straightliners"), which is generally considered an indicator of low response quality (Zhang & Conrad, 2014). Another commonly recognized problem is speeding in online surveys (Greszki et al., 2015). Since participants were compensated by reward points for their participation and might therefore have been incentivized to click through the survey without reading it, we removed all cases in which a participant spent less than 60.0% of the median time on the questionnaire (henceforth "speeders"). These speeders took approximately six minutes for a survey that, based on our pretests with approximately 100 participants, we had expected to take between 15 and 20 minutes. All in all, we removed 33 cases in the study on schools in the pandemic, 409 cases in the study on domestic flights and 61 cases in the study on wolf management.[1] In line with previous research, we confirmed that speeders tended to lack response quality showing that the shares of straightliners was significantly higher among speeders than among the rest of the sample (Appendix 1, Zhang & Conrad, 2014). Moreover, we reproduced all the results of our main study including the speeders where they were available to us, namely in the studies on domestic flights and wolf management (Appendix 2). After these data cleansing procedures, we obtained stratified samples of individuals aged 18 and above, representative of the German population with regard to their gender, age, and approximate levels of education for each case study.[2]

Sample Size

Overall moderation effects are often very small, even if considerable effects exist among a segment of a population. Hence samples are often underpowered when it comes to detecting moderation effects (Bodner, 2017). When determining our sample sizes, we took into account that controversies in Germany are typically not polarized, but involve a large consensual center disputing nuances of their positions on an issue and relatively small fringe minorities with more radical positions (e. g., Klinger et al., 2022 for climate change; Rothmund et al., 2022 for the COVID-19 pandemic). We expected small overall interaction effects, anticipating considerable effects primarily in one of the fringe segments of a given public policy dispute. We therefore assumed overall moderation effects of $f^2 = 0.1$ (with a contribution of the interaction of one percent to R^2) with a sample power of 95% and an alpha error of 5%. This yielded sample sizes of 1,073 participants to detect effects resulting from an interaction between a scientist's style of policy advice and respondents' prior attitudes. We therefore recruited approximately 1,000 participants for each scientist arguing for or against a particular case, that is 2,000 participants per case study (schools in the pandemic: $N = 1{,}987$, AAPOR RR5 completion rate COMR = 13.2%; domestic flights: $N = 1{,}983$, COMR = 18.5%; wolf management: $N = 1{,}961$, COMR = 17.4%). In each case study, the four experimental groups were the same with regard to gender, age, levels of education, and prior policy attitudes (Appendix 3).

Experimental Conditions

In a 2×2 factorial between-groups design, subjects were randomly assigned to one of four versions of a short news piece citing a scientist on their study results and policy advice. Each

study result had been reported in authentic media items, but the scientist's name and research institution were fictitious. The four versions were identical except for two variations. First, the news items differed with regard to the *direction of the policy advice* (e.g., supporting school closures vs. openings). Second, and most central, the news items differed with regard to the *style of policy advice* the cited scientist gave.

Experimental Stimuli

The first case study related to the German controversy over schools in the third SARS-CoV -2 infection wave in spring 2021. In all versions, the test article first described the societal dilemma between surging infection rates and the socio-economic consequences of prevention measures, before citing a scientist by the name of Prof Justus Schmidt. In one version, he appeared as an epidemiologist; in the other, as a child psychiatrist. As an epidemiologist, Prof Schmidt supported school closures, based on their latest epidemiological model calculations indicating that infection numbers would surge if schools opened. As a child psychiatrist, Prof Schmidt supported school openings, based on their latest survey indicating that minors suffered greatly from mandatory physical distancing.

In both versions, Prof Schmidt appeared as an epistocrat or honest broker. Importantly, in both roles, he cited an identical policy-relevant research finding and drew a clear policy conclusion from it. However, the epistocrat blurred the distinction between scientific evidence and politics, suggesting that their finding proves a policy imperative, thereby precluding a societal debate over values and priorities. The honest broker makes the distinction between scientific findings and politics transparent, presenting their findings as a reasonable policy argument while acknowledging the limitations of their perspective, thereby including a societal debate over values and priorities. The variations of case study 1 are presented in Table 1. Those of the other two case studies were constructed analogously and appear in Appendix 4.

Manipulation Check

We included a manipulation check in the case study on wolf management. Participants exposed to the honest broker agreed significantly more strongly that the article citing the scientist "gives the impression that the advantages and disadvantages of wolf protection [wolf shootings] should be debated in society." This indicated that perceptions of a preclusion versus an inclusion of a debate about values and priorities in policymaking were successfully induced (see Appendix 5 for further items used in the treatment check).

Measures

Dependent Variables

Trust in Cited Scientist. Based on a pretest, we shortened the Muenster Epistemic Trustworthiness Inventory, which captures three dimensions of an expert's perceived trustworthiness – namely their perceived expertise, integrity, and benevolence (Hendriks et al., 2015) – selecting the three items with the highest factor loadings for each dimension. After reading the stimulus, respondents were asked the following question: *"Without thinking much about it – what is your first impression of Prof Schmidt?"* They rated nine items in seven-point semantic differentials (e.g., 1 = *"dishonest,"* 7 = *"honest,"* 1 = *"incompetent,"* 7 = *"competent,"* 1 = *"selfish,"* and 7 = *"unselfish"*). Unlike in Hendriks et al. (2015),

Table 1. Stimuli used in conflicts over schools in pandemic (cf. Appendix 4 for all stimuli).

Policy support for school openings	
Condition: Epistocratic	Condition: Honest Broker
Students suffer in lockdown *Scientist: Open schools – politicians must no longer ignore studies* Many Germans are hoping for an easygoing summer after the waves of infection during the winter. However, the situation remains apprehensive. [. . .] *Justus Schmidt, a professor of adolescent psychiatry from the Landau University Hospital, calls for continued school openings.* [identical paragraph on study findings] **Should schools remain open even when infection rates are high?** *According to Schmidt, there is no doubt that schools should remain open: "Our findings show that young people are in a dramatic situation making clear that school closures are no longer justifiable. Politicians must now listen to the science and keep schools open throughout."* [143 words overall in German original]	**Students suffer in lockdown** *Scientist: Openly discuss opening schools* Many Germans are hoping for an easygoing summer after the waves of infection during the winter. However, the situation remains apprehensive. [. . .] *Justus Schmidt, a professor of adolescent psychiatry from the Landau University Hospital, proposes having an open discussion about continued school openings.* [identical paragraph on study findings] **Should schools remain open even when infection rates are high?** *Schmidt sees good reasons for keeping schools open. However, he argues that this is a political issue that needs to be discussed by society: "As a scientist, I have to say that young people's dramatic situation will only improve if schools remain open. Nevertheless, there are people still getting infected while others also suffer from the various mandatory restrictions. We should openly discuss how we weigh all these different issues during the pandemic."* [166 words overall in German original]
Policy support for school closures	
Condition: Epistocratic	Condition: Honest Broker
Students contribute to infection rates *Scientist: Close schools – politicians must no longer ignore studies* Many Germans are hoping for an easygoing summer after the waves of infection during the winter. However, the situation remains apprehensive. [. . .] *The director of the Epidemiological Institute at Landau University Hospital, Professor Dr. Justus Schmidt, calls for continued school closures.* [identical paragraph on study findings] **Should schools be closed until incidence levels stabilize at a low level?** *According to Schmidt, there is no doubt that schools must remain closed: "Our data on the contribution of schools to infection rates clearly shows that keeping schools open is currently not justifiable. Politicians must now listen to the science and close schools."* [145 words overall in German original]	**Students contribute to infections rates** *Scientist: Openly discuss school closures* Many Germans are hoping for an easygoing summer after the waves of infection during the winter. However, the situation remains apprehensive. [. . .] *The director of the Epidemiological Institute at Landau University Hospital, Professor Dr. Justus Schmidt, proposes having an open discussion about continued school closures.* [identical paragraph on study findings] **Should schools be closed until incidence levels stabilize at a low level?** *Schmidt sees good reasons for keeping schools closed. However, he argues that this is a political issue that needs to be discussed by society: "As a scientist, I have to say that schools clearly contribute to infection rates. Nevertheless, there are negative side effects to closing schools. We should openly discuss how we weigh all these different issues during the pandemic."* [162 words overall in German original]

a principal component analysis (PCA) yielded a one-factor solution of the nine items in all our case studies. A plausible reason for this could be that a controversial context changes structures of trust. We formed single composite scores for the case studies on schools during the pandemic ($M = 4.83$; $SD = 1.42$; Cronbach's $\alpha = .959$), domestic flights ($M = 4.60$; $SD = 1.44$; Cronbach's $\alpha = .967$), and wolf management ($M = 4.93$; $SD = 1.34$; Cronbach's $\alpha = .959$, cf. Appendix 6 for all items and factor loadings).

Trust in Presented Evidence. We developed and pretested a six-item scale. Respondents were to rate their levels of agreement with six statements on a seven-point scale (1 = *"totally disagree"*, 7 = *"totally agree"*), such as *"It feels to me like he [Schmidt] is exaggerating the study results." (reverse)*, or *"I don't see what should be wrong with the evidence."* With

a consistent one-factor solution, we averaged all items into one score (schools in pandemic: $M = 4.76$, $SD = 1.46$, Cronbach's $\alpha = .916$; domestic flights: $M = 4.45$, $SD = 1.50$, Cronbach's $\alpha = .925$; wolf management: $M = 4.90$, $SD = 1.45$, Cronbach's $\alpha = .920$).

Independent Variables

Prior to their exposure to the stimulus, respondents rated their policy preferences on seven-point scales developed in pretests and consisting of six to twelve items (1 = *"totally disagree"*, 7 = *"totally agree"*). Since items loaded on one factor each, we created average scores (*support of pandemic contact bans*: Cronbach's $\alpha = .904$, $M = 4.09$, $SD = 1.52$; *support of air traffic restrictions*: Cronbach's $\alpha = .836$, $M = 3.84$, $SD = 1.50$; *support of wolf protection*: Cronbach's $\alpha = .942$, $M = 4.34$, $SD = 1.46$, cf. Appendix 6 for full scales).

Control Variables

We controlled for respondents' age, gender (0 = "*male*", 1 = "*female*"), and levels of education (dummy coded for 0 = "*below university entrance qualification*", 1 = "*university entrance qualification or higher*").[3]

Data Analysis

We examined six cases with a scientist recommending one of two opposite policy options across three distinct topics. We calculated linear ordinary least square (OLS) regression models to determine the effects of respondents' prior attitudes and the cited scientist's style of policy advice on respondents' trust in the scientist and their evidence. To test whether the style of policy advice influenced respondents' trust differently depending on their prior policy preferences, we conducted moderation analyses (based on 5,000 bootstrap samples, 95% confidence interval) for the six cases based on the SPSS macro PROCESS (Model 1). In the presence of heteroscedasticity, we used robust standard error estimates (HC4). We applied the Johnson-Neyman technique to qualify effects of the scientist's style of policy advice on respondents with different attitudes (Hayes, 2012, 2022). To assess effect sizes of the style of policy advice among segments in our samples whose policy preferences were most challenged or affirmed by the cited scientist, we followed Bodner's (2017) recommendation to interpret conditional effects. We reported $\delta_{y,}$ to represent the standardized conditional effect of the cited scientist's style of policy advice on levels of trust among those respondents whose prior policy attitude was one standard deviation below or above the attitude mean, and compared them to effects among respondents whose prior attitude was one standard deviation above or below the attitude mean. Conventionally, values for δ [.2, .5, .8] indicate small, medium, and large conditional effects.[4]

Results

Descriptives

Moderate views dominated in the three controversies. Between 61.2% and 62.3% of respondents ($n = 1{,}217$ through $n = 1{,}260$) were either indifferent or moderately advocated for or against pandemic contact restrictions, restrictions of air travel, or the protection of wolves, with average

scores of between 2.5 and 5.5 on the seven-point scale. Notable minorities had more extreme views, with attitude scores up to 2.5 and above 5.5 on the seven-point scale. Shares of 19.4% (n = 385) were either strongly for or against contact restrictions in the pandemic. A share of 22.9% (n = 455) strongly opposed flight restrictions, while 13.9% (n = 276) supported them. A minority of 12.7% (n = 250) strongly opposed the protection of wolves, while 23.0% strongly supported it (n = 451). While the majority in each conflict held moderate policy preferences, there were opposing camps on the fringes.

Influences of People's Prior Policy Preferences on Their Trust in Scientific Information

Confirming hypothesis 1 and previous evidence (cf. Cologna et al., 2021; Kahan et al., 2011; Kraft et al., 2015), OLS regressions yielded moderate to large effects of

Table 2. OLS regressions explaining people's trust in the cited scientist.

	School openings				School closures			
	b	*SE*	*β*	*p*	*b*	*SE*	*β*	*p*
Constant	6.070	.185		<.001	2.535	.167		<.001
Gender (0=m; 1=f)	.178	.083	.064	.032	.139	.080	.048	.081
Age	.001	.003	.012	.708	.002	.002	.018	.507
Education (0=low; 1=high)	−.030	.087	−.010	.730	.102	.087	.033	.241
Δ Adj. R^2		.007		.021		.010		.005
Prior attitudes (1=rejecting; 7=supporting SARS-CoV2 contact bans)	−.334	.030	−.368	<.001	.498	.028	.523	<.001
Style of policy advice (0=epistocrat; 1=broker)	.027	.082	.010	.743	.147	.079	.051	.061
Δ Adj. R^2		.129		<.001		.266		<.001
Adj. R^2		.136		<.001		.276		<.001
	Continuation of domestic flights				**Ban on domestic flights**			
	b	*SE*	*β*	*p*	*b*	*SE*	*β*	*p*
Constant	5.171	.204		<.001	3.033	.204		<.001
Gender (0=m; 1=f)	.117	.085	.042	.167	.089	.087	.030	.308
Age	−.003	.003	−.038	.242	.000	.003	−.005	.871
Education (0=low; 1=high)	−.022	.094	−.007	.816	.092	.097	.029	.343
Δ Adj. R^2		.002		.187		.001		.235
Prior attitudes (1=rejecting; 7=supporting reduction of air traffic)	−.223	.031	−.242	<.001	.387	.033	.396	<.001
Style of policy advice (0=epistocrat; 1=broker)	.443	.084	.160	<.001	.378	.086	.128	<.001
Δ Adj. R^2		.084		<.001		.167		<.001
Adj. R^2		.086		<.001		.168		<.001
	Wolf shootings				**Wolf protection**			
	b	*SE*	*β*	*p*	*b*	*SE*	*β*	*p*
Constant	6.415	.207		<.001	2.829	.193		<.001
Gender (0=m; 1=f)	−.260	.088	−.085	.003	.215	.076	.082	.004
Age	−.002	.003	−.022	.438	.005	.002	.063	.023
Education (0=low; 1=high)	.058	.093	.018	.535	.086	.080	.031	.281
Δ Adj. R^2		.010		.004		.007		.019
Prior attitudes (1=rejecting; 7=supporting wolf protection)	−.423	.032	−.405	<.001	.400	.028	.445	<.001
Style of policy advice (0=epistocrat; 1=broker)	.451	.088	.148	<.001	.374	.074	.143	<.001
Δ Adj. R^2		.182		<.001		.208		<.001
Adj. R^2		.192		<.001		.215		<.001

n_1 = 992, n_2 = 995, n_3 = 1,002, n_4 = 981, n_5 = 978, n_6 = 983; VIF < 1.094; Durbin-Watson [1.978, 2.099]; all standard errors are robust standard error estimates not assuming homoscedasticity (HC4).

Table 3. OLS regressions explaining people's trust in the cited evidence.

	School openings				School closures			
	b	*SE*	*β*	*p*	*b*	*SE*	*β*	*p*
Constant	6.147	.171		<.001	2.024	.163		<.001
Gender (0=m; 1=f)	.244	.080	.086	.002	.081	.077	.027	.289
Age	.006	.002	.067	.021	.003	.002	.035	.160
Education (0=low; 1=high)	−.054	.088	−.018	.538	.051	.084	.016	.543
Δ Adj. R^2		.013		.001		.017		<.001
Prior attitudes (1=rejecting; 7=supporting SARS-CoV2 contact bans)	−.437	.027	−.472	<.001	.591	.026	.602	<.001
Style of policy advice (0=epistocrat; 1=broker)	.092	.079	.033	.241	.199	.076	.066	.009
Δ Adj. R^2		.215		<.001		.354		<.001
Adj. R^2		.228		<.001		.371		<.001
	Continuation of domestic flights				**Ban on domestic flights**			
	b	*SE*	*β*	*p*	*b*	*SE*	*β*	*p*
Constant	5.262	.208		<.001	2.505	.186		<.001
Gender (0=m; 1=f)	.255	.087	.086	.003	.138	.085	.046	.107
Age	.001	.003	.016	.592	.002	.002	.027	.348
Education (0=low; 1=high)	−.171	.094	−.054	.069	.067	.095	.021	.482
Δ Adj. R^2		.005		.043		.004		.089
Prior attitudes (1=rejecting; 7=supporting reduction of air traffic)	−.353	.031	−.358	<.001	.448	.030	.452	<.001
Style of policy advice (0=epistocrat; 1=broker)	.416	.086	.141	<.001	.438	.084	.146	<.001
Δ Adj. R^2		148		<.001		.217		<.001
Adj. R^2		.153		<.001		.221		<.001
	Wolf shootings				**Wolf protection**			
	b	*SE*	*β*	*p*	*b*	*SE*	*β*	*p*
Constant	6.388	.213		<.001	2.510	.193		<.001
Gender (0=m; 1=f)	−.226	.085	−.072	.008	.119	.072	.045	.098
Age	.002	.003	.016	.541	.005	.002	.062	.026
Education (0=low; 1=high)	−.163	.092	−.049	.077	.024	.079	.008	.760
Δ Adj. R^2		.020		<.001		.003		.128
Prior attitudes (1=rejecting; 7=supporting wolf protection)	−.514	.031	−.479	<.001	.470	.028	.520	<.001
Style of policy advice (0=epistocrat; 1=broker)	.520	.086	.167	<.001	.325	.072	.123	<.001
Δ Adj. R^2		.253		<.001		.272		<.001
Adj. R^2		.273		<.001		.275		<.001

$n_1 = 992$, $n_2 = 995$, $n_3 = 1{,}002$, $n_4 = 981$, $n_5 = 978$, $n_6 = 983$; VIF < 1.094; Durbin-Watson [1.951; 2.055]; all standard errors are robust standard error estimates not assuming homoscedasticity (HC4).

individuals' prior policy preferences on their levels of trust in all cases (cf. Tables 2 & 3). The more respondents supported a specific policy, the more they trusted a scientist and their evidence that confirmed their prior policy preferences, and the more they distrusted a scientist and their evidence that disconfirmed their prior policy preferences.

Influence of a Scientist's Style of Policy Advice on People's Trust in Scientific Information

We assumed that the style of an honest broker relative to that of an epistocrat would influence people's trust and reduce the gap of trust. First, the OLS regressions

largely confirm that the style of an honest broker versus that of an epistocrat increased participants' trust in the cited scientist and scientific evidence (H2). There was only one exception in six cases (cf. Tables 2 & 3). In cases where a scientist argued in favor of school closures, a ban on and a continuation of flights, wolf shootings and wolf protection, participants trusted a scientist and their evidence slightly more when he acted as an honest broker. Only when presenting evidence in favor of school openings did the honest broker not have an influence. In addition, when presenting evidence in favor of school closures, the effect of the honest broker only reached borderline significance. This confirmed hypothesis 2 with one exception, though effects were small in all cases and only reached borderline significance in one case.

Yet we expected effects to be particularly pronounced among those whose prior policy preferences were challenged by the policy advice (H3). Moderation analyses confirm this for almost all cases (cf. Appendix 7 for details of the moderation analyses). We first describe the common pattern and then two slight deviations in the case of schools in the pandemic.

The influence of the scientist's style of policy advice on people's trust in the cited scientist and evidence was moderated by participants' prior attitudes toward air traffic. This was true for a scientist supporting a continuation of air traffic (trust in scientist: $b = .242$, $SE(\text{HC4}) = .060$, $p < .001$ with $R^2 = .108$, $p < .001$; $R^2_{change} = .017$, $p < .001$; trust in evidence: $b = .145$, $SE(\text{HC4}) = .062$, $p = .020$ with $R^2 = .163$, $p < .001$; $R^2_{\text{change}} = .005$, $p = .020$) and for a scientist supporting a ban on domestic flights – though the overall moderation effect on respondents' trust in the cited scientist only reached borderline significance (trust in scientist: $b = -.123$, $SE(\text{HC4}) = .065$, $p = .058$ with $R^2 = .176$, $p < .001$; $R^2_{change} = .004$, $p = .058$; trust in evidence: $b = -.143$, $SE(\text{HC4}) = .059$, $p = .017$ with $R^2 = .230$, $p < .001$; $R^2_{change} = .005$, $p = .017$). Next, and most important to our endeavor, we quantified effects for people across the attitudinal spectrum. Compared to the epistocrat, the honest broker made a remarkable difference among individuals whose prior policy preferences contradicted the scientist's policy advice most strongly (cf. Figures 1 and 2). The scientist who delivered his policy advice supporting a ban on domestic flights as an honest broker gained personal trust and trust in his evidence, particularly among those who strongly favored a continuation of air traffic. Standardized effects among individuals whose prior support for restrictions of air traffic was one standard deviation below the mean were medium in size (trust in the scientist: $\delta_y = .513$; trust in cited evidence: $\delta_y = .574$). Among those whose views were strongly supported by the scientists' evidence, the style of policy advice did not have a significant effect (cf. Figures 1 and 2). The same applied when the cited scientist supported a continuation of domestic air travel. As an honest broker rather than epistocrat, the scientist gained personal trust and trust in his evidence, particularly among those who strongly favored restrictions of air traffic. Standardized effects among individuals whose prior support for restrictions of air traffic was one standard deviation above the mean were medium in size (trust in scientist: $\delta_y = .762$; trust in cited evidence: $\delta_y = .582$). Again, among those whose prior views were most strongly supported by the scientist, the style of policy advice did not have an effect.

The same pattern held in the dispute over wolf management. The influence of the scientist's style of policy advice on people's trust was significantly moderated by participants' prior policy preferences. This was true for a scientist supporting wolf

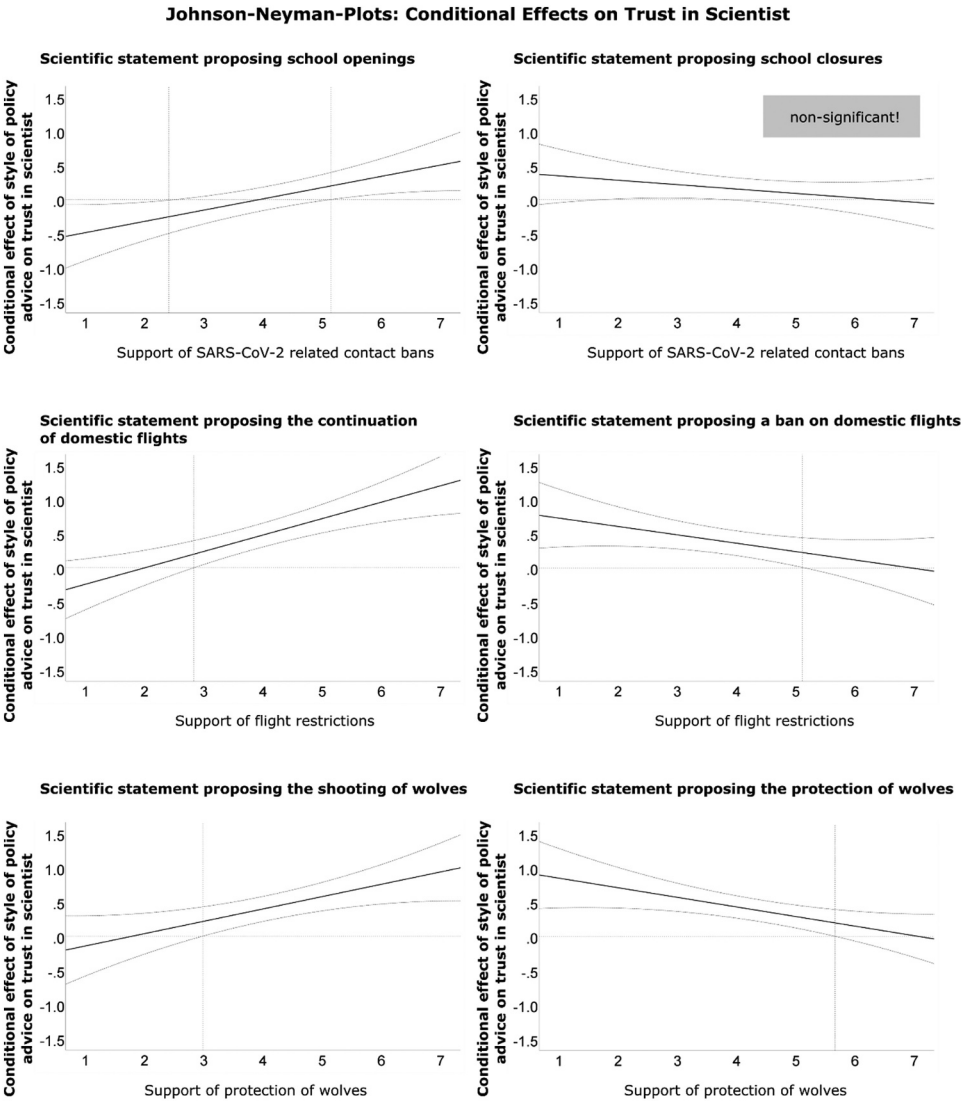

Figure 1. Conditional effects of the style of epistocrat vs. honest broker on trust in cited scientist as a function of individuals' prior attitudes. Notes: $n_1 = 992$, $n_2 = 995$, $n_3 = 1{,}002$, $n_4 = 981$, $n_5 = 978$, $n_6 = 983$; the graphs show the conditional unstandardized effect of the experimental condition on trust in cited scientist (y-axis) as a function of individuals' prior attitudes (x-axis). The bold line represents the point estimate and the dashed lines the corresponding 95% confidence intervals. The vertical axes mark Johnson-Neyman regions in which the conditional effects are significant.

shootings in residential areas (trust in scientist: $b = .181$, $SE(\text{HC4}) = .065$, $p = .005$ with $R^2 = .204$, $p < .001$; $R^2_{change} = .007$, $p = .005$; trust in evidence: $b = .168$, $SE(\text{HC4}) = .061$, $p = .006$ with $R^2 = .282$, $p < .001$; $R^2_{\text{change}} = .006$, $p = .006$) and for a scientist supporting wolf protection (trust in scientist: $b = -.140$, $SE(\text{HC4}) = .057$, $p = .014$ with $R^2 = .225$, $p < .001$; $R^2_{change} = .006$, $p = .014$; trust in evidence: $b = -.164$, $SE(\text{HC4}) = .056$, $p = .004$ with $R^2 = .287$, $p < .001$; $R^2_{change} = .008$, $p = .004$). The scientist supporting wolf

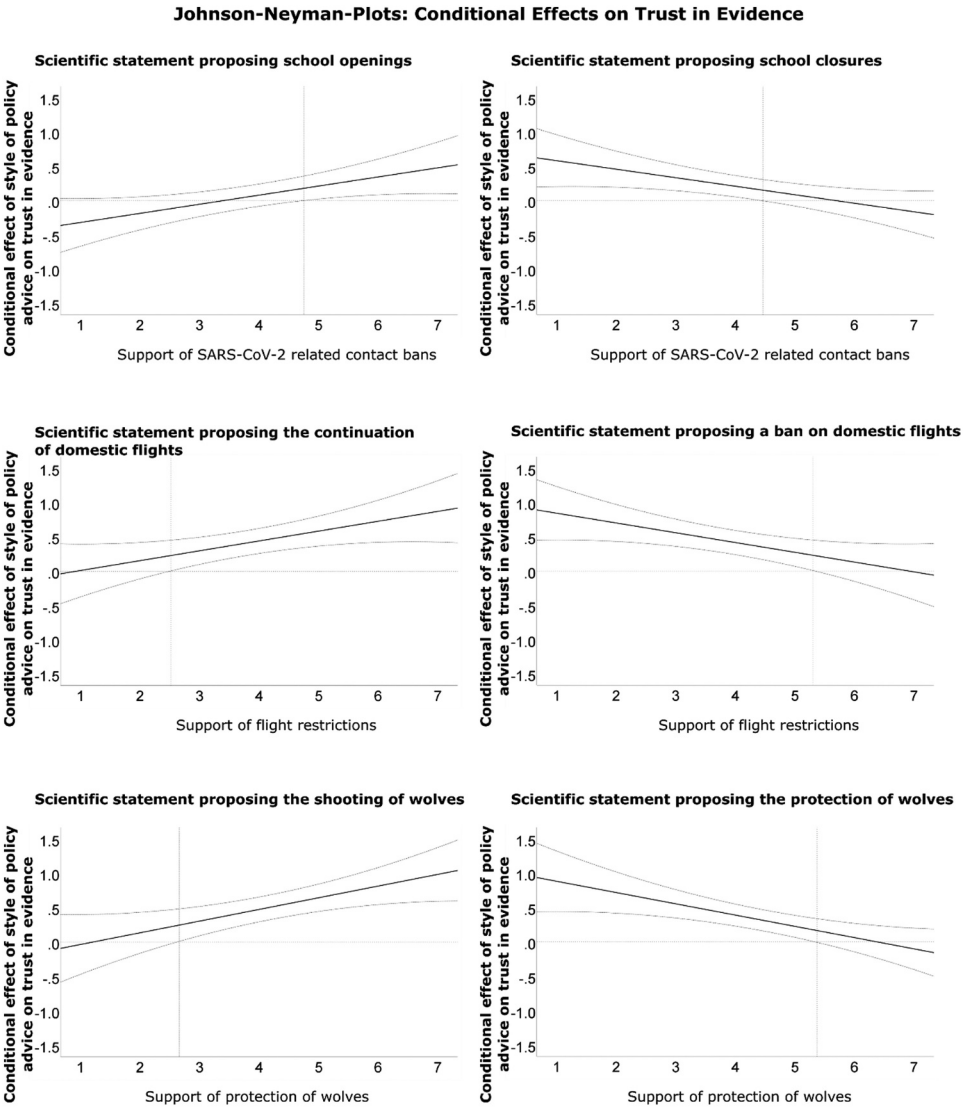

Figure 2. Conditional effects of the style of epistocrat vs. honest broker on trust in cited evidence as a function of individuals' prior attitudes. Notes: $n_1 = 992$, $n_2 = 995$, $n_3 = 1{,}002$, $n_4 = 981$, $n_5 = 978$, $n_6 = 983$; the graphs show the conditional unstandardized effect of the experimental condition on trust in cited evidence (y-axis) as a function of individuals' prior attitudes (x-axis). The bold line represents the point estimate and the dashed lines the corresponding 95% confidence intervals. The vertical axes mark Johnson-Neyman regions in which the conditional effects are significant.

shootings as an honest broker rather than an epistocrat gained personal trust and trust in his evidence, particularly among those who strongly favored wolf protection. Standardized effects among individuals whose prior support for wolf protection was one standard deviation above the mean were medium in size, with δ_y = .639 for their trust in the scientist and δ_y = .649 for their trust in the cited evidence. Among those whose prior views were bolstered, with a prior policy preference one standard

deviation below the mean, the scientist's style of policy advice did not affect their trust in the scientist, and only marginally increased their trust in the cited evidence, with δ_y = .233. The pattern also held when the cited scientist supported wolf protection. As an honest broker compared to an epistocrat, he gained personal trust and trust in his evidence primarily among those whose policy preferences were challenged most strongly. Standardized effects among individuals whose prior support for wolf protection was one standard deviation below the mean were medium in size, with δ_y = .510 for their trust in the scientist and δ_y = .476 for their trust in the cited evidence. Again, among those whose views were supported by the scientist's advice, trust remained unaffected by the style of policy advice.

Last, the influence of the scientist's style of policy advice on people's trust was also significantly moderated by participants' prior preference for pandemic contact restrictions. This was true for a scientist supporting school openings (trust in scientist: b = .165, SE(HC4) = .059, p = .005 with R^2 = .148, p < .001; R^2_{change} = .008, p = .005; trust in evidence: b = .132, SE(HC4) = .054, p = .014 with R^2 = .237, p < .001; R^2_{change} = .005, p = .014) and partly true for a scientist supporting school closures (trust in scientist: n. s.; trust in evidence: b = –.125, SE(HC4) = .051, p = .013 with R^2 = .378, p < .001; R^2_{change} = .004, p = .013). However, there are three deviations from the above pattern. First, effects in this case study were notably smaller than in the other two. Second, there is one exception. In the case of the scientist supporting school closures, the honest broker, as against the epistocrat, made the most challenged individuals trust more in the cited evidence (as expected) but, not in the scientist (against expectations). The standardized effect among individuals whose prior support for pandemic contact restrictions was one standard deviation below the mean was medium in size, with δ_y = .308 for their trust in the cited evidence. Third, there is a notable deviation. In the case of the scientist supporting school openings, as expected, the style of an honest broker enhanced personal trust and trust in the cited evidence primarily among those whose views were most strongly challenged by the scientist's assessment. The standardized effects among individuals whose prior support for pandemic contact restrictions was one standard deviation above the mean was small in size (trust in scientist: δ_y = .257; trust in cited evidence: δ_y = .256). At the same time, however, there was a loss of personal trust among those whose views were most strongly supported by the scientists' assessment. Yet the loss of trust among individuals whose prior support for pandemic contact restrictions was one standard deviation below the mean was also small, with δ_y = - .208 for their trust in the scientist.

Discussion

Results across three distinct controversies and six distinct pieces of policy advice demonstrate that in all but one case a scientist gained personal trust and trust in his evidence when they delivered their policy advice as an honest broker rather than an epistocrat. These gains prevailed among people whose prior policy preferences opposed the cited scientist's policy advice most strongly and who were, therefore, the most attitudinally challenged. Hence, compared with an epistocratic style of policy advice, the style of an honest broker mitigated the well-established attitudinal polarization of trust in science by way of enhancing trust among the most attitudinally challenged.

These effects indicate that when scientists appear to present their policy conclusions as imperative, precluding societal value debates, their scientific reputation suffers in parts of society. This may undermine science's capability of informing public policy debates, because a common acceptance of secured scientific knowledge is a minimum requirement of scientifically informed policymaking and finding ethically sound responses. By contrast, when scientists appear to present their policy conclusions as policy options, including societal value debates, they can counteract losses of trust. One might ask, however, whether policy advice in the style of an honest broker comes with certain disadvantages compared with the epistocratic style. For example, an international comparative study on the COVID-19 pandemic found that transparent negative information about the vaccine (e.g., side effects, lack of long-term studies) decreased vaccine acceptance, but increased people's trust in public authorities (Petersen et al. 2021). In the same vein, one might hypothesize that the epistocrat is more persuasive than the honest broker in terms of their policy proposal. We did not measure effects on respondents' policy preferences after their exposure to the stimulus article, but future studies should do so to be able to assess and balance possible trade-offs between people's policy acceptance and their trust, especially in public crises.

This study raises further questions for future research. First, while our findings provide robust evidence that a scientist's style of policy advice can influence people's levels of trust, we did not clarify the underlying explanatory mechanism. It is an open question whether participants' polarization of trust in the reported scientist and evidence was the result of directional motivated reasoning or their previous reliance on diverging informational diets (Druckman & McGrath, 2019). Therefore, we also do not know the mechanism by means of which the honest broker, relative to the epistocrat, enhanced levels of trust among the most challenged. Was it because, compared to the epistocrat, the honest broker offered identity-protective cues to respondents, thus allowing them to maintain their value judgments while accepting scientific knowledge? Or was it because the honest broker offered credibility cues to people who had previously learned to distrust certain types of science? Future research should address the mechanism behind polarizations of trust in scientists and hence the mechanisms behind potential remedies.

Second, by hinting at legitimate value disputes, the honest broker might have appeared as more politically tolerant or moderate than the epistocrat, which might have made them appear more trustworthy in parts of the population. Likewise, the epistocrat might have appeared ruder than the honest broker affecting people's trust (Yuan et al., 2018). To quantify the unexplained variance in people's trust in the scientist and cited evidence, we utilized our treatment check employed in the case study on wolf management. We used the perceptual items of our treatment check as mediators to determine the degree to which these perceptions account for the effect of our stimulus articles on people's trust. We found that people's perception that the article citing the scientist "gives the impression that the advantages and disadvantages of wolf protection [shootings] should be debated in society" fully (in one out of eight cases, strongly) mediated the influence of the stimulus article on people's trust in the scientist and evidence. Thus, variation in respondents' levels of trust induced by the manipulated style of policy advice was fully or mostly due to their perception that the honest broker included a societal debate on values and priorities whereas the epistocrat precluded such a debate (see Appendix 5 for details of the mediation analyses).

Nevertheless, future studies should account and control for potential confounding variables such as scientists' perceived rudeness. Moreover, there might be relevant mediating

variables such as people's perceptions of scientists' motives to influence policy on the one hand versus a motive to inform policy on the other (Beall et al., 2017). Yet even if such confounders or mediators exist, our findings robustly indicate that people's perceptions of scientists in the political domain influence their trust in them as scientists and thus as representatives of a domain where credibility is granted not for "the ability to articulate why certain moral, ethical, economic or social trade-offs offer the best way to live", as in politics, but for "conveying, rigorous, unbiased scientific information" and "a commitment to the scientific method" (Lupia, 2023). For example, one might appreciate a politician fighting for one's interests for being offensive, fierce or persuasive in a political contestation but would one expect such a politician to deliver unbiased information? A scientist, by contrast, is trusted as a scientist based on their impression of abiding by scientific principles. This is likely why in our study, with one exception, the honest broker did not suffer losses of trust even among politically radically opposed fringe groups.

Third, one may ask how persistent and relevant are the effects found in this study. They might be deemed negligible for two reasons. One is that effects occur only among minorities of people whose prior policy attitudes most strongly opposed the scientist's policy recommendation. However, effects among these minorities were considerable with medium standardized effects in four out of six cases. It was only in the controversy over schools in the pandemic that effects were smaller among the fringe groups. This might be due to the vast media attention the controversy had attracted over a year during the pandemic and the related stability of respondents' levels of trust. In fact, effects were largest in the controversy on wolf management, which attracted the least media attention. Moreover, effects among the fringe minorities might, indeed, be the most relevant. Polarized public disputes in digital media systems are mostly driven by polarized minorities, while the moderates retreat from public discourse (Prior, 2013). For example, throughout the pandemic – from March, 2000 through December, 2022 – a large-scale German longitudinal study revealed a continuous strong correlation of Pearson's $r = > .45$ between people's impression that pandemic policies were exaggerated and their readiness to demonstrate against restriction policies (Betsch et al., 2022).

One might also question the persistence of effects we found (Hill et al., 2013). Can a scientist really increase trust among their audiences in a sustainable way by making policy recommendations as an honest broker rather than an epistocrat? This hardly seems realistic in a noisy and diverse information environment in which not only scientists, but journalists, policymakers, business, and public interest groups refer to scientific evidence. It is well documented that public actors frequently tap into the authority of science to compel political action and make their political cases more convincing. Our findings give at least reason to assume that such a utilization of science for political purposes might contribute to a political polarization of trust in scientific knowledge and that scientists and other actors can counteract this effect by referring to scientific information in the style of an honest broker.

Therefore, notwithstanding the limitations and open questions, we believe that practitioners of public science communication engaged in public controversies that touch on scientific or technological issues should take note of our findings and consider them in their professional contributions to public discourse in journalism, public science communication, and political communication. Adopting the style of an honest broker as against that of an epistocrat might contribute to a depolarization of trust in scientists by enhancing trust among the most attitudinally challenged in public policy disputes.

Notes

1. The numbers differ due to different procedures of data delivery. In our first case study (schools in the pandemic), speeders were removed by the market research company and were not delivered to us. In our second case study (domestic flights), we removed speeders and straightliners ourselves. After removal, the dataset was biased with regards to the demographic quotas we had sought to fulfil. Upon our request, we obtained approx. 400 fresh uncleared cases by the company which enabled us to fulfill both our quotas and quality standards after data cleansing. In our third case study (wolf management), we obtained a dataset that fulfilled our quotas after our removal of straightliners and speeders.
2. Compared with the 2011 census, our samples have a very slight underweight of lowly educated and a very slight overweight of highly educated people.
3. We also controlled for the presence of school-aged children in participants' households (study 1), the number of flights taken per year (study 2), and a rural versus urban place of residence (study 3). Since these controls were not related to our outcome variables, we dropped them from the present analyses.
4. We calculated standardized conditional effect sizes δ_y employing a semi-partial correlation metric and using the mean square residual (MSR) from the ANOVA summary table of the regression model as an unbiased estimator for the residual variance:

$$\delta_y = \left(\beta_1 + \beta_2 M_i\right) \frac{\sqrt{MSR}}{SD(Y)}$$

where β_1 represents the unstandardized regression coefficient of the style of policy advice, β_2 the unstandardized regression coefficient of the interaction between the style of policy advice and respondents' attitudes, and M_i a specific partial point of the model under examination (in our case, $\pm$ 1SD of respondents' mean attitude, cf. Bodner, 2017). This method allowed us to estimate the difference in means of trust for respondents exposed to the epistocrat versus honest broker at a specific attitude score, while also considering the random variation in the outcome variable within each group.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Data availability statement

The data that support the findings of this study are openly available in an OSF project at https://doi.org/10.17605/OSF.IO/TJXDG

Code availability

Datasets in the current study were analyzed using IBM SPSS 28 and the SPSS macro PROCESS (Hayes, 2012). All codes are openly available in the according OSF project.

References

Alinejad, D., & van Dijck, J. (2022). Climate communication: How researchers navigate between scientific truth and media publics. *Communication and the Public*, *8*(1), 29–44. https://doi.org/10.1177/20570473221138612

Beall, L., Myers, T. A., Kotcher, J. E., Vraga, E. K., Maibach, E. W., & Wilsdon, J. (2017). Controversy matters: Impacts of topic and solution controversy on the perceived credibility of a scientist who advocates. *Public Library of Science ONE*, *12*(11), e0187511. https://doi.org/10.1371/journal.pone.0187511

Betsch, C., Eitze, S., Felgendreff, L., Geiger, M., Korn, L., Schmid, P., Shamsrizi, P., Sprengholz, P., & Taubert, F. (2022). *COSMO Explorer: COVID-19 Snapshot Monitoring*. Universität Erfurt, Bernhard-Nocht-Institut für Tropenmedizin, Robert Koch Institut, Bundeszentrale für gesundheitliche Aufklärung, Leibniz-Institut für Psychologie und Science Media Center. https://projekte.uni-erfurt.de/cosmo2020/web/explorer/

Bodner, T. E. (2017). Standardized effect sizes for moderated conditional fixed effects with continuous moderator variables. *Frontiers in Psychology*, *8*, 562. https://doi.org/10.3389/fpsyg.2017.00562

Bogner, A. (2021). *Die Epistemisierung des Politischen: Wie die Macht des Wissens die Demokratie gefährdet. (Was bedeutet das alles?): Nr. 14083*. Reclam.

Bolsen, T., & Druckman, J. N. (2015). Counteracting the politicization of science. *Journal of Communication*, *65*(5), 745–769. https://doi.org/10.1111/jcom.12171

Bromme, R., & Goldman, S. R. (2014). The public's bounded understanding of science. *Educational Psychologist*, *49*(2), 59–69. https://doi.org/10.1080/00461520.2014.921572

Bromme, R., Mede, N. G., Thomm, E., Kremer, B., Ziegler, R., & Gesser-Edelsburg, A. (2022). An anchor in troubled times: Trust in science before and within the COVID-19 pandemic. *Public Library of Science ONE*, *17*(2), e0262823. https://doi.org/10.1371/journal.pone.0262823

Brüggemann, M., Elgesem, D., Bienzeisler, N., Dedecek Gertz, H., & Walter, S. (2020). Mutual group polarization in the blogosphere: Tracking the hoax discourse on climate change. *International Journal of Communication*, *14*, 1025–1048.

Campbell, T. H., & Kay, A. C. (2014). Solution aversion: On the relation between ideology and motivated disbelief. *Journal of Personality and Social Psychology*, *107*(5), 809–824. https://doi.org/10.1037/a0037963

Clarke, L. (2021). Covid-19's rebel scientists: Has iSAGE been a success? *BMJ*, n2504. https://doi.org/10.1136/bmj.n2504

Cologna, V., Baumberger, C., Knutti, R., Oreskes, N., & Berthold, A. (2022). The communication of value judgements and its effects on climate scientists' perceived trustworthiness. *Environmental Communication*, *16*(8), 1094–1107. https://doi.org/10.1080/17524032.2022.2153896

Cologna, V., Knutti, R., Oreskes, N., & Siegrist, M. (2021). Majority of German citizens, US citizens and climate scientists support policy advocacy by climate researchers and expect greater political engagement. *Environmental Research Letters*, *16*(2), 24011. https://doi.org/10.1088/1748-9326/abd4ac

Dietz, T. (2013). Bringing values and deliberation to science communication. *Proceedings of the National Academy of Sciences of the United States of America*, *110*(*Suppl 3*), 14081–14087. https://doi.org/10.1073/pnas.1212740110

Druckman, J. N. (2017). The crisis of politicization within and beyond science. *Nature Human Behaviour*, *1*(9), 615–617. https://doi.org/10.1038/s41562-017-0183-5

Druckman, J. N., & Bolsen, T. (2011). Framing, motivated reasoning, and opinions about emergent technologies. *Journal of Communication*, *61*(4), 659–688. https://doi.org/10.1111/j.1460-2466.2011.01562.x

Druckman, J. N., & McGrath, M. C. (2019). The evidence for motivated reasoning in climate change preference formation. *Nature Climate Change*, *9*(2), 111–119. https://doi.org/10.1038/s41558-018-0360-1

Duncan, R., Robson-Williams, M., & Edwards, S. (2020). A close examination of the role and needed expertise of brokers in bridging and building science policy boundaries in environmental decision making. *Palgrave Communications*, *6*(1). https://doi.org/10.1057/s41599-020-0448-x

Elliott, K. C., McCright, A. M., Allen, S., Dietz, T., & Rosenfeld, C. S. (2017). Values in environmental research: Citizens' views of scientists who acknowledge values. *Public Library of Science ONE*, *12*(10), e0186049. https://doi.org/10.1371/journal.pone.0186049

Greszki, R., Meyer, M., & Schoen, H. (2015). Exploring the effects of removing "too fast" responses and respondents from web surveys. *Public Opinion Quarterly*, *79*(2), 471–503. https://doi.org/10.1093/poq/nfu058

Grundmann, R., & Rödder, S. (2019). Sociological perspectives on earth system modeling. *Journal of Advances in Modeling Earth Systems*, *11*(12), 3878–3892. https://doi.org/10.1029/2019MS001687

Guess, A., & Coppock, A. (2020). Does counter-attitudinal information cause backlash? Results from three large survey experiments. *British Journal of Political Science*, *50*(4), 1497–1515. https://doi.org/10.1017/S0007123418000327

Hart, P. S., & Nisbet, E. C. (2012). Boomerang effects in science communication. *Communication Research*, *39*(6), 701–723. https://doi.org/10.1177/0093650211416646

Hayes, A. F. (2012). *PROCESS* (version 4) [Computer Software]. https://processmacro.org

Hayes, A. F. (2022). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. In *Methodology in the social sciences* (Third ed.). The Guilford Press.

Hendriks, F., Kienhues, D., Bromme, R., & Wicherts, J. M. (2015). Measuring laypeople's trust in experts in a digital age: The muenster epistemic trustworthiness inventory (METI). *Public Library of Science ONE*, *10*(10), e0139309. https://doi.org/10.1371/journal.pone.0139309

Hetzel, N., Klawier, T., Prochazka, F., & Schweiger, W. (2022). How do COVID-19 conspiracy beliefs, exposure to alternative sources and social media correlate in Germany? *SCM Studies in Communication and Media*, *11*(4), 508–535. https://doi.org/10.5771/2192-4007-2022-4-508

Hill, S. J., Lo, J., Vavreck, L., & Zaller, J. (2013). How quickly we forget: The duration of persuasion effects from mass communication. *Political Communication*, *30*(4), 521–547. https://doi.org/10.1080/10584609.2013.828143

Hirschi, C. (2021). Kalkül schlägt Kompetenz. *Frankfurter Allgemeine Zeitung*, *72*, 9–11.

Jasanoff, S. (1987). Contested boundaries in policy-relevant science. *Social Studies of Science*, *17*(2), 195–230. https://doi.org/10.1177/030631287017002001

Kahan, D. M., Braman, D., Slovic, P., Gastil, J., & Cohen, G. (2009). Cultural cognition of the risks and benefits of nanotechnology. *Nature Nanotechnology*, *4*(2), 87–90. https://doi.org/10.1038/nnano.2008.341

Kahan, D. M., Jenkins-Smith, H., & Braman, D. (2011). Cultural cognition of scientific consensus. *Journal of Risk Research*, *14*(2), 147–174. https://doi.org/10.1080/13669877.2010.511246

Kahan, D. M., Jenkins-Smith, H., Tarantola, T., Silva, C. L., & Braman, D. (2015). Geoengineering and climate change polarization: Testing a two-channel model of science communication. *The Annals of the American Academy of Political and Social Science*, *658*(1), 192–222. https://doi.org/10.1177/0002716214559002

Kepplinger, H. M., & Lemke, R. (2016). Instrumentalizing Fukushima: Comparing media coverage of Fukushima in Germany, France, the United Kingdom, and Switzerland. *Political Communication*, *33*(3), 351–373. https://doi.org/10.1080/10584609.2015.1022240

Klinger, K., Metag, J., & Schäfer, M. S. (2022). Global warming's five germanys – revisited and framed in an international context. *Environmental Communication*, *16*(8), 1108–1126. https://doi.org/10.1080/17524032.2022.2153897

Klocksiem, J. (2019). Epistocracy is a wolf in wolf's clothing. *The Journal of Ethics*, *23*(1), 19–36. https://doi.org/10.1007/s10892-019-09279-1

Kotcher, J. E., Myers, T. A., Vraga, E. K., Stenhouse, N., & Maibach, E. W. (2017). Does engagement in advocacy hurt the credibility of scientists? Results from a randomized national survey experiment. *Environmental Communication*, *11*(3), 415–429. https://doi.org/10.1080/17524032.2016.1275736

Kraft, P. W., Lodge, M., & Taber, C. S. (2015). Why people "don't trust the evidence". *The ANNALS of the American Academy of Political and Social Science*, *658*(1), 121–133. https://doi.org/10.1177/0002716214554758

Krause, N. M., Brossard, D., Scheufele, D. A., Xenos, M. A., & Franke, K. (2019). Trends: Americans trust in science and scientists. *Public Opinion Quarterly*, *83*(4), 817–836. https://doi.org/10.1093/poq/nfz041

Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin*, *108*(3), 480–498. https://doi.org/10.1037/0033-2909.108.3.480

Lupia, A. (2023). Political endorsements can affect scientific credibility. *Nature*, *615*(7953), 590–591. https://doi.org/10.1038/d41586-023-00799-3

Moraro, P. (2018). Against epistocracy. *Social Theory and Practice*, *44*(2), 199–216. https://doi.org/10.5840/soctheorpract20185835

Mothes, C. (2017). Biased objectivity: An experiment on information preferences of journalists and citizens. *Journalism & Mass Communication Quarterly*, *94*(4), 1073–1095. https://doi.org/10.1177/1077699016669106

Münkler, L. (2020). Expertokratie: Zwischen Herrschaft kraft Wissens und politischem Dezisionismus. *Jus publicum: Band 292*. Mohr Siebeck. https://doi.org/10.1628/978-3-16-159643-8

Nauroth, P., Gollwitzer, M., Bender, J., & Rothmund, T. (2014). Gamers against science: The case of the violent video games debate. *European Journal of Social Psychology*, *44*(2), 104–116. https://doi.org/10.1002/ejsp.1998

Nisbet, E. C., Cooper, K. E., & Garrett, R. K. (2015). The partisan brain: How dissonant science messages lead conservatives and liberals to (dis)trust science. *The ANNALS of the American Academy of Political and Social Science*, *658*(1), 36–66. https://doi.org/10.1177/0002716214555474

Nowlin, M. C. (2021). Political beliefs, views about technocracy, and energy and climate policy preferences. *Public Understanding of Science*, *30*(3), 331–348. https://doi.org/10.1177/0963662520978567

Nyhan, B. (2021). Why the backfire effect does not explain the durability of political misperceptions. *Proceedings of the National Academy of Sciences of the United States of America*, *118*(15). https://doi.org/10.1073/pnas.1912440117

Pasek, J. (2018). It's not my consensus: Motivated reasoning and the sources of scientific illiteracy. *Public Understanding of Science*, *27*(7), 787–806. https://doi.org/10.1177/0963662517733681

Petersen, M. B., Bor, A., Jørgensen, F., & Lindholt, M. F. (2021). Transparent communication about negative features of COVID-19 vaccines decreases acceptance but increases trust. Proceedings of the National Academy of Sciences of the United States of America, 118. https://doi.org/10.1073/pnas.2024597118(29).

Pielke, R. A. (2004). When scientists politicize science: Making sense of controversy over the skeptical environmentalist. *Environmental Science & Policy*, *7*(5), 405–417. https://doi.org/10.1016/j.envsci.2004.06.004

Pielke, R. A. (2007). *The honest broker: Making sense of science in policy and politics*. Cambridge University Press. https://doi.org/10.1017/CBO9780511818110

Popper, K. R. (1957). *The Open Society and its enemies* (3rd ed.). Routledge & Kegan Paul.

Post, S. (2016). Communicating science in public controversies: Strategic considerations of the German climate scientists. *Public Understanding of Science*, *25*(1), 61–70. https://doi.org/10.1177/0963662514521542

Post, S. (2022). Zwischen Expertokratie und Wissenschaftspopulismus. Wie die politische Aufladung wissenschaftlicher Expertise polarisiert. *Aus Politik und Zeitgeschichte*, *72*(26/27), 28–34.

Post, S., Bienzeisler, N., & Lohöfener, M. (2021). A desire for authoritative science? How citizens' informational needs and epistemic beliefs shaped their views of science, news, and policymaking in

the COVID-19 pandemic. *Public Understanding of Science*, *30*(5), 1–19. https://doi.org/10.1177/09636625211005334

Post, S., & Ramirez, N. (2018). Politicized science communication: Predicting scientists' acceptance of overstatements by their knowledge certainty, media perceptions, and presumed media effects. *Journalism & Mass Communication Quarterly*, *95*(4), 1150–1170. https://doi.org/10.1177/1077699018769668

Prior, M. (2013). Media and political polarization. *Annual Review of Political Science*, *16*(1), 101–127. https://doi.org/10.1146/annurev-polisci-100711-135242

Reinemann, C., Haas, A., & Rieger, D. (2022). "I don't care, 'cause I don't trust them!" the impact of information sources, institutional trust, and right-wing populist attitudes on the perception of the COVID-19 pandemic during the first lockdown in Germany. *SCM Studies in Communication and Media*, *11*(1), 132–168. https://doi.org/10.5771/2192-4007-2022-1-132

Rode, J. B., Dent, A. L., & Ditto, P. H. (2022). Climate change consensus messages may cause reactance in conservatives, but there is no meta-analytic evidence that they backfire. *Environmental Communication*, 1–7. https://doi.org/10.1080/17524032.2022.2101501

Rothmund, T., Farkhari, F., Ziemer, C. -., & Azevedo, F. (2022). Psychological underpinnings of pandemic denial - patterns of disagreement with scientific experts in the German public during the COVID-19 pandemic. *Public Understanding of Science*, *31*(4), 437–457. https://doi.org/10.1177/09636625211068131

Sarewitz, D. (2004). How science makes environmental controversies worse. *Environmental Science & Policy*, *7*(5), 385–403. https://doi.org/10.1016/j.envsci.2004.06.001

Scheufele, D. A. (2014). Science communication as political communication. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(*Suppl 4*), 13585–13592. https://doi.org/10.1073/pnas.1317516111

Schmid-Petri, H., Bienzeisler, N., & Beseler, A. (2022). Effects of politicization on the practice of science. In T. Bolsen & R. Palm (Eds.), *Progress in molecular biology and translational science: Vol. 188. Molecular biology and clinical medicine in the age of politicization* (pp. 45–59). Elsevier.

Schuldt, J. P., Roh, S., & Schwarz, N. (2015). Questionnaire design effects in climate change surveys: Implications for the partisan divide. *The ANNALS of the American Academy of Political and Social Science*, *658*(1), 67–85. https://doi.org/10.1177/0002716214555066

Shehata, A., Johansson, J., Johansson, B., & Andersen, K. (2022). Climate change frame acceptance and resistance: Extreme weather, consonant news, and personal media orientations. *Mass Communication and Society*, *25*(1), 51–76. https://doi.org/10.1080/15205436.2021.1967998

Taber, C. S., & Lodge, M. (2006). Motivated skepticism in the evaluation of political beliefs. *American Journal of Political Science*, *50*(3), 755–769. https://doi.org/10.1111/j.1540-5907.2006.00214.x

United Nations. (2023, April 19). Secretary-general calls on states to tackle climate change 'Time Bomb' through new solidarity pact, acceleration agenda, at launch of intergovernmental panel report | UN press [Press Release]. https://press.un.org/en/2023/sgsm21730.doc.htm

Weber, M. (1904). Die Objektivität sozialwissenschaftlicher und sozialpolitischer Erkenntnis. *Archiv für Sozialwissenschaft und Sozialpolitik*, *19*(1), 22–87. https://nbn-resolving.org/urn:nbn:de:0168-ssoar-50770-8

Yuan, S., Besley, J. C., & Lou, C. (2018). Does being a jerk work? Examining the effect of aggressive risk communication in the context of science blogs. *Journal of Risk Research*, *21*(4), 502–520. https://doi.org/10.1080/13669877.2016.1223159

Zhang, F. J. (2023). Political endorsement by nature and trust in scientific expertise during COVID-19. *Nature Human Behaviour*, *7*(5), 696–706. https://doi.org/10.1038/s41562-023-01537-5

Zhang, C., & Conrad, F. (2014). Speeding in web surveys: The tendency to answer very fast and its association with straightlining. *Survey Research Methods*, *8*(2), 127–135. https://doi.org/10.18148/srm/2014.v8i2.5453