Universal acceptance of (nearly all of) basic science in the US

Abstract

XX

Introduction

How much do people trust and accept science? The recent COVID pandemic has highlighted the importance of this question, with trust in science being the best predictor of people's proclivity to follow health guidelines (Algan, Cohen, Davoine, Foucault, & Stantcheva, 2021).

Unfortunately, trust in science is far from being at ceiling (Wellcome Global Monitor, 2018, 2020), and there are suggestions that it has recently been dropping in some countries (Algan et al., 2021) and that it is increasingly politicized in the US (Gauchat, 2012; Krause, Brossard, Scheufele, Xenos, & Franke, 2019; Li & Qian, 2022).

This relative lack of trust in science could mean different things. It could mean that some people reject science wholesale, or at least to a significant extent. Or it could mean that they maintain a high degree of trust in most of science, and only question specific results that happen to contradict specific other beliefs they have (creationism, etc.), or beliefs that are associated with disliked behaviors (vaccination, acting for climate change).

We answer this question by looking at how much Americans accept basic scientific knowledge. We'll pay special attention to two groups of participants: people who say they don't trust science (much, or at all), and people who endorse science-related conspiracy theories (CTs), or have a CT mindset, since this has been linked with a low degree of trust in science, and that many CTs imply a mistrust of at least some science (vaccination, hydroxychloroquine, etc.).

We presently briefly review work on trust in science, and science knowledge, before turning to work on CT and trust in science.

Trust in science

Across the globe, most people say they trust science at least to some extent. In 2018, the Wellcome Global Monitor (WGM) surveyed of over 140'000 people in over 140 countries on trust in science (Wellcome Global Monitor, 2018) . In 2020, during the first year of the

Covid pandemic, a follow up survey was made in 113 countries, involving 119'000 participants (Wellcome Global Monitor, 2020). Across all countries, in 2018, 32% of participants said they trust science "a lot" (41% in 2020), 45% trust "some" science (39% in 2020), and only 13% percent trust science "not much/ not at all" (13% in 2020), while 10% indicated "don't know" (7% in 2020) (https://wellcome.org/reports/wellcome-global-monitor-covid-19/2020#gid=6acd&pid=0).

Trust in science also appears to be relatively stable in the US (Funk & Kennedy, 2020). However, there are some potentially worrying trends: The US might be increasingly polarized on trust in science (Gauchat, 2012). For example, the partisan divide on the question of whether climate change is a major threat to societey has been growing in the last decade (Kennedy, 2023). And while by some measures only about half of the US population believes in anthropogenic climate change, people do mostly not seem to change their mind on on the issue (Motta, 2021).

Trust in science is typically measured in three ways: either asking explictly about general trust in science or scientists, by asking about science attitudes (e.g. XX), or asking questions about specific, typically contentious, science topics (e.g. vaccines, climate change, GMOs). It is unclear to which extent these measures capture trust in basic science. To assess this, we can look at the literature on science knowledge.

Science knowledge

A lot of research has been conducted on the public understanding of science. Part of this research are surveys measuring to which extent people have basic science knowledge (e.g. "Does the Earth go around the Sun, or does the Sun go around the Earth?"). For us, these surveys provide a lower bound to how much people trust basic science: people who give the right answer (and not by chance) supposedly trust science on that question. Unfortunately, that lower bound has often been indeed pretty low: researchers have pointed out the deficit in basic science knowledge (Miller, 1998, 2004). For example, only 55% in the US (in 2014) and only 46% in the EU (in 2005) knew that antibiotics kill only bacteria but not viruses (Science Literacy et al., 2016). A question that remains is whether people do not provide the right answers because they are not familiar with the scientific consensus, or because they explicitly reject that consensus.

[To do: Make a descriptive overview of science knowledge across time/countries. This is a crucial point: if there are questions with specific scientific answers that just about everyone already knows, then in a sense our point is already proven. But there are enough questions where people's knowledge appears quite poor anyways]

CT and TiS

Recently, the relationship of one group to trust in science (TiS) has been particularly scrutinized: conspiracy theorists (CTists), either defined as people who endorse specific conspiracy theories, or as people who have a conspiracy mindset (Rutjens & Većkalov, 2022; Vranic, Hromatko, & Tonković, 2022). CTists reject specific science knowledge (related to their CT), and they tend to trust science less on the whole. What remains unclear is to which extent CTists (dis)trust basic science.

The present studies

In a series of studies, we ask basic science knowledge questions, inform people of the scientific consensus, and see if they accept it. Of particular interest are people who are low in TiS, and CTists.

In study 1, we plainly inform participants of the scientific consensus and ask if they accept it. We use a subset of questions on basic science knowledge that have been used in numerous public opinion surveys (Allum, Sturgis, Tabourazi, & Brunton-Smith, 2008; Durant, Evans, & Thomas, 1989; Miller, 1998) sometimes referred to as the "Oxford scale" (Gauchat, 2011). In study 2, we remove a problematic science question and present people with a more elaborated explanation of the scientific consensus, as well as additional sources. This allows us to remove the issue that participants might simply not have trusted us to correctly report the scientific consensus in study 1. Study 3 follows essentially the same design as study 2, but is run on a vaccine-skeptic sample. Further, we provided participants with an explicit option to revise their answer, in case they rejected the consensus. We also asked follow-up questions on why participants accepted the scientific consensus, namely whether they thought it was because they trust scientists or because they verified independently. Study 4 uses the same design as study 3, but asking science questions that people are less likely to have encountered before, and that they would be less likely to be able to verify (or even understand) themselves [on an anti-vaxx sample again?].

Then: replications in other countries?

Overview of experiments

The goal is to see to which extent people do not accept basic science.

Experiment 1

The main goal of experiment one was to test whether people would accept the scientific consensus on basic knowledge questions. Additionally, we wanted to know if both science knowledge and acceptance of the scientific consensus are associated with trust in science and conspiracy thinking. We had the following research questions:

RQ1: What is the average science knowledge score (1)?

RQ2: What is the average acceptance of the scientific consensus (2)?

RQ3: What is the relationship between trust in science and, respectively, (1) and (2)?

RQ4: What is the relationship between conspiracy thinking and, respectively, (1) and (2)?

Methods

Participants. We recruited 200 participants from the US via prolific. 6 participants failed our attention check, resulting in a final sample of 194 participants (98 female, 96 male; age_{mean}: 41.71, age_{sd}: 13.07, age_{median}: 39). Since we did not have any prior assumptions on effect sizes, we did not do a power analysis.

Procedure. After providing their consent to participate in the study, participants were given an attention check "While watching the television, have you ever had a fatal heart attack?" [1-6; 1 = Never, 6 = Often]. All participants who did not answer "1 = Never" were excluded. Participants then read the following instructions:"We will ask you 11 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, which were randomly selected from a pool of 11 questions, in random order. After each question, participants were presented with an answer reflecting the scientific consensus. Participants were asked to choose whether they accept the answer or not, before proceeding to the next question. Figure A1 displays the survey for an example science question. Finally, participants answered questions on conspiracy thinking and trust in science.

Materials.

Science knowledge and acceptance. Table 1 shows all questions, their scientifically consensual answer, and their source. All but two questions were selected from existing science knowledge questionnaires. We tried to select non-political questions.

Table 1
Science knowledge items

id	Question	Scientific consensus (Study 1)	Explanation (Study 2 & 3)
1	Do antibiotics kill viruses as well as bacteria?	There is a consensus among scientists that antibiotics kill bacteria, but not viruses.	Antibiotics specifically target and kill bacteria, not viruses. Scientists know this thanks to extensive laboratory experiments and clinical trials where antibiotics have been observed to be effective against bacterial infections but not viral ones. Scientists have also studied how antibiotics work, which typically involve disrupting bacterial cell processes like cell wall synthesis or protein production, which are absent in viruses. Here are some resources confirming that antibiotics only kill bacteria: American Chemical Society Queensland Government Wikipedia
2	Are electrons smaller, larger, or the same size as atoms ?	There is a consensus among scientists that electrons are smaller than atoms.	Electrons are much smaller than atoms. Scientists know this thanks to experiments in particle physics, such as electron scattering experiments. They are also able to measure the electron charge and mass. Additionally, atomic theory and quantum mechanics provide a theoretical framework explaining the structure of atoms, where electrons orbit the nucleus in distinct energy levels. Here are some resources confirming that electrons are smaller than atoms: Science Focus Britannica Wikipedia

3	Have the continents on Earth been moving for millions of years or have they always been where they are now?	There is a consensus among scientists that the continents on Earth have been moving for millions of years due to plate tectonics.	The continents on Earth have been moving for millions of years due to plate tectonics. Scientists have gathered evidence from various sources, including fossil records, geological formations, and the magnetic properties of rocks. The theory of plate tectonics explains how the Earth's lithosphere is divided into large, rigid plates that move over the semi-fluid asthenosphere, leading to phenomena like continental drift, earthquakes, and volcanic activity. Here are some resources confirming that continents on Earth have been moving for millions years: Britannica Live Science National Geographic
4	What decides whether a baby is a boy or a girl ? Is it the father's genes, the mother's genes, or both?	There is a consensus among scientists that it is the genes in the father's sperm which are decisive on whether a baby is a boy or a girl.	Chromosomes are structures found in the nucleus of cells that carry long pieces of DNA. Two of the chromosomes (the X and the Y chromosome) are called sex chromosomes. In most cases, females have two X chromosomes, while males have one X and one Y chromosome. At conception, the mother transmits an X chromosome, and the father may contribute an X or a Y. The chromosome from the father therefore determines if the baby is female (if the father transmits an X) or male (if the father transmits a Y). In most cases, children are born a male or female according to their chromosomes. However, some children may be born with genitalia that do not match their chromosomes. Here are some resources confirming that it is the father's genes that decide the sex of a baby: National Library of Medicine Nature Wikipedia
5	Do lasers work by focusing sound waves?	There is a consensus among scientists that lasers do not work by focusing sound waves.	Lasers produce a narrow beam of light in which all of the particles of light have very similar wavelengths. The laser's lightwaves travel together with their peaks all lined up, in phase. This is why laser beams are very narrow, very bright, and can be focused into a very tiny spot. Because laser light stays focused and does not spread out much (like a flashlight would), laser beams can travel very long distances. Here are some resources confirming that lasers do not work by focusing sound waves: NASA Lawrence Livermore National Library Wikipedia
6	How long does it take for Earth to go around the sun: one day, one month, or one year ?	There is a consensus among scientists that it takes one year for Earth to go around the sun.	Earth takes approximately one year to orbit the sun. This knowledge is based on astronomical observations and measurements of celestial motion. Early astronomers tracked the movement of the Earth relative to the stars and planets, leading to the development of models that accurately predict the Earth's orbital period around the sun. Here are some resources confirming that Earth goes around the sun in one year: NASA National Geographic Wikipedia

7	Are diamonds made of carbon ?	There is a consensus among scientists that diamonds are made of carbon.	Diamonds are made of only one element, carbon. Carbon is the same element that makes coal or graphite used for pencils. Why are diamonds transparent and hard while coal and graphite are opaque and soft? It all comes down to the placement of their atoms. In diamonds, each carbon atom is bonded to 4 other carbon atoms, while in graphite, each atom is only bonded to 3 other carbon atoms. The bonds in diamonds are held in such a tight structure that all light passes around them, which is why diamonds look transparent. In coal and graphite, light gets trapped between the atoms, which is why they look dark and opaque. Why do carbon atoms bond differently in diamonds? At very high pressures and temperatures, the carbon atoms are squeezed so much that they start touching more atoms. When the pressure is about 50,000 times the pressure at the surface of the Earth and the temperature is about 1600°C, the carbon atoms bond with 4 other atoms and result in diamonds. Here are some resources confirming that diamonds are made of carbon: Arizona State University University of Bristol Wikipedia
8	Which travels faster : light or sound?	There is a consensus among scientists that light travels faster than sound.	Light travels faster than sound. This conclusion arises from numerous experiments and observations in physics. You can also experience this for yourself during a thunderstorm. Unless the lighting is right above you, you will first see the lighting, then hear the thunder some time after (you can even tell how far the lighting struck by counting how many seconds it takes for the thunder to reach you). More precisely, the speed of light has been measured accurately using techniques such as the Michelson–Morley experiment. Similarly, the speed of sound has been measured through experiments involving the propagation of sound waves through various materials. Here are some resources confirming that light travers faster than sound: NASA Wikipedia : Speed of light Wikipedia: Speed of sound
9	Is common table salt made of calcium carbonate?	There is a consensus among scientists that common table salt is not made of calcium carbonate; it is made of sodium chloride.	Common table salt, or sodium chloride (NaCl), is not made of calcium carbonate. Scientists can use a variety of tests to understand what matter is made of. The most used test for sodium chloride is the chemical reaction with silver nitrate. The presence of sodium chloride yields a white precipitate upon drops of a silver nitrate solution. Calcium carbonate, by contrast, is the substance that makes up, for instance, chalk. Here are some resources confirming that common table salt is not made of calcium carbonate: National Library of Medicine Chem Europe Wikipedia

10	Is water made of molecules containing one oxygen and two hydrogen atoms?	There is a consensus among scientists that water is made of molecules containing one oxygen and two hydrogen atoms, and that its chemical formula is therefore H2O.	Water is made of molecules containing one oxygen atom and two hydrogen atoms, chemically represented as H2O. We know this for instance because if you set hydrogen on fire in a container with oxygen, water will form on the sides of the container. More recent techniques such as spectroscopy and X-ray crystallography have allowed scientists to more directly see the composition and structure of water molecules, confirming the presence of two hydrogen atoms bonded to one oxygen atom. Here are some resources confirming that water is made of molecules containing one oxygen and two hydrogen atoms: National Library of Medicine Wikipedia: Chemical structure Wikipedia: Water
11	Where do trees mainly draw the materials with which they create their mass?	There is a consensus among scientists that carbon drawn from the air during photosynthesis makes up most of the materials that trees use to build new leaves, stems, and roots.	

Conspiracy scales. To measure conspiracy thinking, we selected 10 science/health related conspiracy theories from the Belief in Conspiracy Theory Inventory (BCTI) by Pennycook, Binnendyk, and Rand (2022) (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 - completly false, 5 - unsure, 9 - completely true]".

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.

To cross-check our results with alternative measures, we also assessed the conspiracy

mentality questionnaire (CMQ) by Bruder, Haffke, Neave, Nouripanah, and Imhoff (2013) and the Single Item Conspiracy Beliefs Scale (SICBS) by Lantian, Muller, Nurra, and Douglas (2016) (see Appendix A).

Trust in science. Our main item for measuring trust in science is selected from the Wellcome Global Monitor survey: "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 also included two additional trust questions, one also from the Wellcome Global Monitor (WGM) survey ("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]"), the other from the Pew research center ("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]"). We selected these items so that we could compare the ratings in our sample to global survey results. The WGM survey has been administered in over 140 countries and included over 140000 respondents. The Pew question has recently been used by a world-wide many labs study in 67 countries with 71417 respondents (Cologna et al., 2024).

Results

Regarding RQ1 and RQ2, participants answered on average 74 % (sd = 0.16) of the questions correctly, and accepted the scientific consensus on average for 93 % (sd = 0.12) of the questions.

Fig. A7 illustrates the relationship between knowledge and acceptance. In most cases (76.3 %), participants readily accepted the scientific consensus after having given the wrong answer to a question. In very few cases (1.6 %), participants who gave the correct response afterwards rejected the scientific consensus, thereby contradicting their own initial response. We believe this might have been due to inattention.

For RQ3, we find a positive but small correlation between both science knowledge and trust in science ($r = 0.29$, $p < .001$), and acceptance of scientific consensus and trust in science ($r = 0.27$, $p < .001$). The more people are knowledgeable about science and the more they tend to accept the scientific consensus, the more they tend to trust science. These correlations are relatively weak, which might be partly due to ceiling effects: As illustrated in Fig. **??**, (i) most people do trust science, and (ii) that is true even among people with low knowledge or acceptance rates.

For RQ4, we find a negative correlation of similar magnitude between conspiracy thinking and science knowledge ($r = -0.38$, $p < .001$), and conspiracy thinking and acceptance of scientific consensus ($r = -0.33$, $p < .001$).

In Appendix A, we show that these associations are robust when using alternative measures of trust and conspiracy thinking. Appendix A also includes more descriptive statistics, such as knowledge and acceptance by science questions.

Are trust in science and conspiracy thinking, respectively, associated with being more easily convinced of the scientific consensus? In our main analyses, we looked at correlations of acceptance across all observations. One possibility is that the associations between

trust in science/conspiracy thinking and acceptance of scientific consensus are explained by science knowledge: People who give the right answer in the first place are more ready to accept the consensus, and trust in science/conspiracy thinking are mostly associated with this knowledge, but not with willingness to accept the consensus. To addressed this potential confound, in a non-preregistered analysis, we restricted our sample to cases where participants gave the wrong answer to the knowledge question. We than calculated the correlation between trust in science and average acceptance rate by participant. We find no statistically significant correlation of acceptance with neither conspiracy thinking ($r = -0.14$, $p = 0.061$), nor with trust in science ($r = 0.06$, $p = 0.387$).

Discussion

These results suggest that most people accept the scientific consensus most of the time. Even when people do not know the correct answer to a science question, they tend to mostly accept the scientific consensus afterwards. Yet, in 23.7 % of the cases, participants rejected the scientific consensus after having given the wrong answer, suggesting that simply stating the consensus is not sufficient to convince participants sometimes. In general, people with lower trust in science and who believe more in conspiracy theories tend to both know less about science and accept the scientific consensus less.

Experiment 2

In experiment 1, we tested whether participants would accept the scientific consensus on basic science facts. In most instances they did, but not always. In experiment 2, we wanted to test whether this reluctance was because of participants not trusting us as a source of consensual science knowledge. To do so, we added an explanation and sources to each consensus statement, instead of only stating the consensus. To better understand reasons for consensus rejection, after having answered all questions, we asked participants an open-ended question to explain why they rejected the consensus, for each question on which they did so. We also excluded the where do trees their materials from, as this question clearly seemed to be an outlier where most participants would get the answer wrong (see Appendix A).

Based on experiment 1, we formulated the following hypotheses:

H1a: Higher trust in science is associated with more science knowledge?

H1b: Higher trust in science is associated with more acceptance of the scientific consensus, for participants who did not already know it?

H2a: Higher conspiracy thinking is associated with less science knowledge?

H2b: Higher conspiracy thinking is associated with less acceptance of the scientific consensus, for participants who did not already know it?

We had the following research questions:

RQ1: What is the average science knowledge score?

RQ2: When a participant's answer does not match the consensus, how often do they change their mind and accept the consensus?

RQ3: What reasons do participants provide to justify their rejection of the scientific consensus?

Methods

Participants. We recruited 201 participants from the US via prolific. 11 participants failed our attention check, resulting in a final sample of 190 participants (96 female, 94 male; age_{mean}: 43.48, age_{sd}: 12.25, age_{median}: 42). Since we did not have any prior assumptions on effect sizes and our analyses were descriptive, we did not do a power analysis.

Procedure. The procedure was the same as in experiment 1, with the difference that, instead of just stating the scientific consensus, participants were presented with a short explanation which we wrote, partly based on explanations generated by ChatGPT, and three links to authoritative sources supporting the answer (Fig. B1.

Materials. We relied on the same items as in experiment 1. The only difference was that we removed the question on trees.

Results

As in experiment 1, we find a positive but small correlation between science knowledge and trust in science (H1a: r = 0.28, p < .001) and a small negative correlation between science knowledge and conspiracy thinking (H2a: r = -0.40, p < .001). By contrast to experiment 1, we conditioned on initially false answers when looking at the relationship of consensus acceptance with trust in science and conspiracy thinking, respectively. For trust in science, we find no statistically significant correlation (r = 0.16, p = 0.051). For conspiracy thinking we find a small negative one (r = -0.22, p = 0.006).

Confirming results from experiment 1, we find that the more people are knowledgeable about science and the more they tend to accept the scientific consensus even when they are not that knowledgeable in science, the more they tend to trust science. These correlations are relatively weak, which might be partly due to ceiling effects: As illustrated in Fig. **??**, (i) most people do trust science, and (ii) that is true even among people with low knowledge or acceptance rates. In Appendix B we show that these results hold for our alternative measures of trust and conspiracy thinking. We also include more descriptive statistics, such as knowledge and acceptance by science questions.

Regarding RQ1, participants answered on average 79 % (sd = 0.19) of the questions correctly, and accepted the scientific consensus on average for 98 % (sd = 0.05) of the questions. Fig. B7 illustrates the relationship between knowledge and acceptance. In response to RQ2, in most cases (92.9 %), participants readily accepted the scientific consensus after having initially given the wrong answer to a question. In very few cases (0.5 %), participants who gave the correct response afterwards rejected the scientific consensus, thereby contradicting their own initial response.

For RQ3, we got 35 answers from 25 different participants to the open-ended questions on why they had rejected the scientific consensus on a particular question. Table 3

Table 3
Justifications by category

Category	N (instances)	Share (instances)	N (unique participants)
Personal convictions	12.00	34.3%	8.00
Mistake	9.00	25.7%	8.00
No justification	7.00	20%	5.00
Not convinced	5.00	14.3%	5.00
Religious Beliefs	2.00	5.7%	2.00

summarizes these answers by five categories. All answers can be read in Appendix B.

Discussion

Similar to experiment 1, most people (i) do know and agree with the scientific consensus, and (ii) tend to accept the scientific consent even if they were not previously aware of it (i.e. answered the knowledge question wrongly). The share of these latter is considerably larger in experiment 2 (92.9 %) than in experiment 1 (76.3 %). While this could be just sampling variation, it might be that adding explanations and sources convinced people more than merely stating the consensus. We also show, again, that people with lower trust in science and who believe more in conspiracy theories tend to both know less about science and accept the scientific consensus less.

Experiment 3

Study 3 is essentially a replication-–with some minor modifications-–of study 2, but on a different type of sample. Both study 1 and 2 were run on convenience samples. For study 3, we recruited a sample of people holding anti-vaccination beliefs (see below). By contrast to study 2, after asking participants an open question about why they did not accept the consensus (in cases where they didn't), we provide them with an explicit opportunity to change their answer (Fig. C1). Based on the answers to the open-ended questions, we also pre-registered a categorization scheme of reasons why people rejected the consensus. Finally, we also ask participants about why they agree with the scientific consensus on certain questions, in case they do. We want to know if participants perceive that this is because of trust, or other factors.

As for study 2 (but without conditioning on wrong answers, as we did in study 1), we had the following hypotheses:

H1a: Higher trust in science is associated with more science knowledge?

H1b: Higher trust in science is associated with more acceptance of the scientific consensus.

H2a: Higher conspiracy thinking is associated with less science knowledge?

H2b: Higher conspiracy thinking is associated with less acceptance of the scientific consensus.

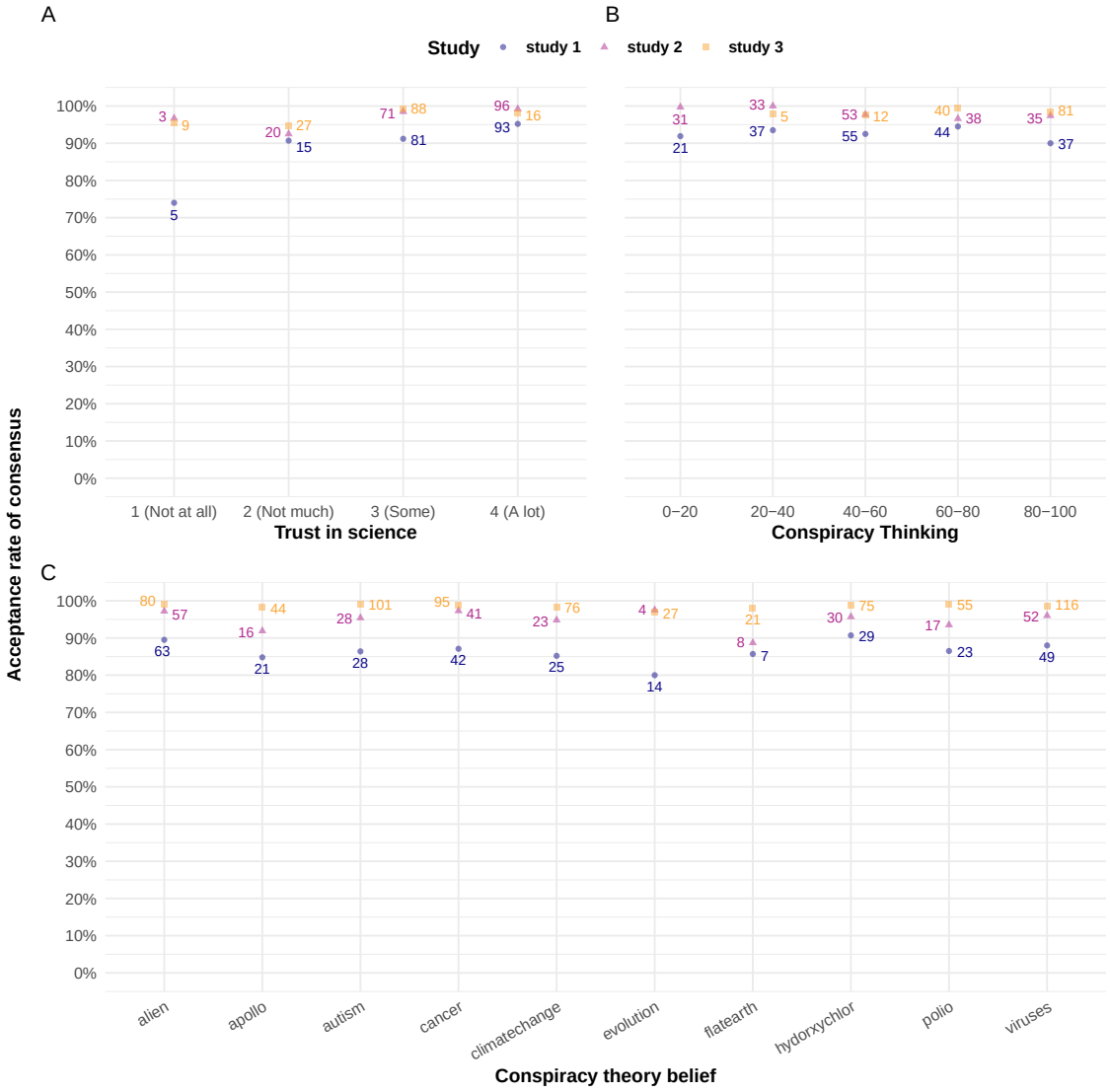

Figure 1. Points represent the average share of acceptance as a function of the **A** level of trust in science ("In general, would you say that you trust science a lot, some, not much, or not at all? [1 = Not at all, 2 = Not much, 3 = Some, 4 = A lot]"); **B** average conspiracy thinking (CMQ, 5 items on a scale from 0 to 100); **C** belief in a specific conspiracy theory. Participants were asked to rate their belief in the conspiracy on a scale from 1 to 9, with the labels: "1 - completly false, 5 - unsure, 9 - completely true". Averages are only based on participants who believed at least to some degree in the conspiracy theory. We consider a believer as anyone scoring higher than the scale midpoint, i.e. >5. Number labels in plots represent the number of participants for the corresponding data point.

We had the following research questions:

RQ1: What is the average science knowledge score?

RQ2: What is the average acceptance of the scientific consensus

RQ3: What reasons do participants provide to justify their rejection of the scientific consensus?

RQ4: In case they agree with the scientific consensus, do people feel that this is because of trust?

Methods

Participants. We recruited 200 participants from the US via prolific, of which none failed our attention check, resulting in a final sample of 200 participants (125 female, 73 male; age_{mean}: 42.90, age_{sd}: 12.00, age_{median}: 41). Since we did not have any prior assumptions on effect sizes and our analyses were descriptive, we did not do a power analysis.

However, due to a randomization mistake for our outcomes, participant answered only two of the three outcome measure blocs (trust in science, conspiracy thinking, and reason for accepting consensus). This leaves us with reduced sample sizes for all analyses concerning these outcomes (N = 140 for trust in science, N = 138 for conspiracy measures, N = 122 for reason for accepting consensus).

Procedure. The procedure was mostly the same as in experiment 2. In addition, after each open-ended question on cases where participants rejected the scientific consensus, participants were also asked if they want to change their answer and accept the scientific consensus. Finally, at the end of the survey, we asked participants: "For the questions in which you agreed with the scientific consensus, would you say that...?" The answer options were: (i) "You mostly agree with the consensus because, on that question, you trust scientists", (ii) "You mostly agree with the consensus because you have been able to independently verify it", and (iii) "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?".

Materials. We relied on the same items as in experiment 2. We used a pre-registered categorization scheme for the open ended answers for why people reject the consensus. The categories were XX and XX. [Describe coding process, with independent reviewer etc.]

Results

As in study 1 and 2, we find that participants answered on average 75 % (sd = 0.18) of the questions correctly, and initially accepted the scientific consensus on average for 96 % (sd = 0.08) of the questions (RQ2). The acceptance rate is even higher when accounting for opinion revisions towards acceptance of the consensus, after initial rejection (98 %, sd = 0.06).

Table 4
Justifications by category

Category	N (instances)	Share (instances)	N (unique participants)
Personal convictions	25.00	33.8%	19.00
Mistake	21.00	28.4%	18.00
No justification	18.00	24.3%	13.00
Not convinced	7.00	9.5%	3.00
Religious Beliefs	3.00	4.1%	3.00

Fig. C7 illustrates the relationship between knowledge and acceptance. In most cases (87 %), participants readily accepted the scientific consensus right after having given the wrong answer to a question. After providing the chance to revise the initial consensus rejection, this share is even larger (95.5 %). In very few cases (0.9 %), participants who initially gave the correct response afterwards rejected the scientific consensus right after, thereby contradicting their own initial response. This share drops slightly after providing the chance to revise the initial consensus rejection (0.7 %).

In the appendix XX we provide an analysis that this drop is statistically significant [TO DO].

For all correlations, we include opinion revisions for measuring consensus acceptance. We find no statistically significant correlation between science knowledge and trust in science (r = 0.14, p = 0.100), but a samll positive correlation between acceptance of scientific consensus and trust in science (r = 0.20, p = 0.019). Again, these findings might be partly due to ceiling effects: As illustrated in Fig. **??**, (i) most people do trust science, and (ii) that is true even among people with low knowledge or acceptance rates. We find no statistically significant correlation between conspiracy thinking and science knowledge (r = -0.16, p = 0.055), and between conspiracy thinking and acceptance of scientific consensus (r = c(cor = -0.023), c(t = -0.27), = 0.788, c(df = 136), -0.189, 0.145, Pearson's product-moment correlation, two.sided, [-0.189, 0.145], p = 0.788).

In Appendix C, we show that these associations are statistically significant (except the last one?). We show that they are robust when using alternative measures of trust and conspiracy thinking. Appendix C also includes more descriptive statistics, such as knowledge and acceptance by science questions.

Regarding RQ1, participants answered on average 75 % (sd = 0.18) of the questions correctly. For RQ3, we got 74 answers from 47 different participants to the open-ended questions on why they had rejected the scientific consensus on a particular question. Table 4 summarizes these answers by five categories.

All answers can be read in the appendix.

For RQ4, we had 122 participants answering the question. Of these 41.8% said they accepted the scientific consensus because they trust scientists on this question, while 47.5% said they independently verified the fact. 10.7% answered with other "other" and gave an open-ended explanation (see Appendix).

We also asked all 58 participants who answered that they had independently verified the answer to explain how they did so. The open-ended answers are listed in Appendix XX.

Discussion

[We can draw some inspiration from the "Westwood et al 2021 Current research overstates American support for political violence" paper: we want to put in perspective the current rise (? discourse around?) in mistrust towards science]

There is increasingly more talk of defiance towards science and towards experts more generally. In every population, many people only trust science 'some of the time', and a sizable minority doesn't trust it. This appears difficult to reconcile with the fact that, in many countries, most people receive at least a basic science education, that science education (along with education more generally) is increasing, and that science education seems to be the main driver of trust in science.

But how deep is distrust of science? In four studies, we have shown that almost every participant accepts almost all of basic science questions we included.

Traditionally, people have interpreted people's lack of basic knowledge in light of the deficit-model. Here, we show that people readily accept the scientifically consensual answer to these questions.

"The dominant approach to conceptualizing and measuring science literacy in population surveys has arisen out of work by Jon D. Miller and Kenneth Prewitt in the United States (see Miller, 1983, 1998, 2004) alongside collabora- tors in Great Britain (see Durant et al., 1989). Underlying these efforts appears to have been widespread concern among policy makers and the scientific com- munity that nonscientists were becoming skeptical about the benefits of sci- ence and that such skepticism might result in cuts to science funding that would harm the scientific progress that many argue underpins both American and European economic development (Bauer et al., 2007). The results of the U.S. portion of this work have formed the core of a chapter of a biennial report called Science and Engineering Indicators (hereafter, Indicators) that the National Science Board provides to Congress and the Executive Branch. Scholars have also used the raw data collected for Indicators (which is made publicly available) for peer-reviewed research (e.g., Gauchat, 2012; Losh, 2010), and other countries have used many of the Indicators' questions for their own national surveys (e.g., Bauer et al., 2012a; National Science Board, 2016)."

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Appendix A
Experiment 1

Materials

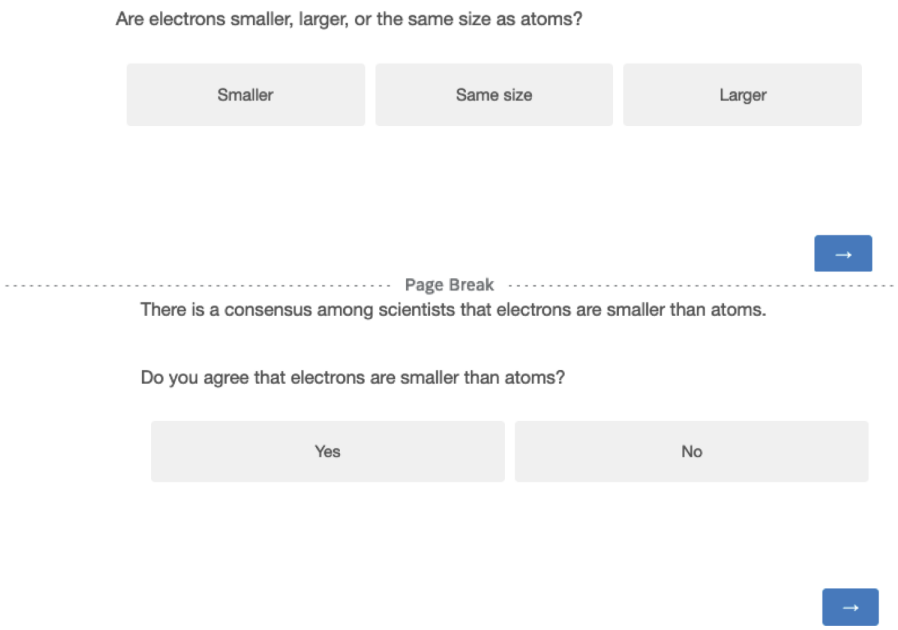

Figure A1. Example of a science question, the scientific consensus and the corresponding acceptance question.

Conspiracy scales. Beside Belief in Conspiracy Theory Inventory (BCTI) by Pennycook et al. (2022) which report in the main study, we also assessed two other consipiracy thinking measures:

1. The conspiracy mentality questionnaire (CMQ) by Bruder et al. (2013): I think that . . .

- . . . many very important things happen in the world, which the public is never informed about. - politicians usually do not tell us the true motives for their decisions.
- . . . government agencies closely monitor all citizens.
- . . . events which superficially seem to lack a connection are often the result of secret activities.
- . . . there are secret organizations that greatly influence political decisions.

[0% - 100%; 0 = certainly not, 100 = certain]

2. The Single Item Conspiracy Beliefs Scale (SICBS) by Lantian et al. (2016) :

- I think that the official version of the events given by the authorities very often hides the truth. [1-9; 1 = Completely false, 5 = Unsure, 9 = Completely true]

Trust in science. We rely on three items

1. 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]
2. 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]
3. 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]

Comparing items

Conspiracy theories. Table A1 shows the correlations of the three different scales assessing conspiracy thinking.

Table A1
Correlations of the three different scales assessing conspiracy thinking

	BCTI	CMQ	SICBS
BCTI	1.00	0.58	0.56
CMQ	0.58	1.00	0.77
SICBS	0.56	0.77	1.00

Trust in science. Table A2 shows the correlations of the three different items measuring trust in science.

Table A2
Correlations of the three different items measuring trust in science

	wgm_sciencegeneral	wgm_scientists	pew
wgm_sciencegeneral	1.00	0.85	0.75
wgm_scientists	0.85	1.00	0.82
pew	0.75	0.82	1.00

Correlations with alternative measures

Table A3 shows the correlations between knowledge and acceptance, respectively, and outcome variables.

Results conditional on false responses

Table A4 shows the correlations between acceptance and outcome variables based on linear regression models on standardized values.

By-question variation

Knowledge.
Acceptance.

Table A3
Correlations between knowledge and acceptance, respectively, and outcome variables

outcome	Correlation with knowledge	Correlation with acceptance
BCTI (main conspiracy measure)	-0.38 (p< .001)	-0.33 (p< .001)
CMQ	-0.11 (p= 0.121)	-0.07 (p= 0.317)
SICBS	-0.1 (p= 0.158)	-0.09 (p= 0.213)
WGM trust scientists	0.23 (p= 0.001)	0.26 (p< .001)
WGM trust general (main trust measure)	0.29 (p< .001)	0.27 (p< .001)
PEW trust scientists	0.16 (p= 0.027)	0.21 (p= 0.003)

Table A4
Based on false response data only, correlations between acceptance and outcome variables based on linear regression models on standardized values

	BCTI_avg	CMQ_avg	SICBS	wgm_scientists	wgm_sciencegeneral	pew
(Intercept)	0.000	0.000	0.000	0.000	0.000	0.000
	(0.073)	(0.074)	(0.074)	(0.073)	(0.074)	(0.074)
avg_acceptance	-0.139+	0.008	-0.028	0.108	0.064	0.056
	(0.073)	(0.074)	(0.074)	(0.074)	(0.074)	(0.074)
Num.Obs.	184	184	184	184	184	184
R2	0.019	0.000	0.001	0.012	0.004	0.003
R2 Adj.	0.014	-0.005	-0.005	0.006	-0.001	-0.002
AIC	523.6	527.2	527.0	525.0	526.4	526.6
BIC	533.2	536.8	536.7	534.7	536.1	536.2
Log.Lik.	-258.801	-260.578	-260.512	-259.506	-260.204	-260.295
RMSE	0.99	1.00	1.00	0.99	1.00	1.00

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Trust in science

Conspiracy thinking

Distribution.
By-item variation.

Open ended comments

Table A5
Reasons for consensus rejection

id	comments
1	no
20	None
22	I answered thoughtfully, good luck!

27	interesting, thank you.
30	n/a
32	None
39	no
41	none
42	n/a
67	thanks
69	No comments
74	no
76	none
78	None - thank you!
79	Should've clicked agree about plants getting carbon from the air, but I wanted to look it up first. Whenever I encounter something I didn't know online, I like to cross-reference. In retrospect though, everything else you asked about was simple and on the level, and I'm sure you are correct. Thanks for your hard work.
84	No, thank you.
86	n/a
89	N/A
95	no
98	Great topics! Thank you for this study.
109	To provide context for my responses, I currently study physiology (STEM) and perform academic research as an undergrad at my university.
110	n/a
114	Everything in the survey went fine with no issues. We seem to have a lot of conspiracy theory nuts in the world today and I think it's a sign of the larger mental health crisis that's currently going on.
115	I like the subject content of the survey
116	No
132	None.
133	very interesting
135	Nope
139	none
140	Air AND water make up the bulk of trees mass and the water is drawn from the earth. Water has much more mass than air and I stand by my answer of Earth being that is where the water is drawn from. The question was very vague and as you see... open to interpretation
141	n/a
148	no
150	no
152	None.
154	none, tysm!

155	Not virus, just metals/DDT. And I think it would be impossible for dinosaurs to have sex with the way they are shaped.
157	none
159	I think scientists are acting in the best interests of science rather than the community directly. An unethical scientist could advance scientific knowledge while hurting humanity.
161	Mo Thanks
164	I appreciate science but understand that if scientists don't go along with what investors/govt want they won't receive grants for funding. I also very recently lived through several years of gaslighting about covid. While I realize I'm not the sharpest tool in the shed, I'm not a total idiot. Things that were censored at the beginning of the pandemic are now allowed to be discussed freely. Science should be publicly debated otherwise it isn't science.
165	it was interesting
166	Everything in the study was good I enjoyed taking it
167	none
169	good study
170	Thanks for the opportunity!
173	No
180	The study was great.
183	Very interesting study.
185	None
186	Thanks, have good day
189	no

Additional plots

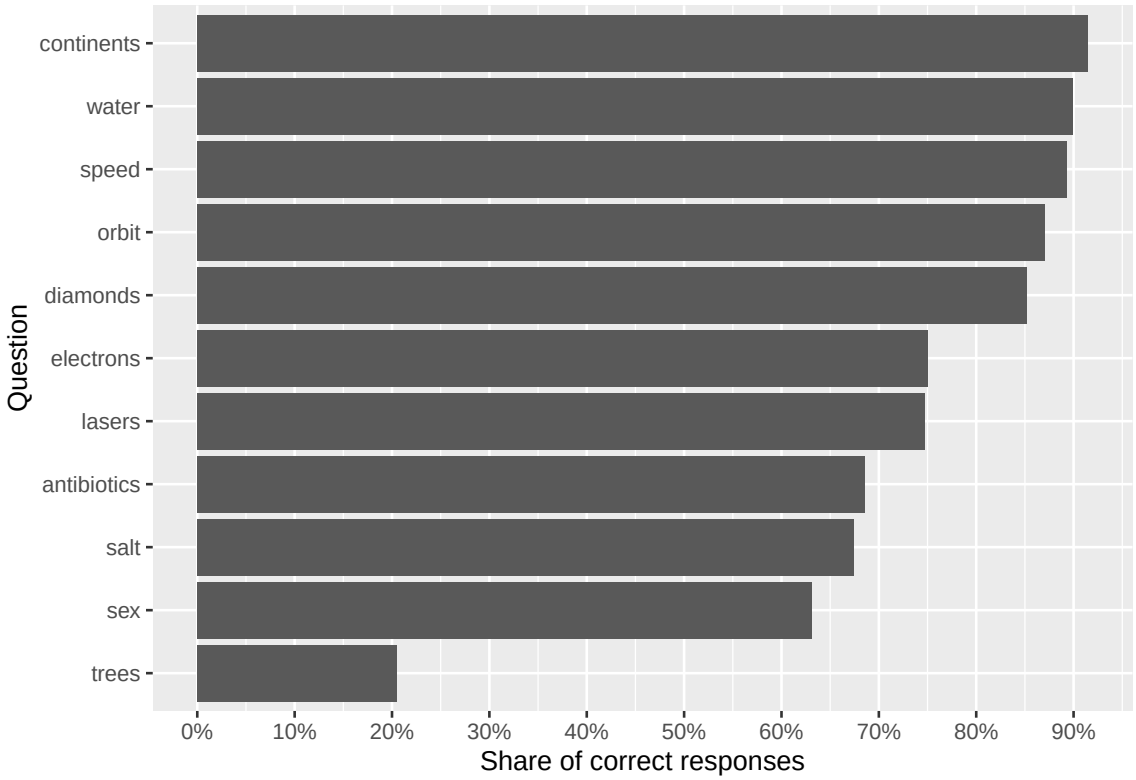

Figure A2. Distribution of correct answers by question.

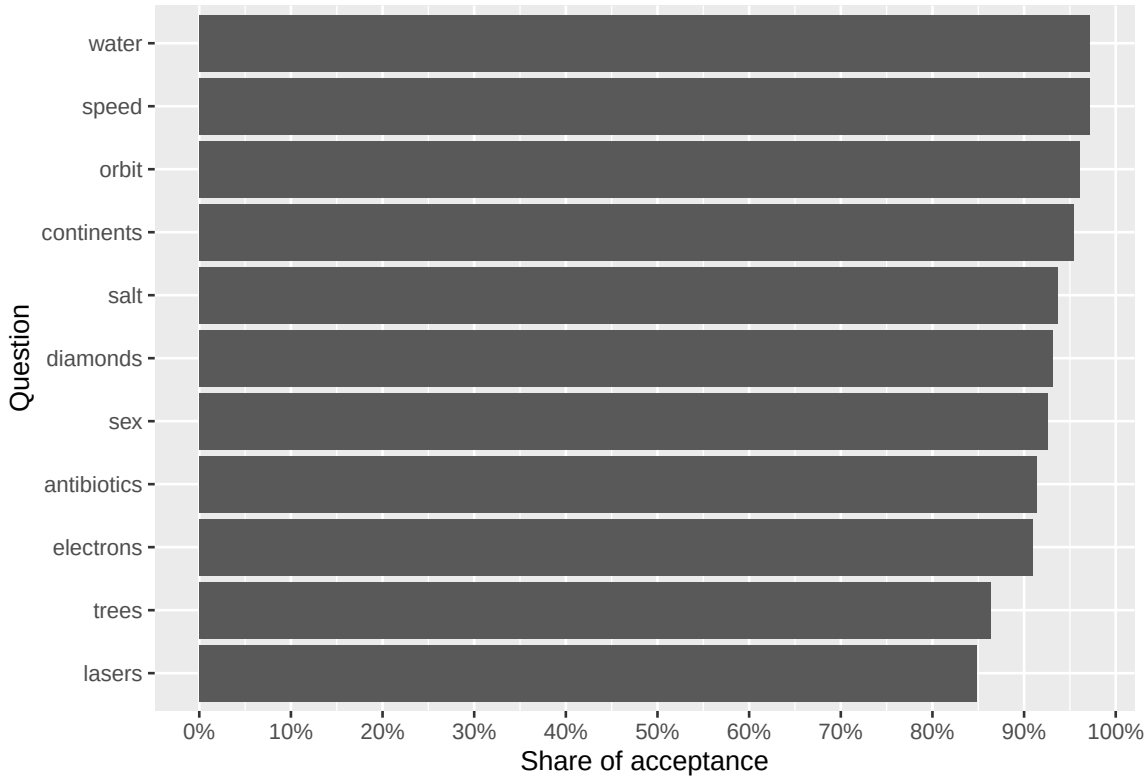

Figure A3. Distribution of consensus acceptance by question.

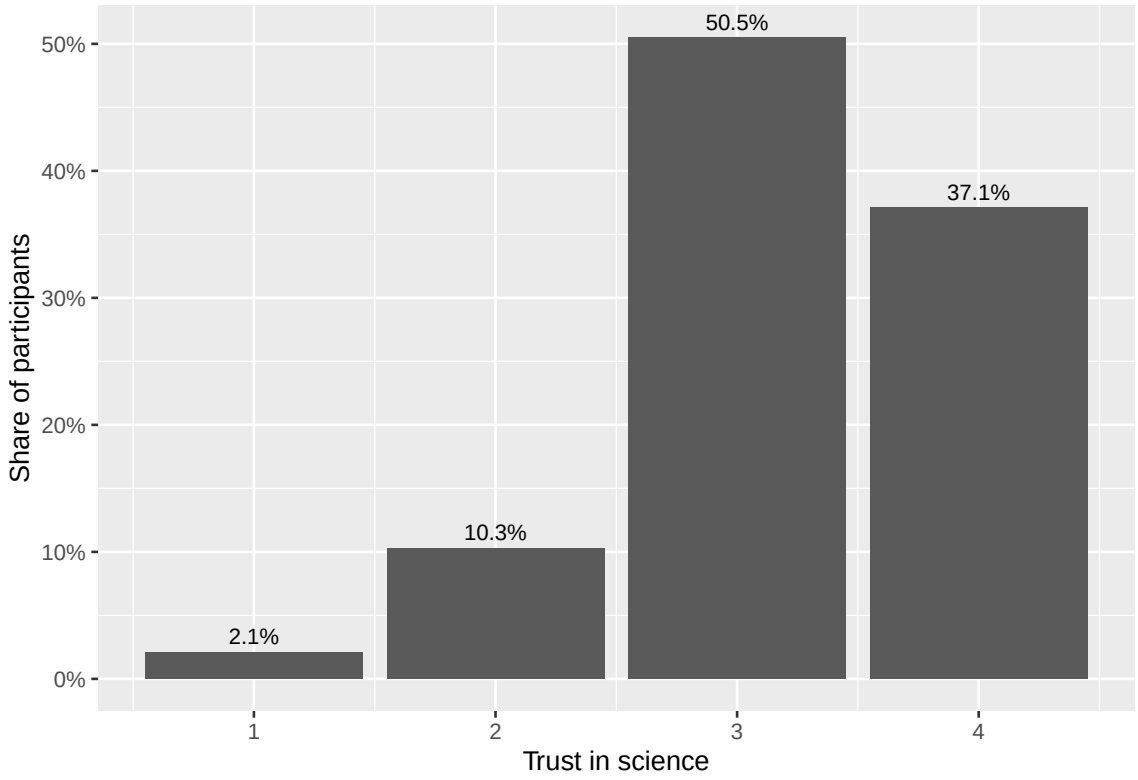

Figure A4. Distribution of trust in scientists.

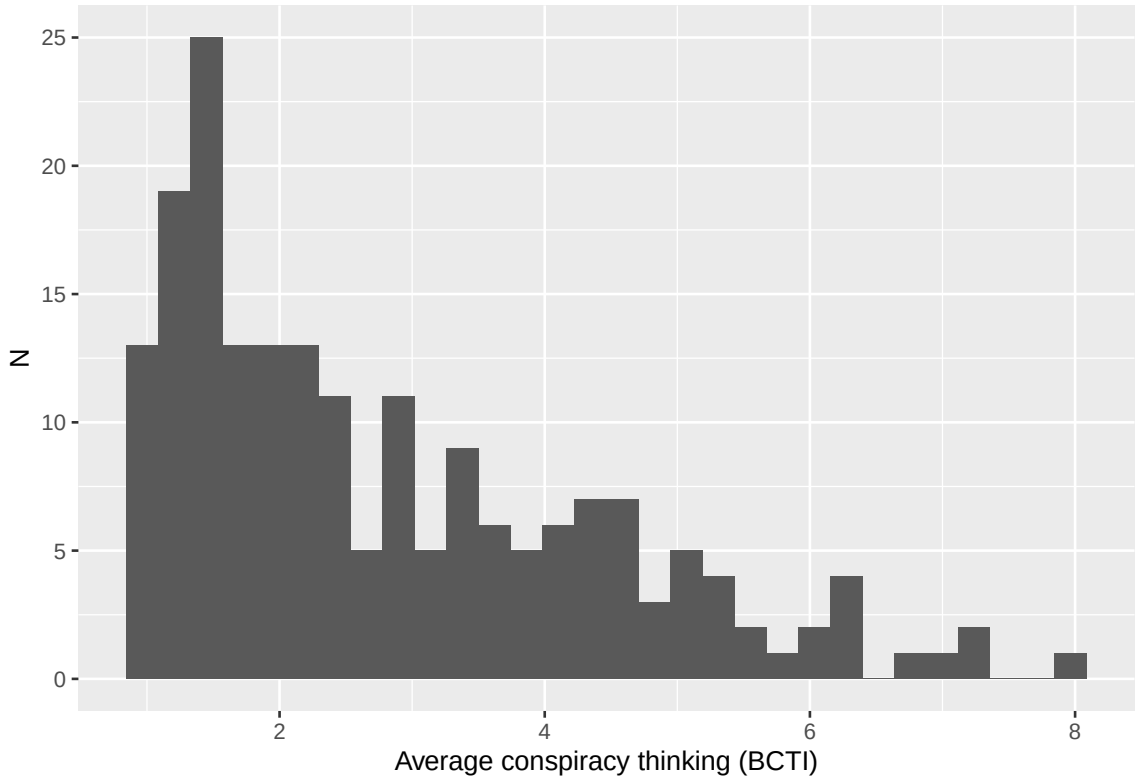

Figure A5. Distribution of conspiracy thinking.

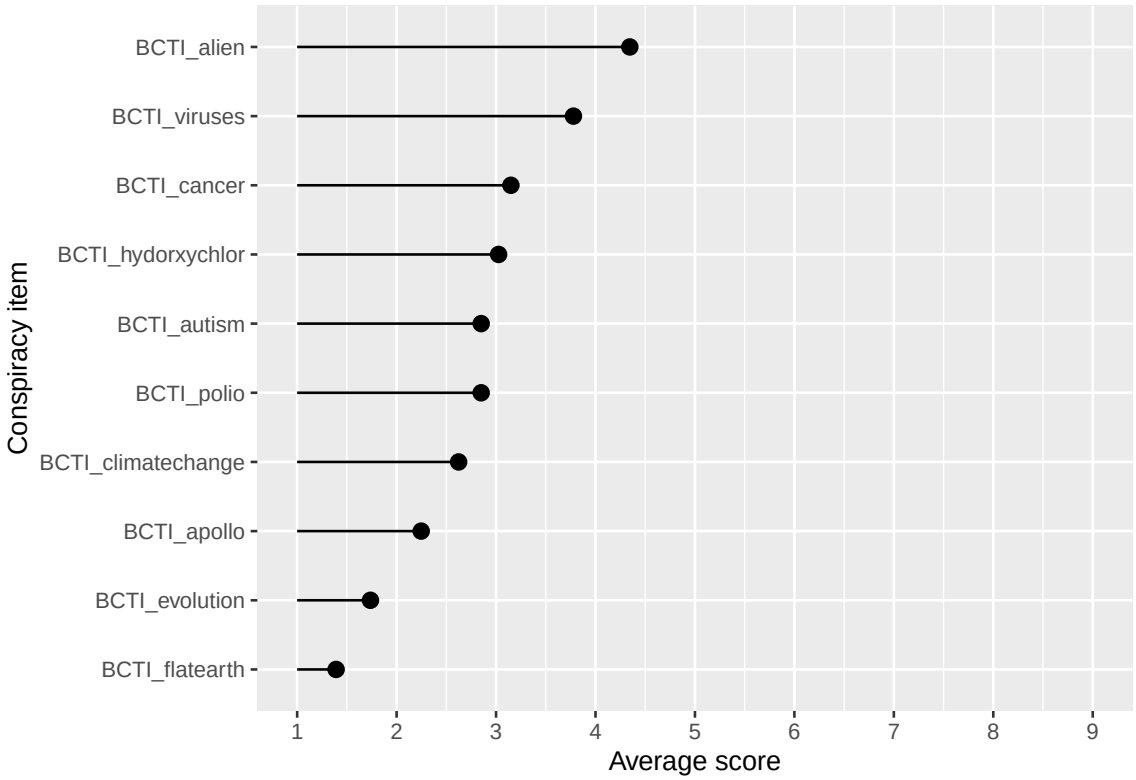

Figure A6. Distribution of conspiracy thinking by item.

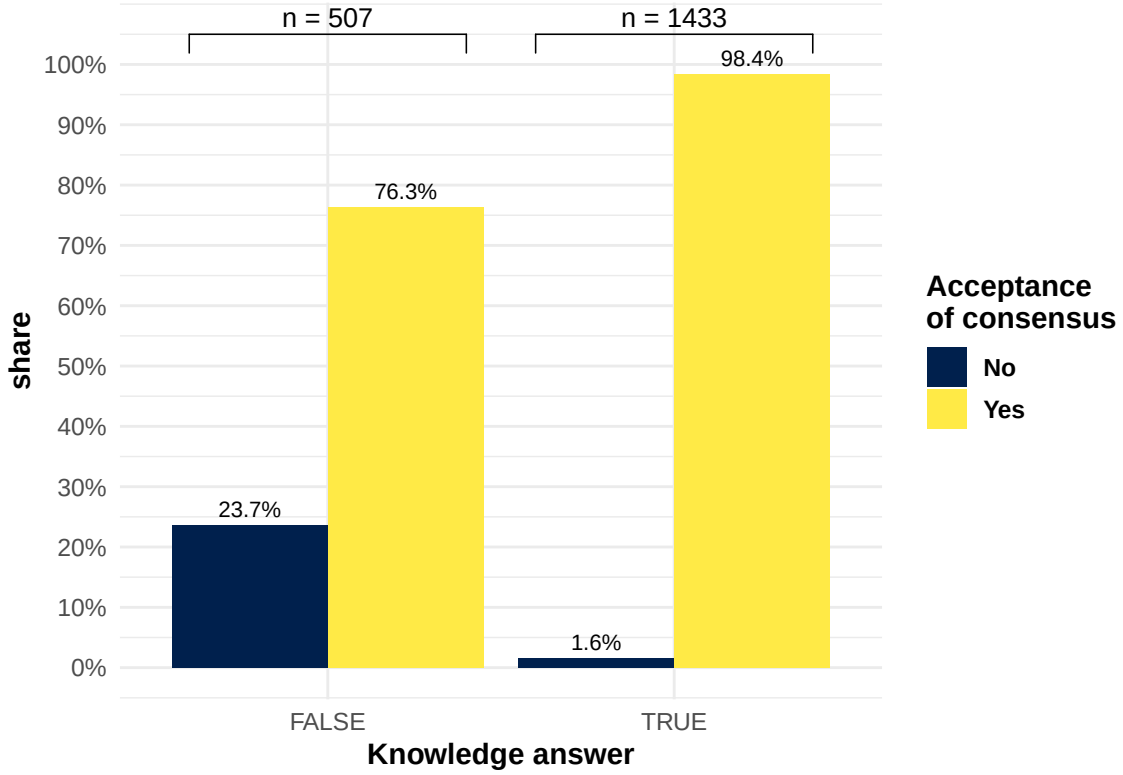

Figure A7. Acceptance rates of scientific consensus, based on whether the initial response to the knowledge question was false or true.

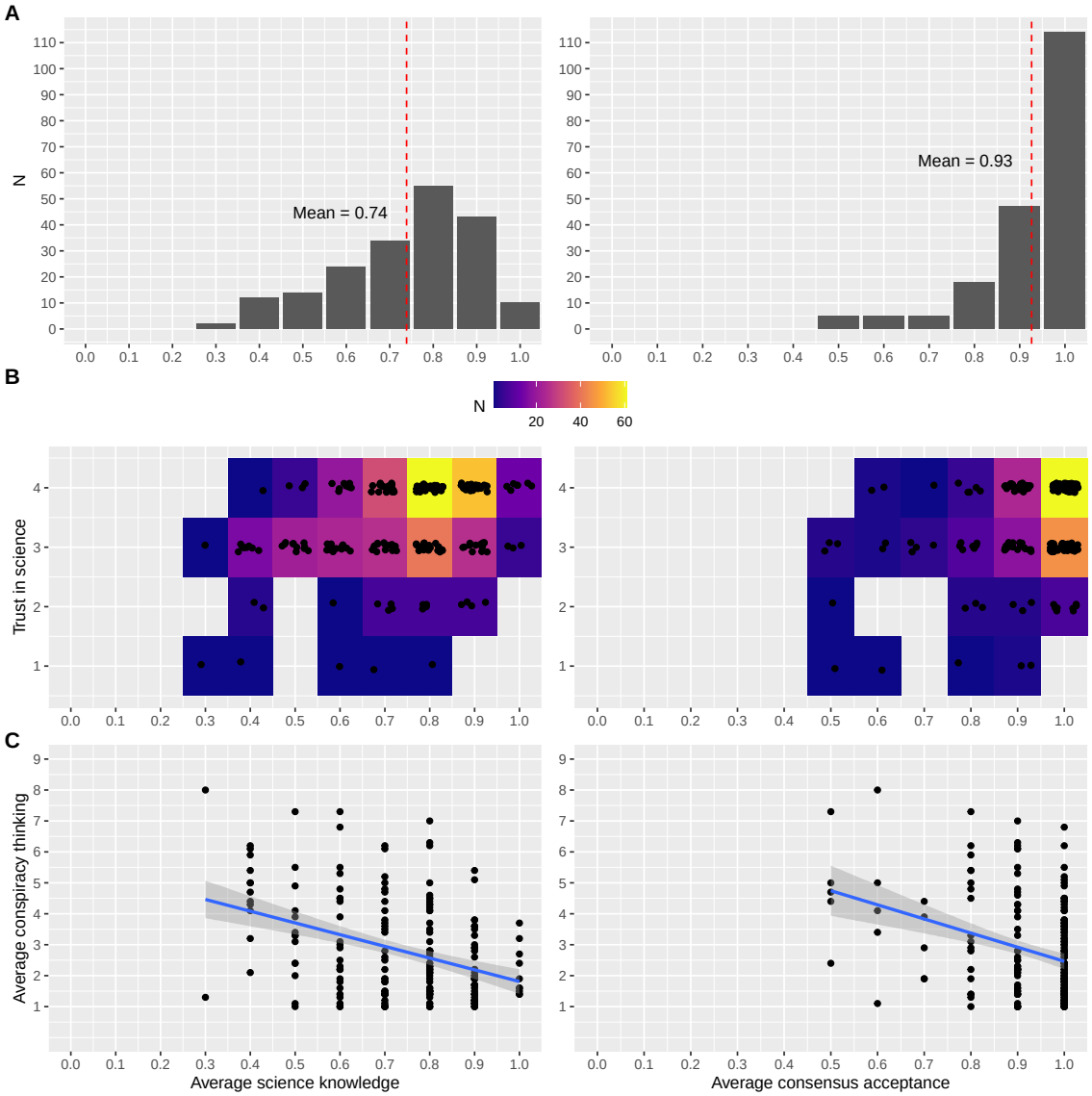

Figure A8. **A** Shows the distribution of science knowledge (left) and acceptance of scientific consensus **B** Shows the relationship between trust in science and science knowledge/acceptance of scientific consensus **C** Shows the relationship between conspiracy thinking and science knowledge/acceptance of scientific consensus

Appendix B
Experiment 2

Materials

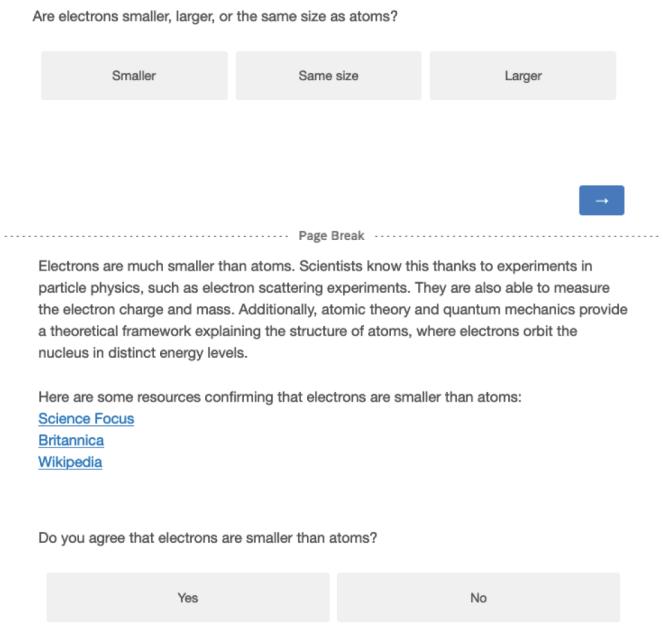

Figure B1. Example of a science question, the scientific consensus and corresponding explanation and sources.

Comparing items

Conspiracy theories. Table B1 shows the correlations of the three different scales assessing conspiracy thinking.

Table B1
Correlations of the three different scales assessing conspiracy thinking

	BCTI	CMQ	SICBS
BCTI	1.00	0.66	0.63
CMQ	0.66	1.00	0.86
SICBS	0.63	0.86	1.00

Trust in science. Table B2 shows the correlations of the three different items measuring trust in science.

Table B2
Correlations of the three different items measuring trust in science

	wgm_sciencegeneral	wgm_scientists	pew
wgm_sciencegeneral	1.00	0.89	0.79
wgm_scientists	0.89	1.00	0.85
pew	0.79	0.85	1.00

Table B3
Correlations between knowledge and acceptance, respectively, and outcome variables

std.error	statistic	p.value	conf.low	conf.high	outcome	ci
0.07	-6.01	< .001	-0.53	-0.27	BCTI (main conspiracy measure)	[-0.533, -0
0.07	-2.36	= 0.019	-0.31	-0.03	CMQ	[-0.311, -0
0.07	-1.91	= 0.058	-0.28	0.00	SICBS	[-0.28, 0.0
0.07	3.20	= 0.002	0.09	0.37	WGM trust scientists	[0.087, 0.3
0.07	3.98	< .001	0.14	0.42	WGM trust general (main trust measure)	[0.14, 0.41
0.07	2.23	= 0.027	0.02	0.30	PEW trust scientists	[0.019, 0.3
0.07	-5.47	< .001	-0.50	-0.24	BCTI (main conspiracy measure)	[-0.504, -0
0.07	-3.03	= 0.003	-0.36	-0.08	CMQ	[-0.356, -0
0.07	-2.76	= 0.006	-0.34	-0.06	SICBS	[-0.338, -0
0.07	3.51	< .001	0.11	0.39	WGM trust scientists	[0.108, 0.3
0.07	4.29	< .001	0.16	0.44	WGM trust general (main trust measure)	[0.161, 0.4
0.07	3.04	= 0.003	0.08	0.36	PEW trust scientists	[0.076, 0.3

Correlations with alternative measures

Table B3 shows the correlations between knowledge and acceptance, respectively, and outcome variables.

Results conditional on false responses

Table B4 shows the correlations between acceptance and outcome variables based on linear regression models on standardized values.

By-question variation

Knowledge.
Acceptance.

Trust in science

Conspiracy thinking

Distribution.
By-item variation.

Table B4
Based on false response data only, correlations between acceptance and outcome variables based on linear regression models on standardized values

	BCTI_avg	CMQ_avg	SICBS	wgm_scientists	wgm_sciencegeneral	pew
(Intercept)	0.000	0.000	0.000	0.000	0.000	0.000
	(0.081)	(0.080)	(0.081)	(0.082)	(0.082)	(0.082)
avg_acceptance	-0.225**	-0.247**	-0.201*	0.131	0.161+	0.130
	(0.081)	(0.080)	(0.081)	(0.082)	(0.082)	(0.082)
Num.Obs.	147	147	147	147	147	147
R2	0.051	0.061	0.041	0.017	0.026	0.017
R2 Adj.	0.044	0.054	0.034	0.010	0.019	0.010
AIC	414.5	412.9	416.1	419.6	418.3	419.7
BIC	423.5	421.9	425.0	428.6	427.3	428.6
Log.Lik.	-204.248	-203.465	-205.036	-206.802	-206.141	-206.826
RMSE	0.97	0.97	0.98	0.99	0.98	0.99

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

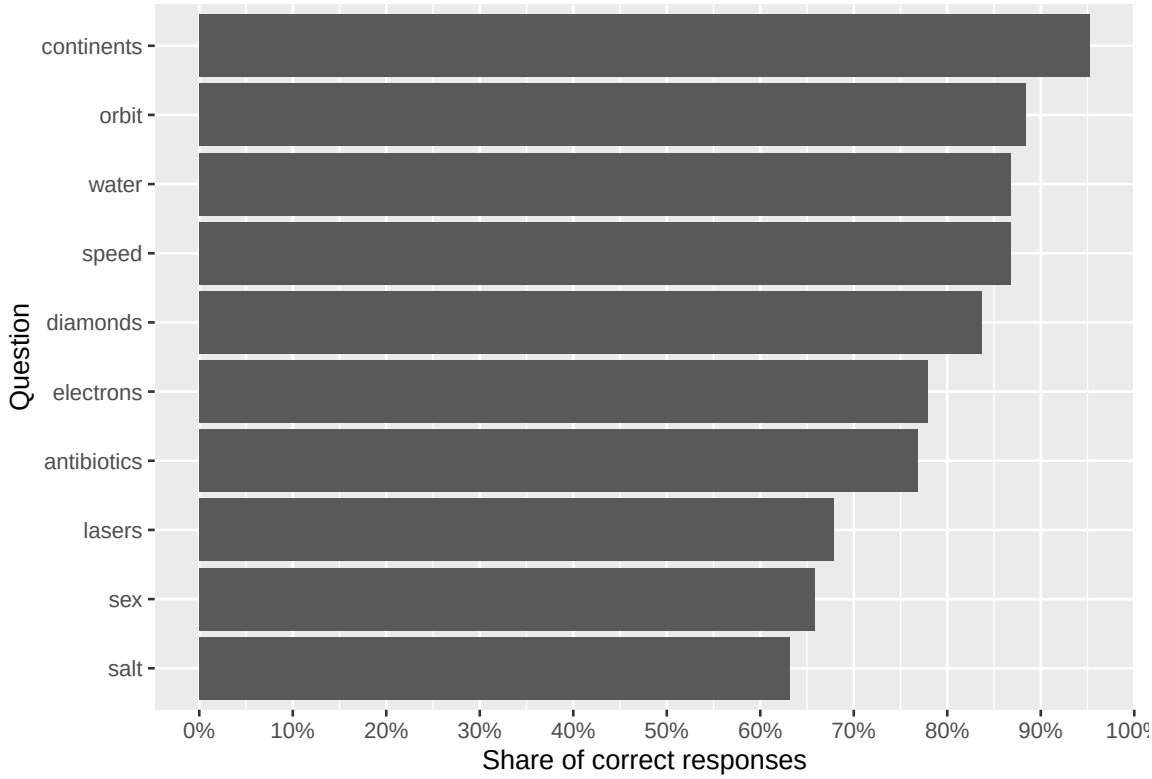

Figure B2. Distribution of correct answers by question.

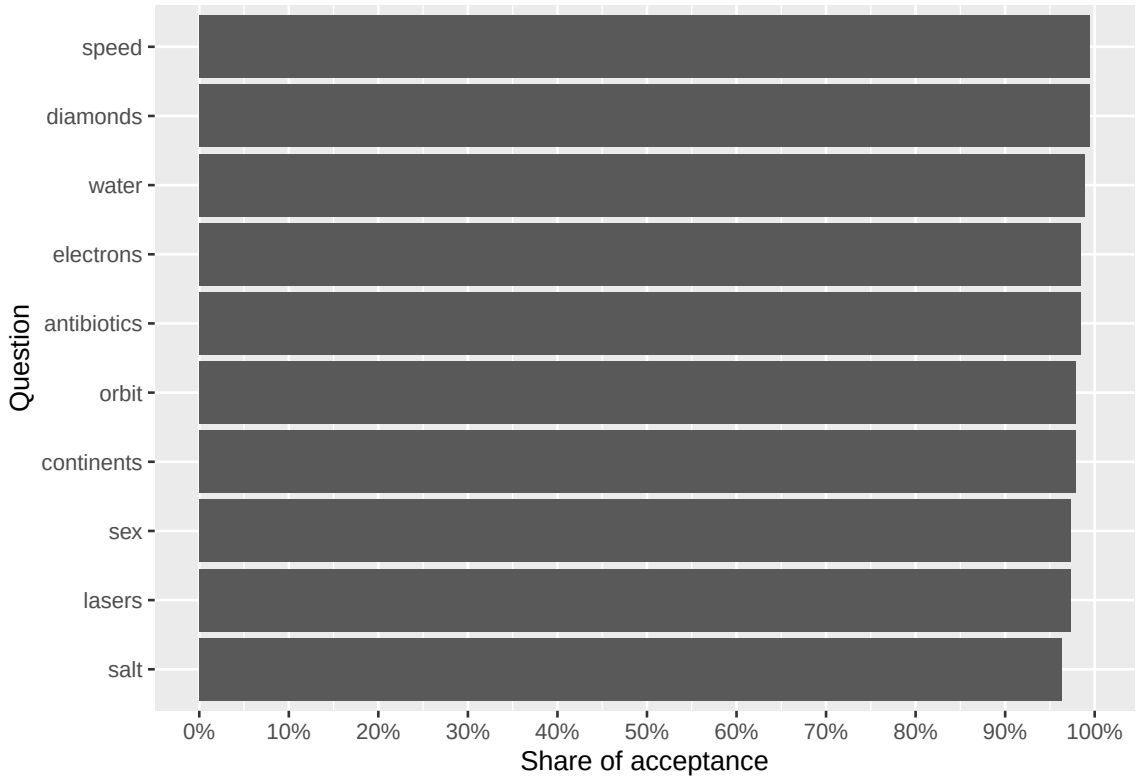

Figure B3. Distribution of consensus acceptance by question.

Reasons for consensus rejection

By category. [To do]
All raw answers.

Table B5
Reasons for consensus rejection

id	question	answer
33	sex	Because I didn't think the information provided here was accurate, more or less.
45	lasers	I read the article.
45	salt	Read the article provided.
47	lasers	The statement "lasers do not work by focusing sound waves" is correct according to scientific consensus. Lasers operate on the principles of stimulated emission of radiation, wherein photons are emitted in a coherent, focused beam through the process of stimulated emission.
47	diamonds	Are diamonds made of carbon? Scientific consensus: Diamonds are made of carbon. Do you think you could explain why you answered differently?

47	water	it likely arose from a mistake or miscommunication.
50	orbit	I honestly couldn't remember.
50	speed	When I looked it up I got two different answers.
71	water	After I put "No", I realized that I was thinking about "H2o" incorrectly. So yes, I actually do agree.
73	electrons	Atoms are known to be the smallest unit of matter.
77	continents	I believe God make it they way it is and if He wanted it changed, He would have done it
78	sex	no
78	salt	no
79	orbit	It's early and I'm tired. I misread it.
105	salt	I think I simply misunderstood the paragraph. I'm actually trying to read it thoroughly and answering truthfully, but I have misread it.
109	electrons	Maybe
127	continents	I'm a young earth Christian. I believe the Christian Bible (and outside sources) offers ample evidence that the earth is thousands of years old, not millions.
127	orbit	I do not believe in the heliocentric model of an earth spinning around a centralized sun.
130	continents	I don't think the continent move rather it is the atmosphere
130	sex	I think that the gene both parent release should determine the sex of the baby
131	antibiotics	There are some antibiotics that also kill viruses
132	salt	Because it says that table salt is not made of calcium carbonate, so I clicked no.
133	lasers	I feel like the excerpt that was provided did not definitively state the answer.
140	lasers	It was confusing to understand the explanation of why lasers don't focus on sound
152	continents	I think that they were that way after the ice age. It split apart the whole surface and then water filled in and they have remained the same for ever. They are not moving around or have they for millions of years.
152	orbit	The Earth circles the sun every day. The dark side is when the moon comes out. So everyday, you have daylight and dark (moon). Dark comes from the dark side of the sun.
170	lasers	I may have misread, but I did not see confirmation of this.
172	salt	no
178	electrons	This answer is different because atoms is everywhere and you can't see it but electrons aren't out that as much at all but you could possibly know it's there
178	antibiotics	Because antibiotics can kill bacteria in which kills the virus as well in the process so you get healed with this product

178	sex	There is no 100% evidence that this is the case and I still fully believe that it is from both genes to make this decision.
179	antibiotics	Antibiotics seem that if they are capable of killing tiny things such as bacteria then they are most likely to attach to other things in out bodies and cause it harm although unintentional.
183	salt	I thought the scientific consensus was right
186	sex	The scientific consensus is clear: both parents' genes determine the sex of a baby, specifically the sex chromosomes they contribute.
189	salt	I made an error in my selection.

Additional plots

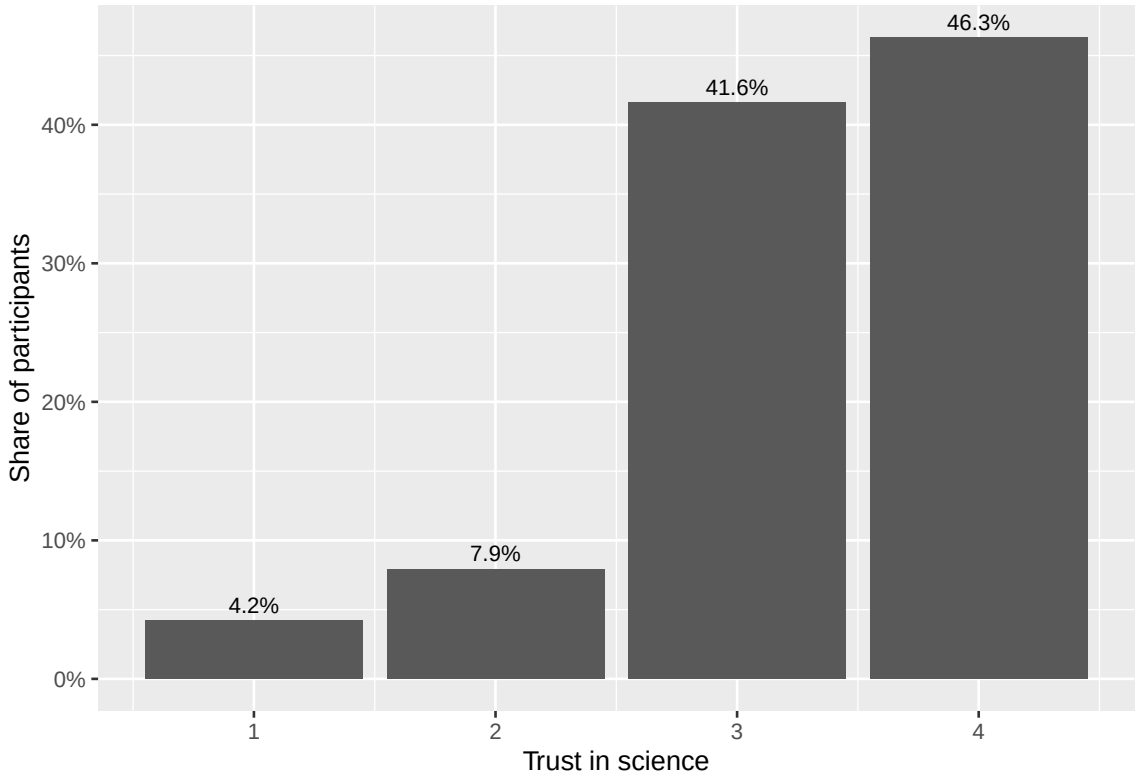

Figure B4. Distribution of trust in scientists.

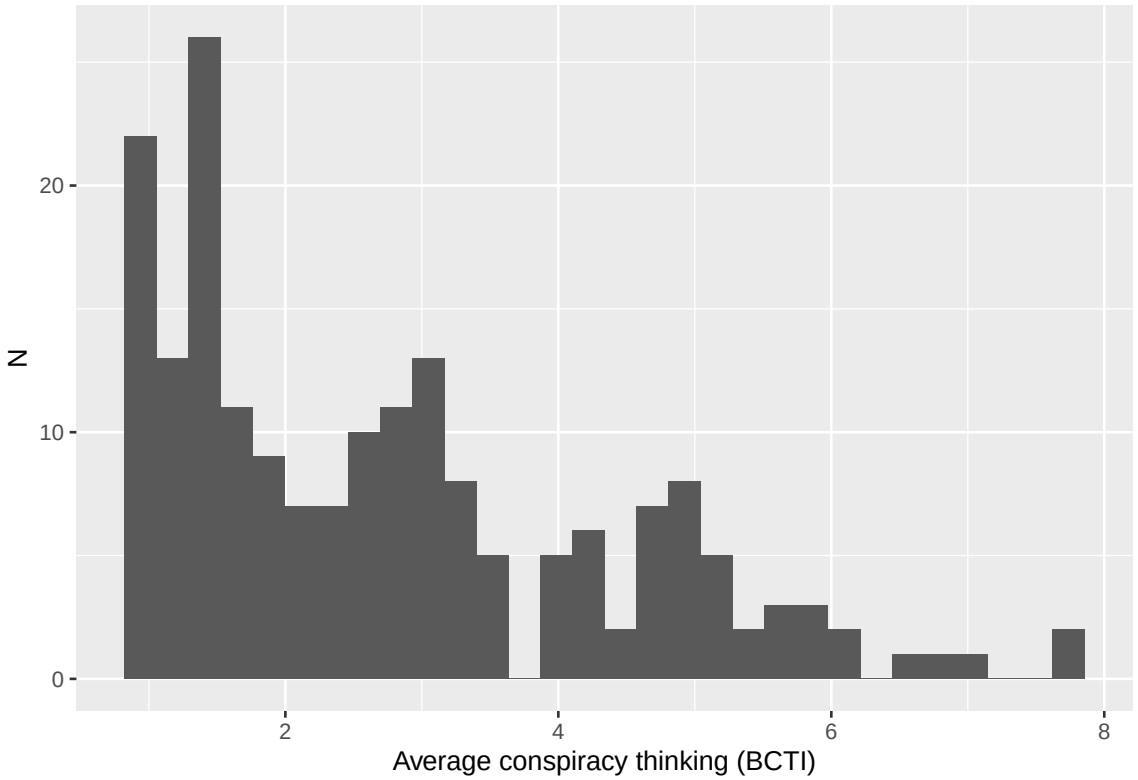

Figure B5. Distribution of conspiracy thinking.

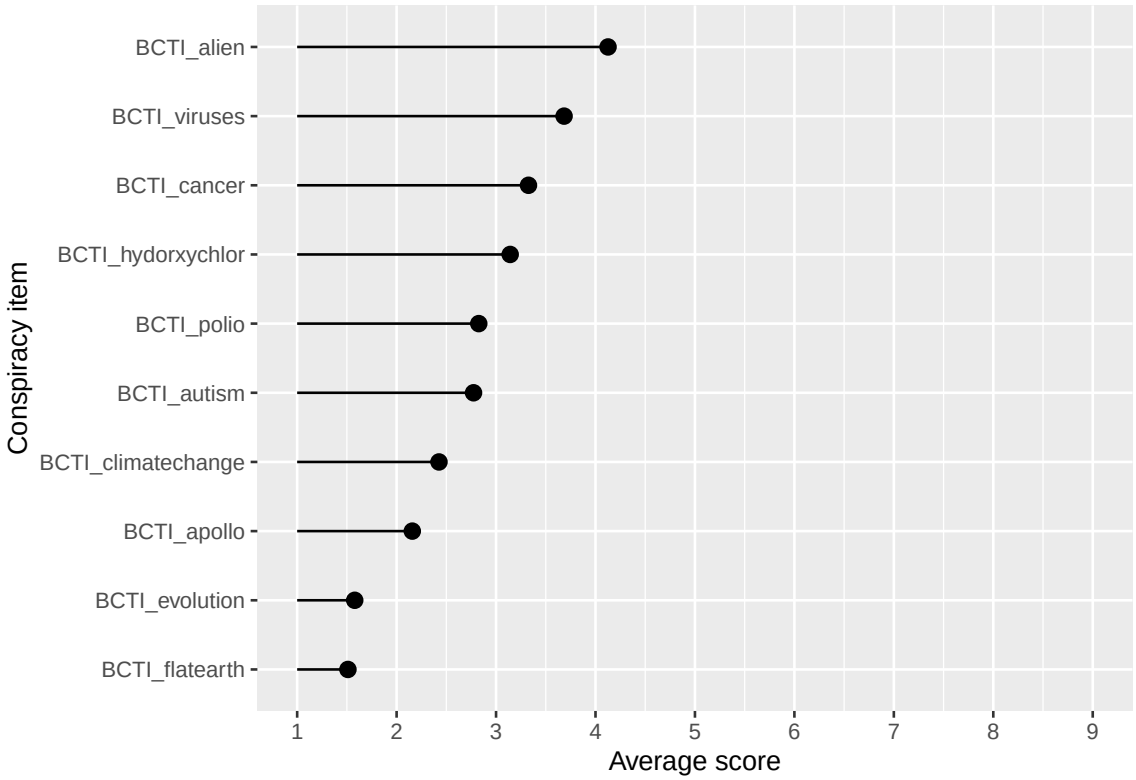

Figure B6. Distribution of conspiracy thinking by item.

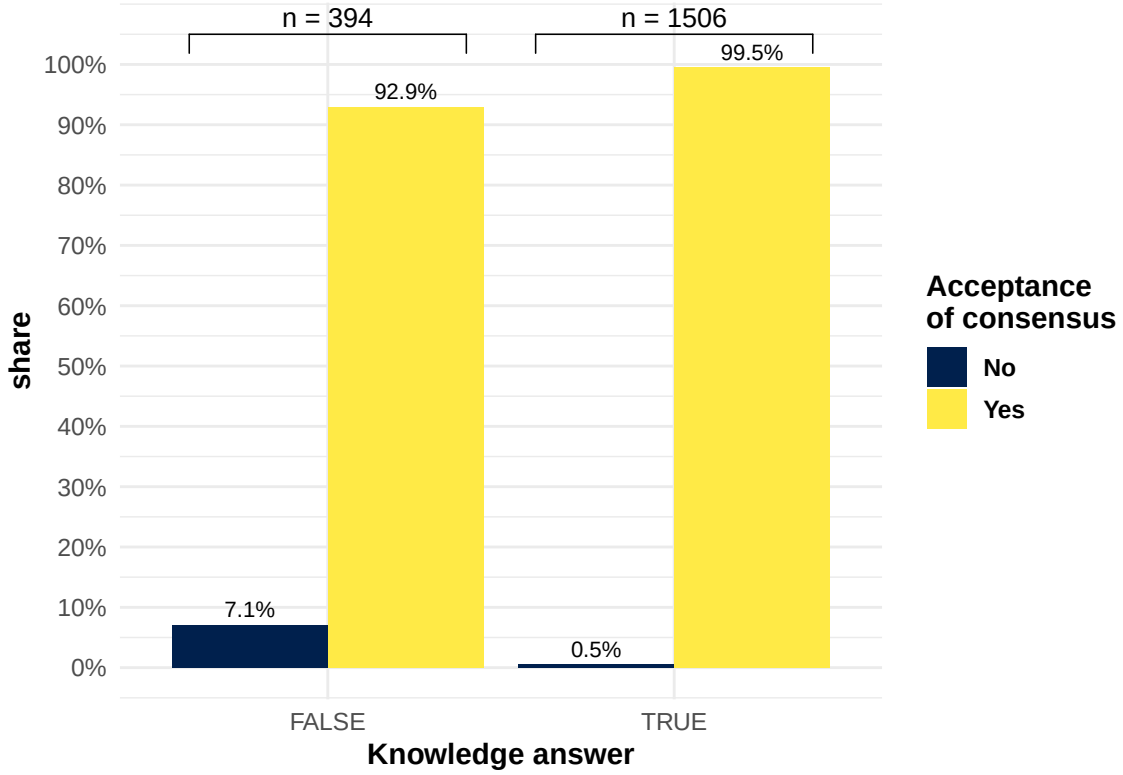

Figure B7. Acceptance rates of scientific consensus, based on whether the initial response to the knowledge question was false or true.

Appendix C
Experiment 3

Materials

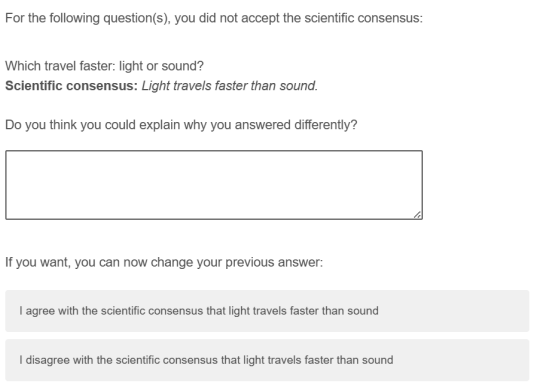

Figure C1. Example of an explanation question and the opportunity to change the previous answer.

Comparing items

Conspiracy theories. Table C1 shows the correlations of the three different scales assessing conspiracy thinking.

Table C1
Correlations of the three different scales assessing conspiracy thinking

	BCTI	CMQ	SICBS
BCTI	1.00	NA	NA
CMQ	NA	1.00	NA
SICBS	NA	NA	1.00

Trust in science. Table C2 shows the correlations of the three different items measuring trust in science.

Table C2
Correlations of the three different items measuring trust in science

	wgm_sciencegeneral	wgm_scientists	pew
wgm_sciencegeneral	1.00	NA	NA
wgm_scientists	NA	1.00	NA
pew	NA	NA	1.00

Table C3
Correlations between knowledge and acceptance, respectively, and outcome variables

std.error	statistic	p.value	conf.low	conf.high	outcome	ci
0.08	-1.93	= 0.055	-0.32	0.00	BCTI (main conspiracy measure)	[-0.317, 0.0
0.08	0.10	= 0.925	-0.15	0.17	CMQ	[-0.154, 0.1
0.08	0.30	= 0.767	-0.14	0.19	SICBS	[-0.138, 0.1
0.08	1.31	= 0.193	-0.06	0.28	WGM trust scientists	[-0.056, 0.2
0.08	1.66	= 0.100	-0.03	0.30	WGM trust general (main trust measure)	[-0.027, 0.3
0.08	-0.91	= 0.367	-0.24	0.09	PEW trust scientists	[-0.243, 0.0
0.11	-0.27	= 0.788	-0.25	0.19	BCTI (main conspiracy measure)	[-0.246, 0.1
0.11	-0.08	= 0.934	-0.23	0.21	CMQ	[-0.226, 0.2
0.11	0.02	= 0.987	-0.22	0.22	SICBS	[-0.215, 0.2
0.07	2.72	= 0.007	0.05	0.34	WGM trust scientists	[0.054, 0.3
0.07	2.37	= 0.019	0.03	0.32	WGM trust general (main trust measure)	[0.029, 0.3
0.07	1.64	= 0.104	-0.03	0.27	PEW trust scientists	[-0.025, 0.2

Correlations with alternative measures

Table C3 shows the correlations between knowledge and acceptance, respectively, and outcome variables.

Results conditional on false responses

Table C4 shows the correlations between acceptance and outcome variables based on linear regression models on standardized values.

By-question variation

Knowledge.

Trust in science

Conspiracy thinking

By-item variation.

Reasons for consensus rejection

All raw answers.

Table C5
Reasons for consensus rejection

id	question	answer
5	lasers	It is what I believed I was taught
12	antibiotics	I do not know

20	water	I think I got it confused in my head. I was thinking 2 oxygen and 1 hydrogen.
25	electrons	I made a mistake.
26	antibiotics	I have always experienced receiving antibiotic for viral infections. So i do not agree that antibiotic does not kill viruses.
32	antibiotics	Because I realized that my thinking was not correct.
32	orbit	After thinking about it, I realized that it does take a year for the sun to go around the earth.
38	continents	The earth is not millions of years old.
38	orbit	The earth is flat and stationary.
43	water	I got it confused. Its true. One oxygen and 2 hydrogen is what i learned in school.
46	sex	Yes. Its normal to think that, however, not always.
53	continents	The Earth was created aged by God and has not been around for millions of years. I do not believe in evolution but rather creation based on the Word of God.
61	continents	I do not believe that the universe is millions of years old
62	continents	I do not believe the theory that the earth is that old.
65	electrons	Because I would like to see more research on this matter.
65	antibiotics	Because I would like to see more research on this matter.
65	continents	Because I would like to see more research on this matter.
65	diamonds	Because I would like to see more research on this matter.
65	water	Because I would like to see more research on this matter.
72	lasers	That's the truth
72	salt	I wasn't sure
83	continents	The Earth has only been around for 6-7 thousand years. As far as I know however, the Continents have been moving.
83	water	thought it was "2 parts oxide, one hydrogen." I was of course wrong. I also miss clicked the wrong answer for how long it takes the Earth the revolve around the sun... I think.
87	electrons	I believe atoms are the smallest particles.
87	continents	On second thought, I agree.
87	diamonds	On second thought, I believe I agree.
87	water	This does not fit according to my recollection.
92	salt	I meant to agree, I did not know the answer.
96	electrons	I don't think electrons are smaller, just because that is what we were taught in science
96	continents	This is something we are taught academically in science, it may not be true
98	antibiotics	I think there are two different kinds of antibiotics. One type kills bacteria infections and the other type kills viral infections

99	continents	I don't have a reason to believe Earth has been here for millions of years, so I don't agree with the consensus. Of course, I know I could be wrong.
102	continents	This information is based in evolution which is a theory.
109	continents	I partially agree that continents have moved due to plate tectonics. But I don't believe the Earth is as old as it mentions in the explanation, and is much younger. I also disagree with scientific consensus and there is really no such thing. Because with science, when you base things on evidence and then find new evidence, you have to change your theory. So there is really no such thing as consensus, there is data, facts and theories.
112	antibiotics	No
112	speed	No
112	salt	No
117	antibiotics	Not really. I thought they killed virus' but maybe I am wrong. heh.
117	sex	I thought both male and female decided the fate of the babies gender.
122	antibiotics	antibotics only kill bacteria
122	lasers	I thought they light was a lot faster than sound waves
122	salt	not sure
129	continents	YES, I believe in a young earth. I do not accept the tax supported theory of evolution.
130	antibiotics	I was confused.
132	continents	Continental drift is an unproven theory. I have seen no actual evidence for it. Flooding and receding of waters are more likely the cause of coastline changes throughout history.
132	orbit	There is no scientific evidence that the earth moves at all except for earthquakes. The sun is clearly moving around the earth in a daily circular pattern. The sun is much smaller and closer than we have been taught.
142	salt	I thought it was made up of that.
143	lasers	Lasers operate based on the principles of stimulated emission of electromagnetic radiation, typically light.
146	antibiotics	Different knowledge and experience.
146	sex	A mothers choice not the fathers choice because of religious beliefs.
146	diamonds	Gained through knowledge and skills.
150	speed	To be honest, I did actually hear the concept that like travels fashion and sound so I'm not sure why I picked that answer.
151	lasers	I accidentally clicked the other answer I'm not going to lie. As soon as I clicked it on accident I was like "Sh*t". I meant to choose the other answer on this one, I'm sorry.
151	salt	I misunderstood this question. This one confused me the most even though it's right in front of me. Sorry.

155	salt	error
158	lasers	No I did not know this question.
158	salt	I knew this one and just blanked on the answer.
159	sex	I thought I read it said in most cases women transmit an X chromosome, but now I'm not sure.
161	antibiotics	I thought antibiotics kills every bit of poison.
166	electrons	I'm not sure, I dont' understand it
166	water	I'm not sure, I dont' understand it
171	diamonds	It just doesn't sit well with me.
172	sex	I was wrong. I agree with scientific consensus.
173	orbit	Yes the scientist now more than I do
178	electrons	I was incorrect on this.
191	antibiotics	I could be wrong, but I thought they killed viruses as well.
191	continents	I do not believe without a doubt the earth has been around for millions of years.
196	sex	Answered incorrectly in error. I agree with the scientific consensus.
197	antibiotics	I've taken antibiotics numerous of times and although my sickness is usually cured, I always get a yeast infection as result. This always happens since the antibiotics kill the good and bad bacteria in the body.
197	sex	I believe that God decides whether parents will be blessed with a boy or girl. It had nothing to do with genetics.
197	diamonds	This just doesn't seem correct even after viewing the article from the university. I can't explain why but I can't justify it.
198	diamonds	I just never heard of diamonds being made of carbon and it makes zero sense to me while thinking about it.
200	continents	The earth is not old but young. Not billions or millions but thanks of years.
200	orbit	One day because the sun is not taking a year to light up other parts of the earth.

Why do people accept the scientific consensus:

Participants who answered "other".

Table C6
Reasons for consensus rejection

id	other_reason_agreement
24	some stuff I already knew, other stuff I don't care about like atoms and molecules
37	I mostly agreed based on my personal knowledge.
62	I have never seen compelling evidence to disprove the consensus.
89	Because it is true.

101	I can't say that I trust scientists on many things, but on most in this survey. However, while I believe the continents have moved around, I don't believe the earth is millions of years old, as I'm a Christian. Though God never notes exactly how old the earth is, so it could be millions of years old.
102	Agreed due to vague knowledge about the subject.
166	I'm not sure, you cant trust any party
172	Because i recall previously being taught that
182	I agree because the explaination makes sense
188	I don't trust scientists, but those are the current established 'facts'. Which, on the mundane side of things, are likely true.
189	I take nothing that anyone tells me at face value. Lots of studying and verifying accuracy of the things that I was taught my entire life.
195	I mostly agree with the consensus because I don't have the equipment to independently test it myself and I also know scientists have proven those who don't have the so called equipment to know what they know. We can only observe what we observe at the moment, but there's more to what the scientists are observing and theorizing.

How did participants independently verifiy?

Participants who answered "other".

Table C7
Reasons for consensus rejection

id	reason_followup
5	By trying to remember
10	Curiosity and the internet
12	Guessed
14	I double-checked the information on Google by looking up various websites, I did go with my initial gut instincts in most cases however if it was wrong upon verifying it then I would change my answer
18	Prior knowledge from a formal education
19	I can check several different sources on the internet and see if they have the same verifiable information.
21	I use intuition. I use common sense.

22 I have read it before, and did some experiments in chemistry class. I look for scientific consensus on everything. On these long established principles, I could have selected both answers. I believe sometimes scientists are bribed or exhibit bias depending on who is funding them and what answers the funding entity wants. COVID treatments were a big example of that. Hospitals were paid to execute certain protocols and disallow others.

27 Most of the questions, the consensus answer was the same as my answer. For the one or two questions where it was not, I looked at who their sources were for the answers, and decided whether I believed those sources and how unsure I was about my answer and made my decision from there.

31 Through exposure to scientific experiments and research that prove the claims valid and can be repeated with the same results occurring.

36 There is evidence and a good amount of understand about these issues. There isn't as much understanding when it comes to things like vaccines.

38 Through many sources, including my own common sense and a lifetime of research into these matters.

39 I used the information that I have learned in school and in the past.

40 Most things I knew already as some were common knowledge

41 My gut instinct.

42 Most was knowledge I already knew, however if I were to find out or look up info, I would simply consult the internet

43 I thought about what i was told in school.

44 I checked reliable sources, and I knew most of them from learning this information in science class.

48 some things are obvious and don't need verification

49 Research on my own as opposed to jist blindly following what the media is told to tell me.

56 extensive research

58 I verified it with what then knowledge I know

67 I remember some of the stuff from school.

68 I clicked on two out of three of the links for most statements that I was unsure about.

71 I have a lot of people who do deep research that verified the info.

77 Just various amounts of research online. There have been times where simple questions were simply ignored or answered in a perplexing manner. Those types of answers always raise a flag.

81 By the knowledge I already had.

82 Some of these questions I remember from high school. And I learned this in science. Therefore I do remember alot of these questions.

88 I don't know
97 Either I already knew the information or after reading the information I can to my conclusion
98 My wife has taken two different kinds of antibiotics, one for viral infections and one for bacterial infections
100 I independently verified the information by doing a lot of research and comparing studies.
103 I do my own research.
114 I guess I haven't independently verified the information.
116 wikipedia articles and google searches
120 The questions I got wrong were facts that I had simply forgotten. Once made aware of the correct answer, I remembered that it was in fact the correct answer.
122 heard of it before
123 I used the links provided and then googled the question if I was unsure
126 It is an obvious pattern whenever these events happen that there is a coverup, you just have to research the track record
129 I'm unsure of which question, you asked several. it's a bit confusing. the vaccine question has been verified by personal treatment and independent studies that were banned on social platforms
131 I used the information and links given to verify it.
132 I have been studying this information for many years. Real science is not consensus alone. Peer review is rigged and fraudulent. We are not being given the truth about many things and most "scientists" don't even know that they are wrong and refuse to reinvestigate the topics.
136 Have an educational background in anthropology and took a lot of science courses. I trust scientists generally but not always the way the findings are relayed.
137 My own research, we were lied to in school
144 By looking through multiple sources on a given topic.
152 A lot of this I have already learned, but I can't personally verify it bc I can't run the tests.
154 I have done several science experiments to prove a lot of these ideas.
156 looking it up online from at least 2-3 sources
159 Instead of taking what the mainstream talking point is and immediately accepting it, I like to do further research myself.
161 I already knew of the information presented to me for years.
163 I googled it and read information from various sources.
164 Many of these tidbits of information are taught as introduction to different subjects. I have either studied this or have used Google Academic to verify.

178	Some of the questions I've done my own research on, others I can see with my own eyes.
185	most of the questions i already knew the answer to because i researched it a long time ago
186	The information presented is basic knowledge we learn throughout ours lives. Light travels faster than sound. The fathers genes decide whether ba baby will be male or female. Diamonds are formed from carbon. Calcium carbonate is not sodium chloride. It takes the earth 365.2ish to orbit our sun. Yes, water is 2 hydrogen, 1 oxygen. And and electron is much smaller than an atom. All things we learn in school. Oh and lasers use light waves not sound waves.
187	For light traveling faster then sound it's obviously verifiable because you see lightning before you hear thunder, lasers are visible so obviously they are made of light not sound, the definition of water is H2O so if something isn't H2O then it isn't water. The vast majority of the questions were extremely common sense if you think about them for any amount of time.
191	I either realized I was wrong or it sounded logical in my mind.
200	The Bible.

Additional plots

Table C4
Based on false response data only, correlations between acceptance and outcome variables based on linear regression models on standardized values

	BCTI_avg	CMQ_avg	SICBS	wgm_scientists	wgm_sciencegeneral	pew
(Intercept)	-0.001	0.000	0.000	0.005	0.002	0.008
	(0.091)	(0.091)	(0.091)	(0.088)	(0.089)	(0.088)
avg_acceptance	-0.043	-0.025	-0.009	0.083	0.039	0.125
	(0.090)	(0.090)	(0.090)	(0.079)	(0.079)	(0.078)
Num.Obs.	122	122	122	128	128	128
R2	0.002	0.001	0.000	0.009	0.002	0.020
R2 Adj.	-0.006	-0.008	-0.008	0.001	-0.006	0.012
AIC	351.0	351.1	351.2	367.1	368.0	365.7
BIC	359.4	359.6	359.6	375.7	376.5	374.2
Log.Lik.	-172.491	-172.571	-172.604	-180.560	-180.996	-179.843
RMSE	0.99	1.00	1.00	0.99	1.00	0.99

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

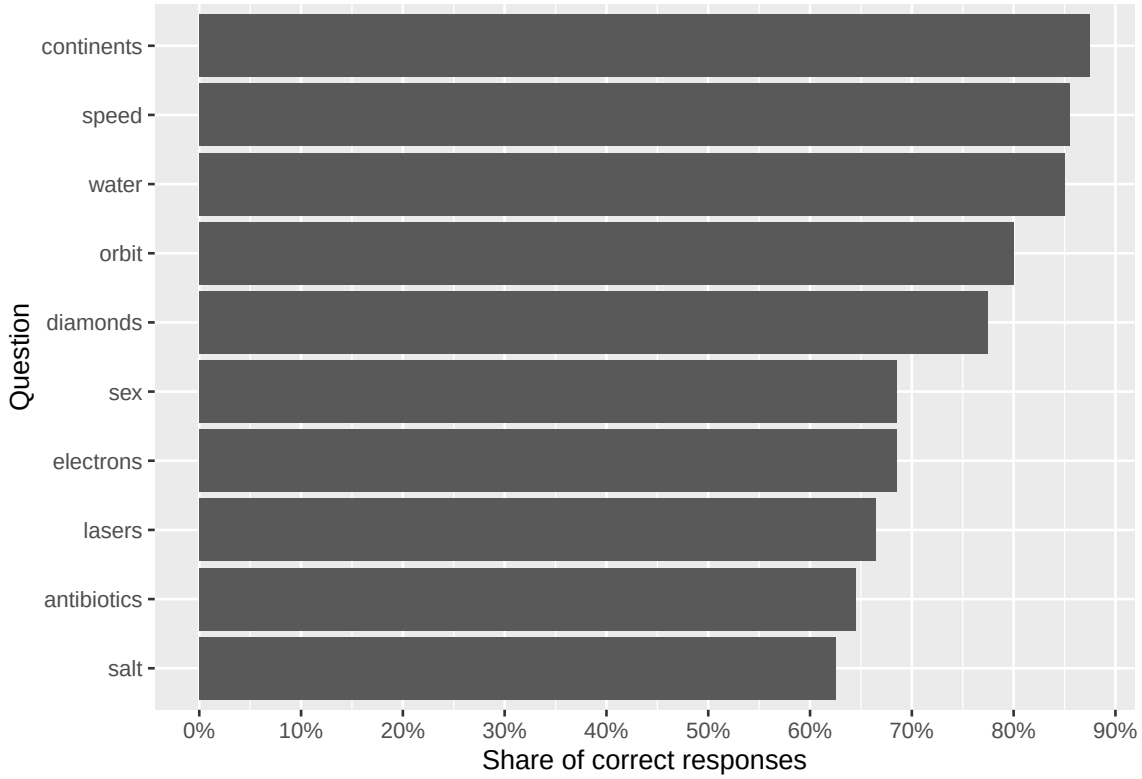

Figure C2. Distribution of correct answers by question.

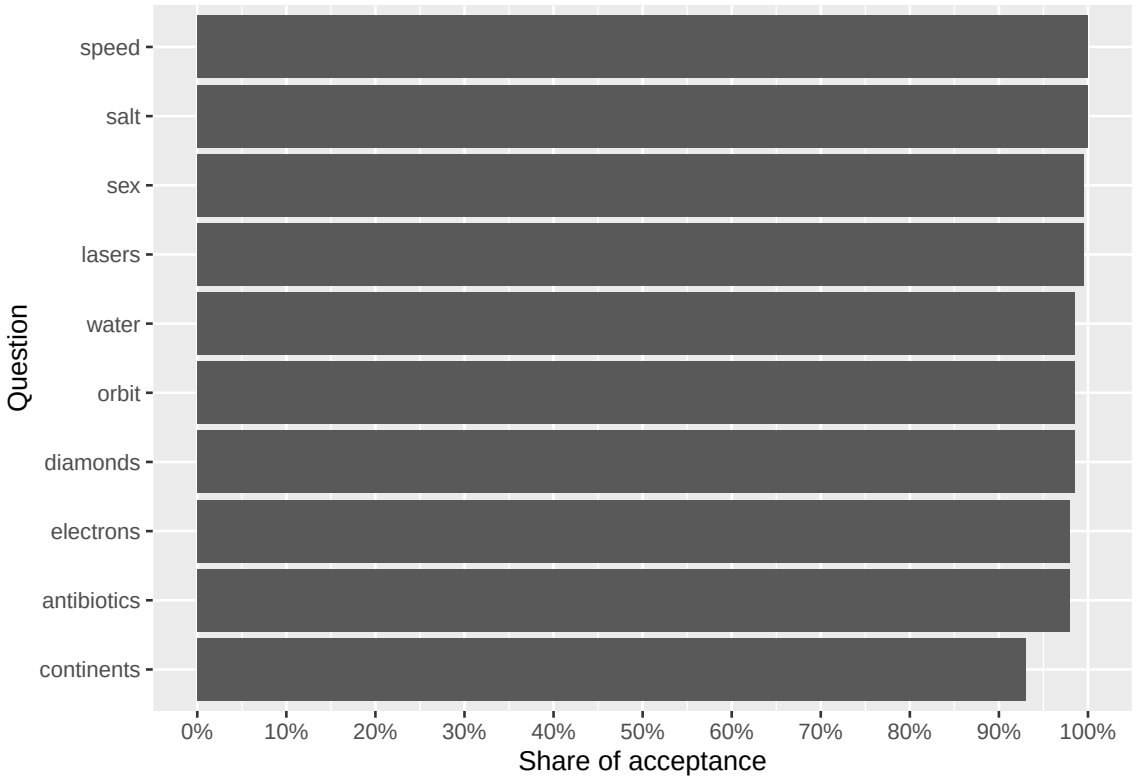

Figure C3. Distribution of consensus acceptance by question.

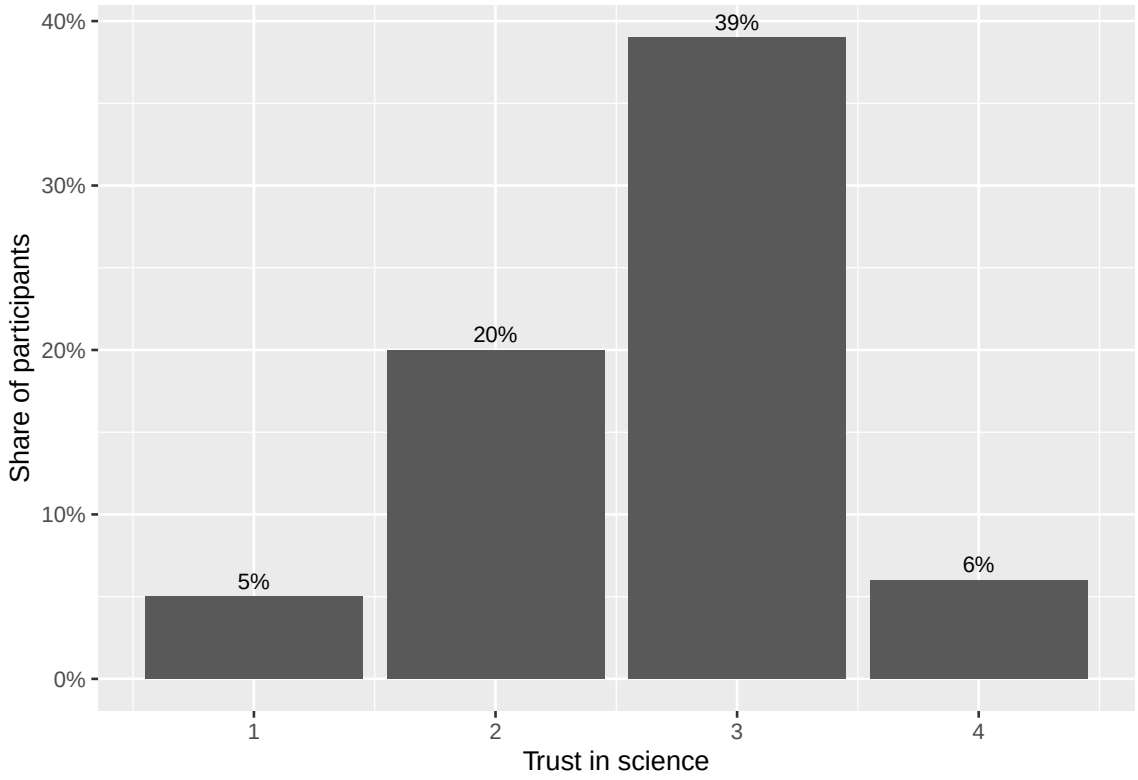

Figure C4. Distribution of trust in scientists.

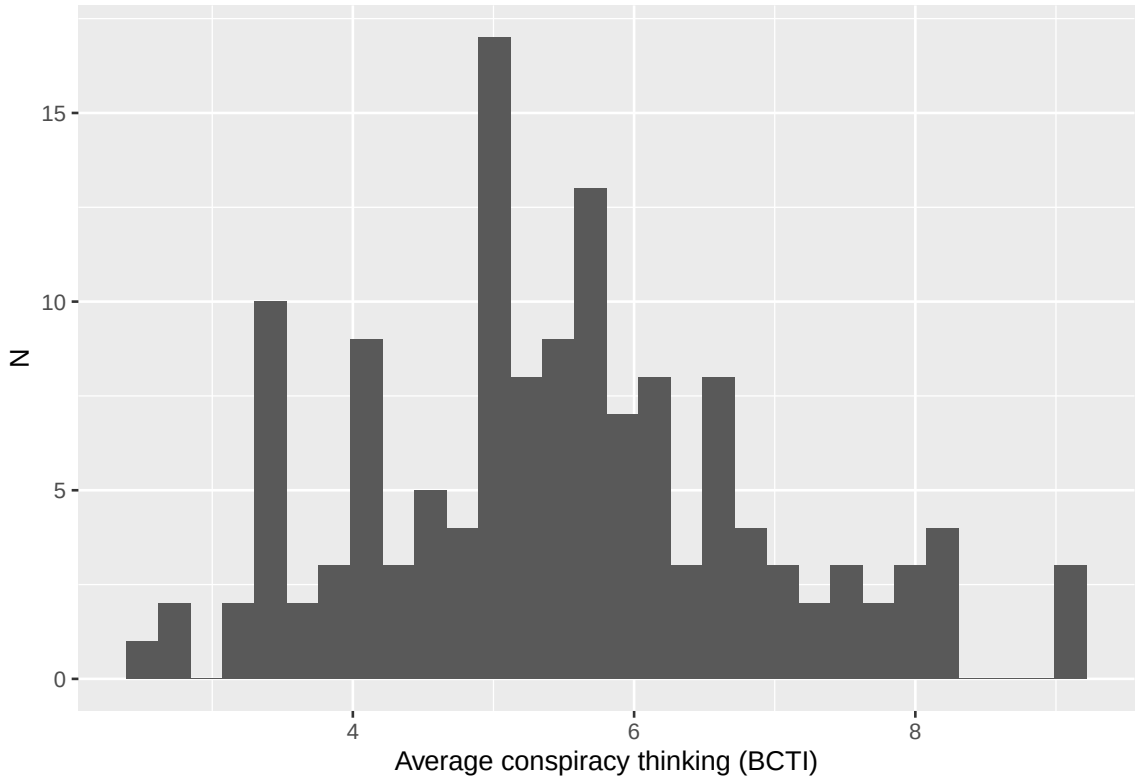

Figure C5. Distribution of conspiracy thinking.

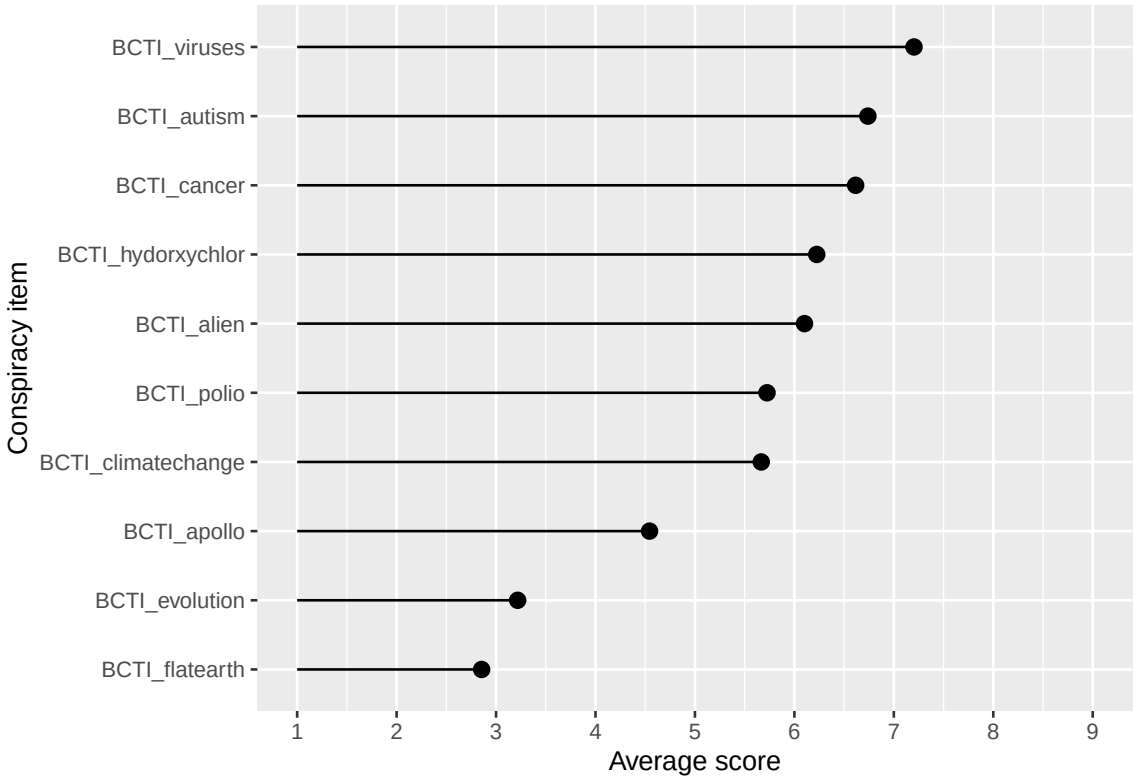

Figure C6. Distribution of conspiracy thinking by item.

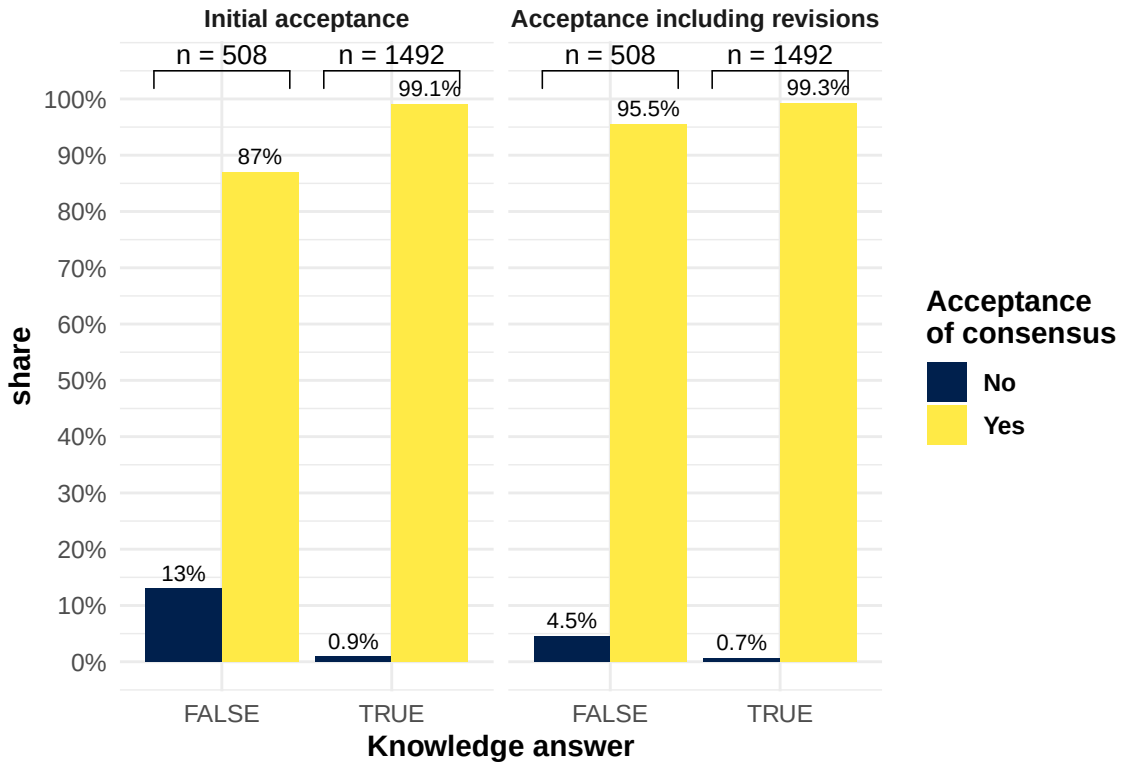

Figure C7. Acceptance rates of scientific consensus, based on whether the initial response to the knowledge question was false or true.

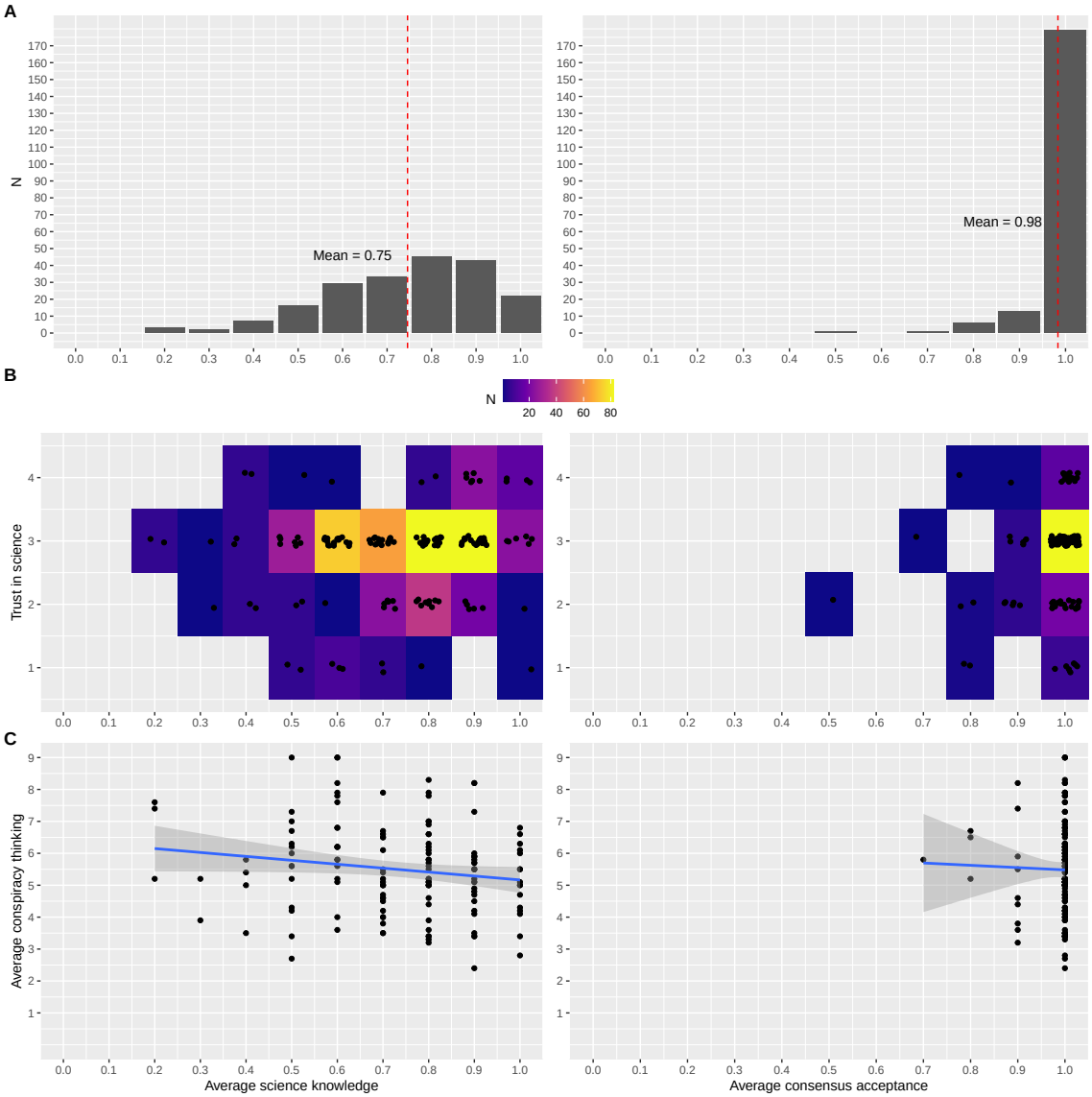

Figure C8. **A** Shows the distribution of science knowledge (left) and acceptance of scientific consensus for participants who gave the wrong answer **B** Shows the relationship between trust in science and science knowledge/acceptance (if wrong at first, rounded to the first digit) of scientific consensus **C** Shows the relationship between conspiracy thinking and science knowledge/acceptance (if wrong at first) of scientific consensus