

Quasi-universal acceptance of basic science in the United States

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Abstract

Substantial minorities of the population report a low degree of trust in science, or endorse conspiracy theories that violate basic scientific knowledge. This might indicate a wholesale rejection of science. In four studies, we asked 782 US participants questions about trust in science, conspiracy beliefs, and basic science (e.g. the relative size of electrons and atoms). Participants were provided with the scientifically consensual answer to the basic science questions, and asked whether they accept it. Acceptance of the scientific consensus was very high in the sample as a whole (95.1%), but also in every sub-sample (e.g. no trust in science: 87.3%; complete endorsement of flat Earth theory: 87.2%). This quasi-universal acceptance of basic science suggests that people are motivated to reject specific scientific beliefs, and not science as a whole. This could be leveraged in science communication.

Keywords

conspiracy theories, conspiracy thinking, science knowledge, trust in science

1. Introduction

Trust in science is related to many desirable outcomes, from acceptance of anthropogenic climate change (Cologna and Siegrist, 2020) or vaccination (Lindholt et al., 2021; Sturgis et al., 2021) to following recommendations during COVID (Algan et al., 2021, who suggest that trust in science was the most important predictor of these behaviors).

Although recent global evidence shows that trust in science is moderately high (Cologna et al., 2025), it is far from being at ceiling. Large-scale polls have shown that people who report a high degree of trust in science are a minority in most countries, and they are outnumbered by people who have low trust in science in many areas, for example, most of Africa and significant parts of

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Asia (Wellcome Global Monitor, 2018, 2020). Moreover, trust in science has recently been declining in some countries (Algan et al., 2021; Brian and Tyson, 2023; although see Funk and Kennedy, 2020; Wellcome Global Monitor, 2021) and in the United States it is increasingly polarizing (Gauchat, 2012; Krause et al., 2019; Li and Qian, 2022).

Besides low answers on general trust in science questions, another indicator of distrust in science is the belief in conspiracy theories that question the scientific consensus on issues such as vaccination, climate change, and even the shape of the Earth. Conspiracy theories—in the realm of science or elsewhere—typically accuse a small group of powerful people of pursuing nefarious goals in secrecy (Douglas et al., 2019; Mede and Schäfer, 2020). Some of these conspiracy theories are widespread (Rutjens and Večkalov, 2022). Data from the European Social Survey between 2020 and 2022 suggests that in several European countries, relatively large minorities of the population believed that COVID-19 was a result of deliberate and concealed efforts of some government or organizations: around 30% in Spain and Portugal, 22% in the United Kingdom, and 25% in Poland (Jabkowski et al., 2023). In 2023, a survey in eight different countries found that, on average, 19% of respondents agreed that “climate change is a hoax and scientists touting its existence are lying” (Stockemer and Bordeleau, 2024). In 2021, 40% of Americans believed that “the dangers of genetically-modified foods are being hidden from the public” (down from 45% in 2020, Uscinski et al., 2022). People who hold such views not only reject the relevant scientifically consensual facts but also tend to believe in other conspiracy theories (Hornsey et al., 2018a, 2018b; Lewandowsky et al., 2013; Littrell et al., 2025), and tend to say that they distrust science more generally (Stockemer and Bordeleau, 2024; Vranic et al., 2022). In spite of these correlations, the causal relationship between declaring general distrust in science and believing in one or more anti-science conspiracy theories is not clear. Although conspiracy thinking has been identified as a “root cause” of anti-science attitudes (Hornsey and Fielding, 2017) in the past, this claim rests largely on observational data.

What does this apparent lack of trust in science actually entail? Do people who say they do not trust science, or who believe in conspiracy theories at odds with well-established science, reject most of science? Or, on the contrary, do they object to a few specific facets of science, while still accepting the overwhelming majority of basic science?

A common conception of trust is a willingness to be vulnerable to another party, whether an individual, a group, or an institution (Mayer et al., 1995; Rousseau et al., 1998). Accordingly, trust in science has been defined as “one’s willingness to rely on science and scientists (as representatives of the system) despite having a bounded understanding of science” (Winterlin et al., 2022, p. 2). Past research has disentangled this general concept of trust in science in various ways. Some research has identified different components of trust, the number of which varies, but which generally cover an epistemological and ethical dimension (Intemann, 2023; Wilholt, 2013). For example, Hendriks et al. (2015) suggest distinguishing between expertise/competence, integrity, and benevolence, while Besley et al. (2021) add openness. Other research has highlighted differences in trust between scientific disciplines (Altenmüller et al., 2024; Gauchat and Andrews, 2018; Gligorić et al., 2024). However, little research has assessed trust in specific scientific findings, besides contentious topics such as vaccines (e.g. Hornsey et al., 2018b), climate change (e.g. Stockemer and Bordeleau, 2024), evolution (e.g. Nadelson and Hardy, 2015), genetically modified organisms (GMOs) (e.g. Fernbach et al., 2019), or a combination of such topics (see, for example, Lewandowsky et al., 2013). To the best of our knowledge, no research has investigated the extent to which people trust basic science facts (e.g. electrons are smaller than atoms). An extensive literature on science literacy has assessed whether people know such facts (National Academies of Sciences, Engineering, and Medicine, 2016), but not whether they accept the facts once presented to them.

Why does it matter whether trust in science is or is not related to trust in specific scientific findings? First, this question has theoretical implications. According to the most prominent explanation of (dis)trust in science—the deficit model—science knowledge is the main driver of attitudes toward science in general. A prediction of this model is that average trust in science on specific facts should be strongly associated with general trust in science. By contrast, a disconnect between the two would be in line with motivated reasoning accounts of trust in science. According to these accounts, science rejection serves to maintain coherence with other beliefs or behaviors (Hornsey, 2020; Lewandowsky and Oberauer, 2016). For example, someone might say they do not trust science in general because they are skeptical of vaccines, not because they actually distrust most of science. A prediction of the motivated reasoning account is that general trust in science should be strongly correlated with conspiracy beliefs. Second, the present question has practical implications: many communication attempts leverage the scientific consensus (e.g. on vaccination and climate change, for a review, see Van Stekelenburg et al., 2022; see also Večkalov et al., 2024). These attempts are more likely to be successful if everyone trusts basic science, than if some people reject science wholesale.

The present studies

In a series of four preregistered online studies (total $n=782$), we asked US participants questions about well-established, consensual scientific facts. For each question, we asked participants what they thought the correct answer was (testing their knowledge of science), we informed them of the scientifically consensual answer, and asked them whether they accepted it (measuring their trust in basic science). We also measured participants' general trust in science using standard measures, as well as their beliefs in various conspiracy theories and their tendency to engage in conspiratorial thinking. The four studies, including materials, hypotheses, and analyses, were preregistered and all materials and data are accessible via the Open Science Framework (<https://osf.io/8utsj/>). The differences between the four studies are summarized presently, and the methods are detailed below.

Materials

In Study 1 (data collected on 5 March 2024), we used questions drawn from questionnaires of scientific knowledge (e.g. “Are electrons smaller, larger, or the same size as atoms? [Smaller; Same size; Larger]”), supplemented by a “trick” question (“Where do trees mainly draw the materials with which they create their mass? [Earth; Water; Air]”; correct answer: Air). In Studies 2 (data collected on 3 April 2024) and 3 (data collected on 22 April 2024), this last question was removed. The scientific facts used in Studies 1 to 3 represent long-established and basic knowledge. In Study 4 (data collected on 13 August 2024), we used more recent, much less basic scientific discoveries (e.g. “What is the electric charge of the Higgs Boson, as established in 2012? [$1.602176634 \times 10^{-19}$; 0; 3.2×10^{-19} C]”; correct answer: 0, that is, electrically neutral).

Presentation of the scientific consensus

In Study 1, we simply told participants that they would be provided with the scientifically consensual answer. However, for participants to accept this answer, they must not only trust science but also trust that we are presenting them with the actual scientifically consensual answer. To address

this concern, in Studies 2 and 3, we presented participants with a short explanation of the correct answer, as well as links to three sources per answer (e.g. Wikipedia, National Geographic or NASA). In Study 4, as the topics were more complex, we did not include an explanation but still provided two sources per answer.

Measure of acceptance of the scientific consensus

In Study 1, we simply looked at whether participants accept the scientifically consensual answer or not. In the subsequent studies, we asked participants to explain cases in which they disagreed with the scientific consensus. This revealed that some participants had made a mistake (misunderstanding, selecting the wrong answer). As a result, in Studies 3 and 4, participants who indicated that they rejected the scientifically consensual answer were offered the option to revise their answer, or to keep rejecting it.

Additional questions

In Studies 3 and 4, we sought to understand how individuals who claim not to trust science could still accept scientifically consensual answers. To this end, we asked whether their acceptance was based on trust in science or on independent verification.

Samples

The surveys were hosted on Qualtrics, and participants were recruited via Prolific Academic, a crowdsourcing platform that allows researchers to pre-screen and invite eligible participants from their participant pool. Studies 1 and 2 were conducted on the standard sample of US participants. In order to increase the share of participants with low trust in science, and who endorse conspiracy theories, Studies 3 and 4 used the same platform, but only recruited participants who had previously declared being skeptical of vaccination.

Because recruitment was conducted through Prolific, we do not have access to the number of individuals who viewed the study invitation but chose not to participate. As such, it is not possible for us to calculate response rates (the proportion of invited participants who completed the survey) for the studies. However, we employed attention checks and, for each study, we report exclusions based on these checks. Moreover, the study invitation was purposefully nondescript (“short psychology experiment”), so that it would be impossible for participants to self-select because of their attitudes toward science for instance.

Hypotheses

The main goal of the present studies is descriptive: to find out whether participants who report not trusting science, or who believe in anti-science conspiracy theories, still accept most well-established scientific facts. However, based on our literature review, we also tested two directional hypotheses (preregistered as research questions in the Study 1):

H1: Higher trust in science is associated with more science knowledge and more acceptance of the scientific consensus

H2: Higher conspiracy thinking/belief is associated with less science knowledge and less acceptance of the scientific consensus

2. Methods

Deviations from preregistration

For Study 2, we restricted our main hypotheses about acceptance to cases in which participants initially provided a wrong answer. However, this meant the more participants had initially provided correct answers, the fewer opportunities they had for accepting correct answers. We provide results on these conditional correlations—for Study 2 and for all other studies—in the online Supplemental Material.¹ However, for the analysis presented here, we proceeded as pre-registered for all other studies, by reporting unconditional correlations between acceptance and trust in science, or, respectively, conspiracy belief.

Procedure

After providing their consent to participate in the study, participants were given the following attention check: “While watching the television, have you ever had a fatal heart attack?” [1–6; 1 = Never, 6 = Often]. Participants who did not answer “1 = Never” were excluded. Participants then read the following instructions: “We will ask you 10 questions about science. After each question, we will provide you with the scientifically consensual answer and ask whether you accept it.” Next, participants answered a set of 10 basic science questions in random order. After each question, participants were presented with an answer reflecting the scientific consensus, and asked whether they accepted it. In Studies 2 and 3, participants additionally saw a short explanation, partly based on explanations generated by ChatGPT, and three links to authoritative sources supporting the answer. In Study 4, we provided only two links and no explanation. Participants then answered questions on conspiracy thinking, conspiracy beliefs, and trust in science.

In Studies 2, 3, and 4, participants who rejected the scientific consensus were given open-ended questions to explain their reasoning. In Studies 3 and 4, participants also had the option to revise their answer and accept the scientific consensus. Finally, at the end of Studies 3 and 4, we asked participants: “For the questions in which you agreed with the scientific consensus, would you say that. . .?” The answer options were (1) “You mostly agree with the consensus because, on that question, you trust scientists,” (2) “You mostly agree with the consensus because you have been able to independently verify it,” and (3) “Other,” with a text box for participants to explain. Participants who selected “You mostly agree with the consensus because you have been able to independently verify it,” were asked the open-ended follow-up question: “Could you please tell us how you independently verified the information?”

Participants

After removing failed attention checks, the total sample size was 782 (194 in Study 1, six failed attention checks; 190 in Study 2, 11 failed attention checks; 200 in Study 3, no failed attention checks; 198 in Study 4, two failed attention checks) participants from the United States, recruited through Prolific. Details and demographics can be found in the online Supplemental Material. While samples for Studies 1 and 2 were convenience samples, Studies 3 and 4 were conducted on a sample holding vaccine-skeptic beliefs. Prolific allows the selection of participants based on their answers to a range of questions. We picked three of these questions and only recruited participants who met our criteria for each of them:

1. “Please describe your attitudes toward the COVID-19 (Coronavirus) vaccines: [For (I feel positively about the vaccines); Against (I feel negatively about the vaccines); Neutral (I don’t have strong opinions either way); Prefer not to say].” We selected participants who answered “Against.”
2. “Have you received a coronavirus (COVID-19) vaccination? [Yes (at least one dose); No; Prefer not to answer].” We select only people who answered “No.”
3. “On a scale from 1-7, please rate to what extent you agree with the following statement: I believe that scheduled immunizations are safe for children. [1 (totally disagree); 2 (disagree); 3 (somewhat disagree); 4 (neither agree nor disagree); 5 (somewhat agree); 6 (agree); 7 (totally agree); rather not say].” We select only people who answered “1,” “2,” or “3.”

Materials

Scientific facts. Studies 1 to 3 used 10 facts drawn from widely used questionnaires about science knowledge (Allum et al., 2008; Durant et al., 1989; Miller, 1998) sometimes referred to as the “Oxford scale” (Gauchat, 2011). A “trick” question was added in Study 1 and removed as its wording proved unclear. Study 4 used 10 more recent scientific discoveries. Table 1 shows all questions and their answer options.

Conspiracy beliefs. We selected 10 science/health related conspiracy theories from the Belief in Conspiracy Theory Inventory (BCTI) (Pennycook et al., 2025) (Table 2). Participants were asked:

Below is a list of events for which the official version has been disputed. For each event, we would like you to indicate to what extent you believe the cover-up version of events is true or false. [1-9; labels: 1—completely false, 5—unsure, 9—completely true].

Conspiracy thinking. For all results presented here, we used the four-item conspiracy mentality questionnaire (CMQ) (Bruder et al., 2013). We also assessed the single item conspiracy beliefs scale (SICBS) (Lantian et al., 2016). Details and comparisons between the scales can be found in the online Supplemental Material.

Trust in science. In all analyses reported in the main paper, we measure trust in science via a question selected from the Wellcome Global Monitor surveys (Wellcome Global Monitor, 2018, 2020): “In general, would you say that you trust science a lot, some, not much, or not at all? [1 = Not at all, 2 = Not much, 3 = Some, 4 = A lot].” We chose this question as it seemed to be the most general one. In the online Supplemental Material, we additionally report results for two alternative measures of trust included in our studies: another from the WGM surveys (“How much do you trust scientists in this country? Do you trust them a lot, some, not much, or not at all? [1 = Not at all, 2 = Not much, 3 = Some, 4 = A lot]”), and one from the Pew Research Center (e.g. Funk et al., 2019) (“How much confidence do you have in scientists to act in the best interests of the public? [1-5; 1 = No confidence at all, 5 = A great deal of confidence]”), the latter having been used in a recent international study on trust in science (Cologna et al., 2025). We selected these items so that we could compare the answers in our sample to global survey results. We find that all three items are highly correlated throughout all studies, and that our results reported here generally replicate when using either of the alternatives measures² (see online Supplemental Material).

Table 1. Science knowledge items.

Study 1–3	Study 4
1 Do antibiotics kill viruses as well as bacteria? [Yes, both; No, only viruses; No, only bacteria]	For which disease is the drug bedaquiline, developed in 2007, a treatment? [Tetanus; Tuberculosis; Malaria]
2 Are electrons smaller, larger, or the same size as atoms? [Smaller; Same size; Larger]	What is the maximum speed a proton can attain in the largest particle collider as to 2015? [90% of the speed of light; 99% of the speed of light; the speed of light]
3 Have the continents on Earth been moving for millions of years or have they always been where they are now? [They have been moving; They have always been where they are now]	Kepler-452b is an exoplanet revolving around the star Kepler-452. How far away from the star is it, as established by astronomers in 2015? [97 million mi; 1,2 million mi; 1254 million mi]
4 What decides whether a baby is a boy or a girl? Is it the father's genes, the mother's genes, or both? [The mother's genes; the father's genes; both]	Using bomb-pulse dating with carbon 14, what is the age of the oldest known vertebrate, as established in 2016? [138 years; 205 years; 392 years]
5 Do lasers work by focusing sound waves? [Yes; No]	How many more glial cells are there in the brain in comparison with neurons, as established in 2016? [The same amount; Twice as many; Ten times as many]
6 How long does it take for Earth to go around the sun: one day, one month, or one year? [One day; One month; One year]	As predicted by the general theory of relativity, how many times would the Earth keep orbiting if the Sun disappeared, as established in 2012? [47 seconds; 8 min; 2 hours]
7 Are diamonds made of carbon? [Yes; No]	What is the electric charge of the Higgs Boson, as established in 2012? [$1.602176634 \times 10^{-19}$; 0; 3.2×10^{-19} C]
8 Which travels faster: light or sound? [Light; Sound]	What is the age of the oldest materials formed on Earth, as established in 2020? [Less than 4.6 Ga; Around 4.6 Ga; More than 4.6 Ga]
9 Is common table salt made of calcium carbonate? [Yes; No]	With the best current cloning techniques, what is the average success rate when operated on mice, as of 2010? [2,7%; 9,4%; 17,2%]
10 Is water made of molecules containing one oxygen and two hydrogen atoms? [Yes; No]	What was the strength of the Earth magnetic field 3.7 billion years ago, as discovered this year? [15 microtesla; 30 microtesla; 45 microtesla]
11 ^a Where do trees mainly draw the materials with which they create their mass? [Earth; Water; Air]	NA

^aOnly used in Study 1.

3. Results

The main outcome of interest is acceptance of the scientifically consensual facts presented. Overall, acceptance was very high (aggregating across all studies: 95.1%; Studies 1: 93%; 2: 98%; 3: 98%; 4: 91%). Note that this includes both participants who had previously correctly answered the knowledge question, and participants who changed their mind when presented with the scientific consensus. In Studies 3 and 4, we gave participants a second chance in case they had initially rejected the consensus, which slightly increased acceptance rates in those studies (initial acceptance in Studies 3: 96%; 4: 86%).

Table 2. Conspiracy items.

1	The Apollo moon landings never happened and were staged in a Hollywood film studio.
2	A cure for cancer was discovered years ago, but this has been suppressed by the pharmaceutical industry and the U.S. Food and Drug Administration (FDA).
3	The spread of certain viruses and/or diseases is the result of the deliberate, concealed efforts of vested interests.
4	The claim that the climate is changing due to emissions from fossil fuels is a hoax perpetrated by corrupt scientists who want to spend more taxpayer money on climate research.
5	The Earth is flat (not spherical) and this fact has been covered up by scientists and vested interests.
6	There is a causal link between vaccination and autism that has been covered up by the pharmaceutical industry.
7	In the 1950s and 1960s more than 100 million Americans received a polio vaccine contaminated with a potentially cancer-causing virus.
8	Proof of alien contact is being concealed from the public.
9	Hydroxychloroquine has been demonstrated to be a safe and effective treatment of COVID and this information is being suppressed.
10	Dinosaurs never existed, evolution is not real, and scientists have been faking the fossil record.

Participants were asked to rate their belief in the conspiracy on a scale from 1 to 9, with the labels: 1—completely false, 5—unsure, 9—completely true.

As shown in Figure 1, these very high rates of acceptance hold for: participants who do not trust science at all (4.2% of participants, acceptance rate of 87.3%), participants who rank in the top two deciles of the conspiracy thinking scale (34.3% of participants, acceptance rate of 93.2%), participants who consider as “completely true” (the maximum of the nine-point scale) conspiracy theories stating that the Earth is flat (3.7% of participants, acceptance rate of 87.2%), or that climate change due to fossil emissions is a hoax (11.4% of participants, acceptance rate of 91.7%).

Participants in the lowest decile of acceptance still had an average acceptance rate of 67.4%. Even the three participants who considered as “completely true” that the Earth is flat and who said they do “not trust science at all” had an average acceptance rate of 86.7%.

These high acceptance rates do not merely reflect science knowledge: participants only correctly answered 65.8% of the questions (Studies 1: 74%; 2: 79%; 3: 75%; 4: 36%) before they were provided with the scientifically consensual answer. Even the lowest decile in science knowledge, which on average answered correctly only on 20% of the questions, had an average acceptance rate of 91.7%.

Did participants who had initially provided a wrong answer change their minds toward the scientific consensus? Yes. In most cases (Studies 1: 76.3%; 2: 92.9%; 3: 95.5%; 4: 89.5%), participants readily accepted the scientific consensus after having initially given the wrong answer to a question.

How do knowledge and acceptance relate to declared general trust in science and conspiracy belief (two strongly correlated variables, pooled $r = -0.64$, $p < .001$)?

Regarding H1, we find a consistent association between trust in science and acceptance of the scientific consensus (Studies 1: $r = 0.27$, $p < .001$; 2: $r = 0.30$, $p < .001$; 3: $r = 0.20$, $p = 0.019$; 4: $r = 0.16$, $p = 0.029$), but a less consistent relation between trust in science and science knowledge (Studies 1: $r = 0.29$, $p < .001$; 2: $r = 0.28$, $p < .001$; 3: $r = 0.14$, $p = 0.100$; 4: $r = 0.10$, $p = 0.144$).

Regarding H2, the results are mixed for the relation of conspiracy beliefs (measured as the average acceptance of all the conspiracy beliefs) with both acceptance of the scientific consensus (Studies 1: $r = -0.33$, $p < .001$; 2: $r = -0.37$, $p < .001$; 3: $r = -0.02$, $p = 0.788$; 4: $r = -0.05$, $p = 0.498$)

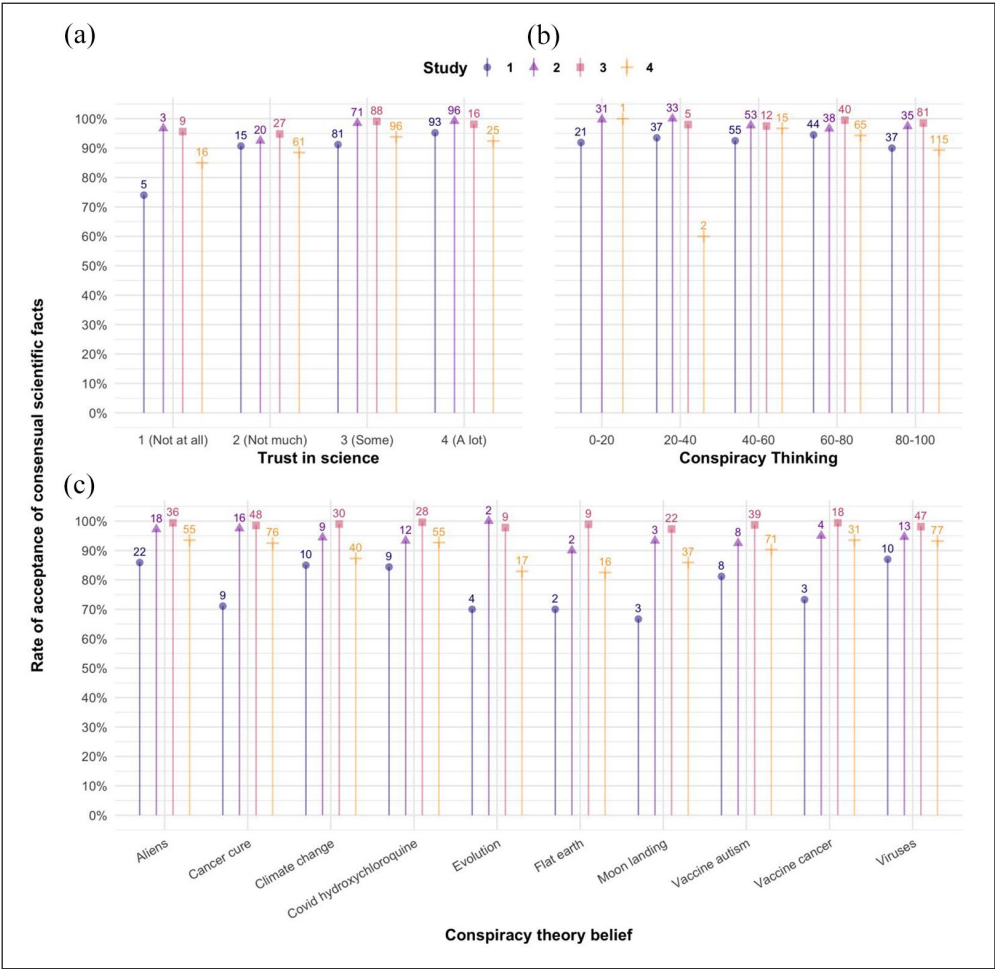


Figure 1. Points represent the average share of acceptance and numbers the absolute count of participants as a function of: (a) the level of trust in science (“In general, would you say that you trust science a lot, some, not much, or not at all? [1 =Not at all, 2 =Not much, 3 =Some, 4 =A lot]”); (b) the average conspiracy thinking (CMQ, five items on a scale from 0 to 100); (c) the belief in specific conspiracy theories (i.e. participants who answered 9, “completely true,” for a given theory, see Table 2 for the list of the theories).

and science knowledge (Studies 1: $r=-0.38, p<.001$; 2: $r=-0.40, p<.001$; 3: $r=-0.16, p=0.055$; 4: $r=-0.02, p=0.742$).

Why did participants reject the scientific consensus? We collected a total of 364 answers (Studies 2: 35; 3: 74; 4: 255) from 167 (Studies 2: 25; 3: 47; 4: 95) participants to the open-ended questions on why they had rejected the scientific consensus on a particular question. Based on the answers, we created five categories (Table 3). All individual answers can be accessed in cleaned data sheets via the OSF project page.

Why did participants say they accept the scientific consensus? In Studies 3 and 4—the vaccine hesitant samples—we had asked participants about cases in which they agreed with the scientific

Table 3. Justifications for rejecting the scientific consensus by category, Studies 2, 3 and 4 combined.

Category	N (instances)	Share (instances)	N (participants) ^a
Not convinced	158	43.4%	70
No justification	103	28.3%	51
Personal convictions	43	11.8%	31
Mistake	42	11.5%	34
Religious Beliefs	18	4.9%	13

^aParticipants with at least one answer in that category.

consensus. A total of 320 (Studies 3: 122; 4: 198) participants answered this question. There were more participants saying they accepted the scientific consensus because they independently verified the fact (Studies 3: 47.5%; 4: 47%), than participants saying it was because they trust scientists (Studies 3: 41.8%; 4: 36.4%).³ Answers to a question about how they had done so can be found in the online Supplemental Material.

In an exploratory analysis, we ran linear regressions to test whether there are differences between participants who said they had trusted science and those who said they had verified the information independently. Participants who said they accepted the consensus because of trust in scientists reported trusting science more (Studies 3: mean=3; $\hat{\beta}_{Trust}=0.19$, $p=0.330$ on a scale from 1 to 4; 4: mean=2.92; $\hat{\beta}_{Trust}=0.46$, $p<.001$) than those who said they verified independently (Studies 3 mean=2.81; 4: mean=2.45). We did not find a difference regarding acceptance (Studies 3: $\hat{\beta}_{Acceptance}=0.01$, $p=0.523$ on a scale from 0 to 1; 4: $\hat{\beta}_{Acceptance}=0.04$, $p=0.116$) or regarding beliefs in conspiracy theories (Studies 3: $\hat{\beta}_{BCTI}=-0.16$, $p=0.694$ on a scale from 1 to 9; 4: $\hat{\beta}_{BCTI}=-0.21$, $p=0.322$). We also did not find a difference regarding time spent on the survey in Study 3 ($\hat{\beta}_{Time}=-0.02$, $p=0.985$; median=7.64 min), but in Study 4, people who said they had accepted the consensus because they trust scientists tended to spend on average 2 min less on the survey ($\hat{\beta}_{Time}=-2.16$, $p=0.018$; median=9.38 min).⁴ In Study 4, in which we used facts that participants were unlikely to have encountered before, we tracked whether people clicked on the source links provided—a behavior that you would expect from people who report verifying facts independently. On average, participants clicked only on 1.36 links (out of 20 possible clicks) and there was no difference between the two groups ($\hat{\beta}_{Clicks}=-1.09$, $p=0.062$).

More detailed results addressing all our preregistered research questions can be found in the online Supplemental Material.

4. Discussion

In four studies, we asked US participants whether they accepted scientifically consensual answers on basic science questions. We found quasi-universal acceptance of basic science, with an overall rate of acceptance of 95.1%, which remained very high for participants who declared not trusting science at all (87.3% acceptance), or who endorsed theories blatantly violating scientific knowledge, such as flat Earth (87.2% acceptance).

This disconnect between declared general trust in science and average trust in (basic) scientific findings goes against predictions from the knowledge-attitudes model of trust in science (see, for example, Bauer et al., 2007), which posits that knowledge of scientific results is the main cause of trust in science. In line with past research (Allum et al., 2008), we find that both knowledge and acceptance of science are only weakly correlated with general trust in science. This supports recent definitions of science literacy, which suggest that for science literacy to be a meaningful concept

for science attitudes, it needs to go beyond measuring knowledge of isolated science facts (National Academies of Sciences, Engineering, and Medicine, 2016).

By contrast, our findings align with a motivated reasoning account of trust in science (Lewandowsky and Oberauer, 2016), in which “people tend to reject findings that threaten their core beliefs or worldview” (p. 217). A number of participants in our studies endorsed specific conspiracy theories questioning basic tenets of science (e.g., on evolution, or the shape of the Earth), while still accepting the vast majority of basic scientific facts presented to them. This suggests that these participants had reasons to reject only specific scientific knowledge, and that this rejection prompted them to express lower trust in science when asked general questions on the topic. Consistent with this explanation, we found a strong association between belief in anti-science conspiracy theories and general trust in science.

Some of the present results also speak to the alienation model (Gauchat, 2011), and more specifically to the need for epistemic autonomy (Fricker, 2006). Declaring one does not trust science, or endorsing conspiracy theories (Harris, 2023) might reflect a desire to maintain epistemic autonomy and not appear to “blindly” accept epistemic authority. Such a need to appear epistemically autonomous could be reconciled with the acceptance of basic science facts if it were thought to stem from independent evaluation instead of trust. The majority of participants in Studies 3 and 4, two samples of vaccine-skeptical participants who scored high across a range of different conspiracy beliefs (see online Supplemental Material), tended to claim that they had accepted the scientific consensus based on their own evaluation, however implausible that might be: it is not clear how participants could independently verify, say, the ratio of glial cells to neurons. These participants also did not engage (more than others) in simple forms of verification, that is, clicking on sources provided in the answers. This result aligns with other findings suggesting that people who endorse conspiracy beliefs tend to claim that they are independent thinkers, but, in fact, do not behave consistently with this claim: recent studies have shown that, although they claim not to be, conspiracy theorists are in fact just as susceptible to social influence as others (Altay et al., 2023; Pummerer et al., 2024).

In applied terms, the present results have implications for science communication. Across various domains of science knowledge such as climate change (Večkalov et al., 2024) or vaccination (Salmon et al., 2015), researchers have observed a consensus gap: a gap between the scientific consensus and public opinion. Some of the most worrying consensus gaps relate to climate change, as substantial segments of the population disagree with scientists on what is happening and what to do about it (e.g., Egan and Mullin, 2017). Yet, we found that for much of basic, non-contentious science, such consensus gaps are absent: the vast majority of our participants—including two vaccine-skeptical samples (Studies 3 and 4)—did not appear to have general grounds for distrusting science, which should have led them to reject most or all of the science knowledge presented to them. Since even people who say they do not trust science, or who reject specific scientific facts, appear to accept most of basic science, stressing the basic science components of publicly controversial fields, from GMOs to climate change, might help reduce the consensus gaps observed in these domains (on climate change, see, for example, Ranney and Clark, 2016). Past research has shown that arguments building on specific scientific findings are more convincing even to populists who are generally skeptical toward expertise (Peresman et al., 2025).

Why do most people (in the United States) trust most of basic science? Based on the present studies, we can only speculate. But if this trust has a rational basis, then education—and science education in particular—is the most likely explanation. Large-scale surveys have identified science education as one of the strongest, or the strongest, correlates of trust in science (Noy and O’Brien, 2019; Wellcome Global Monitor, 2018). If these studies were to assess trust in basic scientific knowledge, rather than assessing trust in science more broadly, we might expect effects to be even


stronger. Differentiating the impact of education on different facets of trust would be an interesting avenue for future research.

The present studies have a number of limitations, in particular the lack of representative samples, and the focus on a single country. The use of online samples recruited via Prolific does not allow us to calculate response rates and thus estimate non-response bias. However, participants could not have self-selected on the basis of the study topic and, by targeting vaccine-skeptic samples in some of the studies, we made an effort to recruit those participants who can be assumed to be most reluctant to partake in a study confronting them with science facts. While our results support motivated reasoning accounts of trust in science, they leave important questions unaddressed, in particular: why do people reject specific scientific findings but not others? Suggestions have already been made for a number of issues such as vaccination (Miton and Mercier, 2015), GMOs (Blancke et al., 2015), or nuclear energy (Hacquain et al., 2021). However, research is still needed to better understand what motivates these rejections (see, for example, Hornsey, 2020). Moreover, rejection of scientific facts can manifest in various ways, for example calling into question the integrity of scientists (Mede, 2023; Mede et al., 2022), or denying the very possibility of scientifically investigating certain issues (Munro, 2010). The classification of justifications we present here does not address these processes in detail. Finally, by design, most of the basic science knowledge presented in this study didn't directly relate to anything controversial for most people. Future studies could look at basic science that does relate to scientific topics which are the object of public and policy-relevant debates (e.g. GM food, climate science, and vaccines), or scientific findings for which there is a more obvious potential conflict of interest (e.g. non-publicly funded medical research).

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Supplemental material

Supplemental material for this article is available online.

Notes

1. Only in Study 4 do we find evidence that changing one's mind toward the scientific consensus is associated with (more) trust in science (Studies 1: $r=0.06$, $p=0.387$; 2: $r=0.16$, $p=0.051$; 3: $r=0.04$, $p=0.619$; 4: $r=0.15$, $p=0.037$) and only in Study 2 evidence that it is associated with (less) conspiracy beliefs and (less) conspiracy thinking (Studies 1: $r=-0.14$, $p=0.061$; 2: $r=-0.22$, $p=0.006$; 3: $r=-0.04$, $p=0.631$; 4: $r=-0.05$, $p=0.455$).
2. With two exceptions: in Study 3, we find no correlation between acceptance and the Pew question; in Study 4, we find a correlation between knowledge and both alternative trust measures, but not with our main measure; see online Supplemental Material.
3. 10.7% in Study 3 and 16.7% in Study 4 answered with "other" and gave an open-ended explanation.
4. For these analyses, we excluded outliers who took over 30 min for the survey, which was estimated to take around 10 min, and for which the median time was 7 min. As a result, we excluded one participant in Study 3 and four in Study 4. Significance levels are not affected by these exclusions.

References

- Algan Y, Cohen D, Davoine E, Foucault M and Stantcheva S (2021) Trust in scientists in times of pandemic: Panel evidence from 12 countries. *Proceedings of the National Academy of Sciences of the United States of America* 118(40): e2108576118.
- Allum N, Sturgis P, Tabourazi D and Brunton-Smith I (2008) Science knowledge and attitudes across cultures: A meta-analysis. *Public Understanding of Science* 17(1): 35–54.
- Altay S, Nera K, Ejaz W, Schöpfer C and Tomas F (2023) Conspiracy believers claim to be free thinkers but (Under)Use advice like everyone else. *British Journal of Social Psychology* 62(4): 1782–1797.
- Altenmüller MS, Wingen T and Schulte A (2024) Explaining polarized trust in scientists: A political stereotype-approach. *Science Communication* 46(1): 92–115.
- Bauer MW, Allum N and Miller S (2007) What can we learn from 25 years of PUS survey research? Liberating and expanding the agenda. *Public Understanding of Science* 16(1): 79–95.
- Besley JC, Lee NM and Pressgrove G (2021) Reassessing the variables used to measure public perceptions of scientists. *Science Communication* 43(1): 3–32.
- Blancke S, Van Breusegem F, De Jaeger G, Braeckman J and Van Montagu M (2015) Fatal attraction: The intuitive appeal of GMO opposition. *Trends in Plant Science* 20(7): 414–418.
- Brian K and Tyson A (2023) Americans' trust in scientists, positive views of science continue to decline. Available at: <https://www.pewresearch.org/science/2023/11/14/americans-trust-in-scientists-positive-views-of-science-continue-to-decline/>
- Bruder M, Haffke P, Neave N, Nouripanah N and Imhoff R (2013) Measuring individual differences in generic beliefs in conspiracy theories across cultures: Conspiracy Mentality Questionnaire. *Frontiers in Psychology* 4: 225. Available at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2013.00225>
- Cologna V and Siegrist M (2020) The role of trust for climate change mitigation and adaptation behaviour: A meta-analysis. *Journal of Environmental Psychology* 69: 101428.
- Cologna V, Mede NG, Berger S, Besley J, Brick C, Joubert M, et al. (2025) Trust in scientists and their role in society across 68 countries. *Nature Human Behaviour* 9: 713–730.
- Douglas KM, Uscinski JE, Sutton RM, Cichocka A, Nefes T, Ang CS, et al. (2019) Understanding conspiracy theories. *Political Psychology* 40(S1): 3–35.
- Durant JR, Evans GA and Thomas GP (1989) The public understanding of science. *Nature* 340(6228): 11–14.
- Egan PJ and Mullin M (2017) Climate change: US public opinion. *Annual Review of Political Science* 20: 209–227.
- Fernbach PM, Light N, Scott SE, Inbar Y and Rozin P (2019) Extreme opponents of genetically modified foods know the least but think they know the most. *Nature Human Behaviour* 3(3): 251–256.
- Fricker E (2006) *Testimony and Epistemic Autonomy* (ed J Lackey and E Sosa). Oxford: Oxford University Press. Available at: <https://doi.org/10.1093/acprof:oso/9780199276011.003.0011>
- Funk C and Kennedy B (2020) Public confidence in scientists has remained stable for decades. Available at: <https://www.pewresearch.org/short-reads/2020/08/27/public-confidence-in-scientists-has-remained-stable-for-decades/>
- Funk C, Johnson C and Hefferon M (2019) 5 key findings about public trust in scientists in the U.S. Available at: <https://www.pewresearch.org/fact-tank/2019/08/05/5-key-findings-about-public-trust-in-scientists-in-the-u-s/>
- Gauchat G (2011) The cultural authority of science: Public trust and acceptance of organized science. *Public Understanding of Science* 20(6): 751–770.
- Gauchat G (2012) Politicization of science in the public sphere: A study of public trust in the United States, 1974 to 2010. *American Sociological Review* 77(2): 167–187.
- Gauchat G and Andrews KT (2018) The cultural-cognitive mapping of scientific professions. *American Sociological Review* 83(3): 567–595.
- Gligorić V, Kleef GA and van Rutjens BT (2024) How social evaluations shape trust in 45 types of scientists. *PLoS ONE* 19(4): e0299621.
- Hacquin A-S, Altay S, Aarøe L and Mercier H (2021) Disgust sensitivity and public opinion on nuclear energy. *Journal of Environmental Psychology* 80: 101749.

- Harris KR (2023) Conspiracy theories, populism, and epistemic autonomy. *Journal of the American Philosophical Association* 9(1): 21–36.
- Hendriks F, Kienhues D and Bromme R (2015) Measuring laypeople's trust in experts in a digital age: The Muenster Epistemic Trustworthiness Inventory (METI). *PLoS ONE* 10(10): e0139309.
- Hornsey MJ (2020) Why facts are not enough: Understanding and managing the motivated rejection of science. *Current Directions in Psychological Science* 29(6): 583–591.
- Hornsey MJ and Fielding KS (2017) Attitude roots and Jiu Jitsu persuasion: Understanding and overcoming the motivated rejection of science. *American Psychologist* 72(5): 459–473.
- Hornsey MJ, Harris EA and Fielding KS (2018a) Relationships among conspiratorial beliefs, conservatism and climate scepticism across nations. *Nature Climate Change* 8(7): 614–620.
- Hornsey MJ, Harris EA and Fielding KS (2018b) The psychological roots of anti-vaccination attitudes: A 24-nation investigation. *Health Psychology* 37(4): 307–315.
- Intemann K (2023) Science communication and public trust in science. *Interdisciplinary Science Reviews* 48(2): 350–365.
- Jabkowski P, Domaradzki J and Baranowski M (2023) Exploring COVID-19 conspiracy theories: Education, religiosity, trust in scientists, and political orientation in 26 European countries. *Scientific Reports* 13(1): 18116.
- Krause NM, Brossard D, Scheufele DA, Xenos MA and Franke K (2019) Trends in Americans' trust in science and scientists. *Public Opinion Quarterly* 83(4): 817–836.
- Lantian A, Muller D, Nurra C and Douglas KM (2016) Measuring belief in conspiracy theories: Validation of a French and English Single-Item Scale. *International Review of Social Psychology* 29(1): 1.
- Lewandowsky S and Oberauer K (2016) Motivated rejection of science. *Current Directions in Psychological Science* 25(4): 217–222.
- Lewandowsky S, Gignac GE and Oberauer K (2013) The role of conspiracist ideation and worldviews in predicting rejection of science. *PLoS ONE* 8(10): e75637.
- Li N and Qian Y (2022) Polarization of public trust in scientists between 1978 and 2018: Insights from a cross-decade comparison using interpretable machine learning. *Politics and the Life Sciences* 41(1): 45–54.
- Lindholt MF, Jørgensen F, Bor A and Petersen MB (2021) Public acceptance of COVID-19 vaccines: Cross-national evidence on levels and individual-level predictors using observational data. *BMJ Open* 11(6): e048172.
- Littrell S, Dickman A, Seelig M, Premaratne K, Wuchty S, Verdear D, et al. (2025) Belief in science-related conspiracy theories. *Journal of Social Issues* 81(1): e70004.
- Mayer RC, Davis JH and Schoorman FD (1995) An integrative model of organizational trust. *The Academy of Management Review* 20(3): 709.
- Mede NG (2023) Science-related populism: Conceptualization, empirical investigation, and implications for science communication (dissertation summary). *Studies in Communication Sciences* 23(3): 383–390.
- Mede NG and Schäfer MS (2020) Science-related populism: Conceptualizing populist demands toward science. *Public Understanding of Science* 29(5): 473–491.
- Mede NG, Schäfer MS, Metag J and Klinger K (2022) Who supports science-related populism? A nationally representative survey on the prevalence and explanatory factors of populist attitudes toward science in Switzerland. *PLoS ONE* 17(8): e0271204.
- Miller JD (1998) The measurement of civic scientific literacy. *Public Understanding of Science* 7(3): 203–223.
- Miton H and Mercier H (2015) Cognitive obstacles to pro-vaccination beliefs. *Trends in Cognitive Sciences* 19(11): 633–636.
- Munro GD (2010) The scientific impotence excuse: Discounting belief-threatening scientific abstracts. *Journal of Applied Social Psychology* 40(3): 579–600.
- Nadelson LS and Hardy KK (2015) Trust in science and scientists and the acceptance of evolution. *Evolution: Education and Outreach* 8(1): 9.
- National Academies of Sciences, Engineering, and Medicine (2016) *Science Literacy: Concepts, Contexts, and Consequences* (ed CE Snow and KA Dibner). Washington, DC: National Academies Press. Available at: <https://doi.org/10.17226/23595>

- Noy S and O'Brien TL (2019) Science for good? The effects of education and national context on perceptions of science. *Public Understanding of Science* 28(8): 897–916.
- Pennycook G, Binnendyk J and Rand D (2025) Overconfidently conspiratorial: Conspiracy believers are dispositionally overconfident and massively overestimate how much others agree with them. *Personality and Social Psychology Bulletin*. Epub ahead of print 24 May 2025. DOI: 10.1177/01461672251338358.
- Peresman A, Larsen LT, Mazepus H and Petersen MB (2025) Do populists listen to expertise? A five-country study of authority, arguments, and expert sources. *Political Studies*. Epub ahead of print 15 March 2025. DOI: 10.1177/00323217251323402.
- Pummerer L, Fock L, Winter K and Sassenberg K (2024) Conspiracy beliefs and majority influence. *The Journal of Social Psychology*. Epub ahead of print 12 September 2024. DOI: 10.1080/00224545.2024.2397491
- Ranney MA and Clark D (2016) Climate change conceptual change: Scientific information can transform attitudes. *Topics in Cognitive Science* 8(1): 49–75.
- Rousseau DM, Sitkin SB, Burt RS and Camerer C (1998) Introduction to special topic forum: Not so different after all: A cross-discipline view of trust. *The Academy of Management Review* 23(3): 393–404. Available at: <http://www.jstor.org/stable/259285>
- Rutjens BT and Većkalov B (2022) Conspiracy beliefs and science rejection. *Current Opinion in Psychology* 46: 101392.
- Salmon DA, Dudley MZ, Glanz JM and Omer SB (2015) Vaccine hesitancy: Causes, consequences, and a call to action. *Vaccine* 33: D66–D71.
- Stockemer D and Bordeleau J-N (2024) Understanding climate change conspiracy beliefs: A comparative outlook. *Harvard Kennedy School Misinformation Review* 5(6): 1–12.
- Sturgis P, Brunton-Smith I and Jackson J (2021) Trust in science, social consensus and vaccine confidence. *Nature Human Behaviour* 5(11): 1528–1534.
- Uscinski J, Enders A, Klostad C, Seelig M, Drochon H, Premaratne K, et al. (2022) Have beliefs in conspiracy theories increased over time? *PLoS ONE* 17(7): e0270429.
- Van Stekelenburg A, Schaap G, Veling H, Van 't, Riet J and Buijzen M (2022) Scientific-consensus communication about contested science: A preregistered meta-analysis. *Psychological Science* 33(12): 1989–2008.
- Većkalov B, Geiger SJ, Bartoš F, White MP, Rutjens BT, Harreveld F, et al. (2024) A 27-country test of communicating the scientific consensus on climate change. *Nature Human Behaviour* 8: 1892–1905.
- Vranic A, Hromatko I and Tonković M (2022) “I did my own research”: Overconfidence, (dis)trust in science, and endorsement of conspiracy theories. *Frontiers in Psychology* 13: 931865.
- Wellcome Global Monitor (2018) Wellcome Global Monitor 2018. Available at: <https://wellcome.org/reports/wellcome-global-monitor/2018>
- Wellcome Global Monitor (2020) Wellcome Global Monitor 2020: Covid-19. Available at: <https://wellcome.org/reports/wellcome-global-monitor-covid-19/2020>
- Wellcome Global Monitor (2021) Public trust in scientists rose during the Covid—19 pandemic—News. Available at: <https://wellcome.org/news/public-trust-scientists-rose-during-covid-19-pandemic>
- Wilholt T (2013) Epistemic trust in science. *The British Journal for the Philosophy of Science* 64(2): 233–253.
- Winterlin F, Hendriks F, Mede NG, Bromme R, Metag J and Schäfer MS (2022) Predicting public trust in science: The role of basic orientations toward science, perceived trustworthiness of scientists, and experiences with science. *Frontiers in Communication* 6: 822757.

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