

Q1. [REMOVED FOR BLIND REVIEW]

It should take approximately 15-20 minutes to complete the questionnaire. Participation in this study is voluntary. You can choose not to take part or not to finish the questionnaire.

We recommend taking this survey on a computer or a laptop instead of a mobile device (e.g., cell phone, tablet).

By selecting “Yes” on the following question, you are acknowledging that you have read the information in this consent form and volunteer to participate in this study. Please print or download a copy of this consent form for your records if you so desire.

Thank you for your time and consideration in taking part in this research project.

Q1. I am at least 18 years old and agree to participate in this study and have read the consent form above.

Yes..... 1
No 2

Q2. Do you currently live in the United States?

Yes..... 1
No 2

Q3. We are conducting a study on how people feel about science. We are asking people to answer questions about science and related issues to get an idea of what people think about them.

While reading and answering the following questions, **please do not visit other websites.**

Please read each item carefully and select the appropriate option to indicate your response. To start, here are a few questions about your typical use of media.

Q4. How much attention do you pay to information about the following topics when you **go online**, either on a website or an app?

None						A lot
1	2	3	4	5	6	7
1)	International and national affairs					
2)	Local government and politics					
3)	Science and technology					
4)	Scientific studies in new areas of research					

Q5. How much attention do you pay to the following **types of content**, either in traditional or online media?

None						A lot
1	2	3	4	5	6	7
1)	Science-themed comedies, such as “The Big Bang Theory”					
2)	Science-themed dramas, such as “CSI: Crime Scene Investigation”					
3)	Science documentaries on stations such as PBS, Discovery Channel, or National					

Geographic Channel

- 4) Late-night **network** TV comedies, such as "The Tonight Show with Jimmy Fallon" or "The Late Show with Stephen Colbert"
- 5) Late-night **cable** TV comedy news, such as "The Daily Show with Trevor Noah" or "Last Week Tonight with John Oliver"
- 6) Science podcasts, such as "Science Friday" or "Radiolab"

Q6. How much attention do you pay to **science information** on the following platforms?

None							A lot
1	2	3	4	5	6	7	

- 1) Facebook
- 2) Twitter
- 3) Instagram
- 4) Snapchat
- 5) TikTok
- 6) Reddit
- 7) YouTube
- 8) Pinterest
- 9) Other: [TEXT BOX]

Q7. Thinking about your **social media use** (e.g., Facebook, Twitter, Instagram, etc.), how often do you do the following?

None							A lot
1	2	3	4	5	6	7	

- 1) Read social media posts
- 2) Comment on social media posts
- 3) Like social media posts
- 4) Browse social media profiles or photos
- 5) Post social media status updates or photos
- 6) Share social media posts

Q8. We would now like to know about your attitudes and preferences as they relate to humor. Please tell us how much you agree or disagree with the following statements.

Strongly disagree							Strongly agree
1	2	3	4	5	6	7	

- 1) People expect me to say amusing things.
- 2) I can crack people up with the things I say.
- 3) I often come up with witty comments.
- 4) I am good at thinking up jokes or funny stories.
- 5) People tell me that I am quick-witted.
- 6) I often feel the need to make other people laugh.

Q9. Continuing with humor, please tell us how much you agree or disagree with the following statements.

Strongly disagree							Strongly agree
1	2	3	4	5	6	7	

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1) I am a connoisseur of humor.
- 2) I prefer situations where people are free to express their senses of humor.
- 3) I enjoy being with people who tell jokes or funny stories.
- 4) I often read jokes and funny stories.
- 5) I enjoy being around quick-witted people.
- 6) I need to be with people who have a sense of humor.

Q10. Next, please indicate the extent to which each of the following statements describes you.

Not at all like me						A lot like me
1	2	3	4	5	6	7

- 1) I prefer complex to simple problems.
- 2) I like having the responsibility of handling a situation that requires a lot of thinking.
- 3) I find satisfaction in deliberating hard and for long hours.
- 4) I enjoy a task that involves coming up with new solutions to problems.
- 5) I prefer my life to be filled with puzzles that I must solve.
- 6) I form opinions about everything.
- 7) It is very important to me to hold strong opinions.
- 8) It bothers me to remain neutral.
- 9) I would rather have a strong opinion than no opinion at all.
- 10) I pay a lot of attention to whether things are good or bad.

Q11. And how much do you agree or disagree with the following statements?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) Scientists know best what is good for the public.
 - 2) Scientists should do what they think is best, even if they have to persuade people that it is right.
 - 3) Scientists should not get involved with comedy.
 - 4) Scientists should not get involved with political issues.
 - 5) I admire scientists who get involved with issues they care about.
 - 6) There have been too many scientists talking about public issues.
 - 7) For quality control purposes, please select "Strongly disagree" in this row.
- IF R SELECTS 2 THRU 7, GC = 0.**

Q12. Please indicate how much you like or dislike the following when it comes to science information.

Strongly dislike						Strongly like
1	2	3	4	5	6	7

- 1) When a source is sometimes funny.
- 2) When a source makes information enjoyable and entertaining.
- 3) When a source shares your point of view on science.

Q13. [TIMING Q: NEXT BUTTON APPEARS AFTER 10 S]

Q13. Next, we are going to ask you about a host of science issues and current events. For context, here are some definitions. Also note that for the remainder of the survey, moving your cursor over each of these terms will provide you with a definition of that term.

Q14. **Artificial intelligence (AI)** is an area of computer science that focuses on computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages. Artificial intelligence has many applications, such as in banking, manufacturing, health care, etc.

Microbiomes are ecosystems or communities made up of microbes (organisms too small for the human eye to see like bacteria, fungi, and viruses) that live within and on organisms such as humans, animals, and plants, and in other habitats. One goal of microbiome research is to develop ways to keep microbial ecosystems healthy and modify it when necessary to improve human health.

Nanotechnology allows scientists to see and work with materials at the nanoscale. Materials can behave in different ways when working with them at this scale. Nano-sized particles are often used in consumer goods, such as nanosilver in cleaning products and carbon nanotubes in tennis rackets.

Synthetic biology is the use of advanced science and engineering to make or redesign living organisms, such as bacteria. Synthetic biology involves making new genetic code, also known as DNA, that does not already exist in nature.

Q15. We would like to know how informed you feel about a number of scientific topics. How informed would you say you are about...?

Not informed at all						Very informed
1	2	3	4	5	6	7

- 1) Nanotechnology
- 2) Synthetic biology
- 3) Global warming
- 4) Artificial intelligence
- 5) Microbiomes

Q16. Now, you are going to read some statements about **global warming and climate change**. Of course, it is impossible to know the answers to all of these, but could you tell us for each of the following statements if you think it is true or false?

Definitely true	Likely true	Likely false	Definitely false	Don't know
1	2	3	4	9

- 1) Burning oil produces carbon dioxide.
- 2) Carbon dioxide is harmful to plants. (-)
- 3) At the same quantity, carbon dioxide is more harmful to the climate than methane. (-)
- 4) The global carbon dioxide concentration in the atmosphere has increased during the past 250 years.
- 5) Scientific evidence shows that global warming is mainly caused by human activities.
- 6) Today's global carbon dioxide concentration in the atmosphere already occurred in the past 650,000 years. (-)

- 7) For the next few decades, the majority of climate scientists expect a warmer climate to increase the melting of polar ice, which will lead to an overall rise in sea level.
- 8) For the next few decades, the majority of climate scientists expect the climate to change evenly. (-)

Q17. How important is the issue of global warming to you personally?

Extremely important.....	5
Very important	4
Somewhat important.....	3
Not too important	2
Not at all important.....	1

Q18. How worried are you about global warming?

Very worried	4
Somewhat worried	3
Not very worried.....	2
Not at all worried.....	1

Q19. How much do you think global warming will harm you personally?

A great deal.....	4
A moderate amount	3
Only a little.....	2
Not at all	1
Don't know	99

Q20. How much do you think global warming will harm future generations of people?

A great deal.....	4
A moderate amount	3
Only a little.....	2
Not at all	1
Don't know	99

Q21. Now, you are going to read some statements about artificial intelligence (AI). Of course, it is impossible to know the answers to all of these, but could you tell us for each of the following statements if you think it is true or false?

Definitely true	Likely true	Likely false	Definitely false	Don't know
1	2	3	4	9

- 1) Machines with AI receive information from the environment and take actions that affect that environment.
- 2) The first AI program was invented in the late 1980s. (-)
- 3) Amazon's Alexa and Apple's Siri are not examples of AI. (-)
- 4) No AI machine has been able to beat a Grandmaster in a chess tournament. (-)
- 5) Self-driving cars are based on AI.
- 6) Using AI to predict face age progression is feasible.
- 7) NASA is now using AI to monitor solar weather.
- 8) Globally, more consumers prefer using a chatbot to solve problems rather than phone calls. (-)

Q22. How important is the issue of artificial intelligence to you personally?

Extremely important.....	5
Very important	4
Somewhat important.....	3
Not too important	2
Not at all important	1

Q23. How worried are you about artificial intelligence?

Very worried	4
Somewhat worried	3
Not very worried.....	2
Not at all worried.....	1

Q24. How much do you think artificial intelligence will harm you personally?

A great deal.....	4
A moderate amount	3
Only a little.....	2
Not at all	1
Don't know	99

Q25. How much do you think artificial intelligence will harm future generations of people?

A great deal.....	4
A moderate amount	3
Only a little.....	2
Not at all	1
Don't know	99

Q26. Now, you are going to read some statements about microbiomes. Of course, it is impossible to know the answers to all of these, but could you tell us for each of the following statements if you think it is true or false?

Definitely true	Likely true	Likely false	Definitely false	Don't know
1	2	3	4	9

- 1) All microbes are bacteria. (-)
- 2) All microbes need water to survive. (-)
- 3) Microbes generate at least half of the oxygen humans breathe.
- 4) The composition of your microbiome changes throughout your life.
- 5) The modification of microbiomes is currently one solution to obesity. (-)
- 6) Microbiomes contain types of microbes that are both helpful and harmful to their hosts.
- 7) Plants and animals do not require microbiomes to be healthy. (-)
- 8) Currently, there are consumer products on the market to improve the health of your microbiome.

Q27. How important is the issue of microbiome research to you personally?

Extremely important.....	5
Very important	4
Somewhat important.....	3

Not too important	2
Not at all important	1

Q28. How worried are you about microbiome research?

Very worried	4
Somewhat worried	3
Not very worried.....	2
Not at all worried.....	1

Q29. How much do you think microbiome research will harm you personally?

A great deal.....	4
A moderate amount	3
Only a little.....	2
Not at all	1
Don't know	99

Q30. How much do you think microbiome research will harm future generations of people?

A great deal.....	4
A moderate amount	3
Only a little.....	2
Not at all	1
Don't know	99

Q31. There is often debate about whether or not the public is told the whole truth about various important issues. Please indicate the degree to which you believe each statement is likely to be true.

Definitely not true			Not sure/ Cannot decide			Definitely true
1	2	3	4	5	6	7

- 1) The spread of certain viruses and/or diseases is the result of the deliberate concealed efforts of some organization.
- 2) Groups of scientists regularly manipulate, fabricate, or suppress evidence in order to deceive the public.
- 3) The government permits or perpetrates acts of terrorism on its own soil, disguising its involvement.
- 4) A small, secret group of people is responsible for making all major world decisions, such as going to war.
- 5) Evidence of alien contact is being concealed from the public.
- 6) New and advanced technology which would harm our current industry is being suppressed.
- 7) The government uses people as patsies to hide its involvement in criminal activity.
- 8) Certain significant events have been the result of the activity of a small group of people who secretly manipulate world events.
- 9) Some UFO sightings and rumors are planned or staged in order to distract the public from real alien contact.
- 10) Experiments involving new drugs or technologies are routinely carried out on the public without their knowledge or consent.

Q32. On the next page, **you will see a screenshot of a Twitter conversation started by a scientist.** Because this is a screenshot, you will not be able to click on any of the content. **Please read it carefully.** We will ask you more questions after viewing the tweet.

Q33 – Q80. [SHOW STIMULUS, R RANDOMLY ASSIGNED TO CONDITIONS, INCLUDE TIMING Q]

Q81. Thinking back to the Twitter conversation, what was the number of retweets associated with the original tweet?

0 to 9	1
10 to 99	2
100 to 499	3
500 or more	4
Cannot recall	9

[IF Q81 = 9, SKIP Q82]

Q82. Do you consider this number of **retweets** to be...

Very few	2	3	4	5	6	A lot
1						7

Q83. As best you can recall, what was the number of likes associated with the original tweet?

0 to 9	1
10 to 99	2
100 to 499	3
500 or more	4
Cannot recall	9

[IF Q83 = 9, SKIP Q84]

Q84. Do you consider this number of **likes** to be...

Very few	2	3	4	5	6	A lot
1						7

Q85. While viewing the **tweets**, how much attention did you pay to the...?

None						A lot
1	2	3	4	5	6	7

- 1) **text** in the Twitter conversation
 - 2) **images** in the Twitter conversation

Q86. Please tell us how you would describe the Twitter conversation you just saw using the following pairs of words. The closer your selection is to a word, the more certain you are of your evaluation. The tweet was...

6) not trustworthy								trustworthy
7) not entertaining								entertaining
8) not lame								lame
9) not annoying								annoying
10) not clever								clever

Q87. And please indicate the extent to which you felt the following while viewing the Twitter conversation.

Not at all							Extremely
1	2	3	4	5	6	7	
3) Afraid							
4) Worried							
5) Hopeful							
6) Optimistic							
7) Sad							
8) Upset							
9) Angry							
10) Frustrated							
11) Disgusted							
12) Distaste							
13) Joy							
14) Happiness							

Q88. People participate in different types of information sharing and gathering on social media. Thinking back to the Twitter conversation, please tell us how much you agree or disagree with the following statements.

Strongly disagree							Strongly agree
1	2	3	4	5	6	7	
1) I would like the original tweet.							
2) I would retweet the original tweet.							
3) I would share the original tweet.							
4) I would add my own comment to the original tweet.							

Q89. Still thinking about the Twitter conversation you just saw, how likely would you be to do each of the following activities?

Strongly disagree							Strongly agree
1	2	3	4	5	6	7	
1) This Twitter conversation serves as an appropriate source of science information.							
2) This Twitter conversation is a legitimate source of science information.							
3) Scientists who are funny serve as appropriate sources of information about science.							
4) Scientists who are funny are a legitimate source of information about science.							

Q90. Some people participate in certain types of information sharing and gathering. Thinking about the Twitter conversation you just saw, how likely would you be to do each of the following activities?

Not at all likely							Very likely
1	2	3	4	5	6	7	

- 1) Seek out information about the topic.
- 2) Share news articles related to the topic with others.
- 3) Pay closer attention to the topic when I encounter it in the news.
- 4) Pay closer attention to the topic when I encounter it on social media.
- 5) Discuss the topic with others.

Q91. **Thinking back again to the Twitter conversation you just saw**, how much do you agree or disagree with each of the following statements?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) I thought about what actions I myself might take based on what I read.
- 2) I found myself making connections between the information and what I have read or heard elsewhere.
- 3) I thought about how the information relates to other things I know.
- 4) I tried to think about the importance of the information for my daily life.
- 5) I tried to relate the ideas in the information to my environment.
- 6) I did not spend much time thinking about the information.
- 7) The tweet did not contain useful information on which to base my thinking about the issue.
- 8) While reading the tweet, I did not think about the details presented in the information.
- 9) I would need more information before I could make any decisions about the issue.
- 10) For quality control purposes, please select “Strongly agree” in this row.

IF R SELECTS 1 THRU 6, GC = 0.

Q92. The next set of questions are about the **scientist who started the Twitter conversation** you saw earlier. Please indicate how strongly you agree or disagree with the following statements: This scientist seems...

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) friendly
- 2) likable
- 3) warm
- 4) approachable
- 5) professional
- 6) competent
- 7) qualified
- 8) well-educated

Q93. And please tell us how much you agree or disagree with the following statements: This scientist...

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) is good at communicating science with the public.
- 2) is good at engaging with public audiences.
- 3) is good at persuading the public about the value of science.
- 4) cares about getting ordinary people involved in science.
- 5) cares about what ordinary people think about science.

Q94. How **risky** do you think each of the following is for society as a whole?

Not at all risky						Very risky
1	2	3	4	5	6	7

- 1) Nanotechnology
- 2) Artificial intelligence
- 3) Global warming
- 4) Synthetic biology
- 5) Microbiome research
- 6) Coal- and oil-burning power plants

Q95. How **beneficial** do you think each of the following is for society as a whole?

Not at all beneficial						Very beneficial
1	2	3	4	5	6	7

- 1) Nanotechnology
- 2) Artificial intelligence
- 3) Global warming
- 4) Synthetic biology
- 5) Microbiome research
- 6) Coal- and oil-burning power plants

Q96. Now, we'd like to ask a few questions about how you feel about **scientists in general**. Please rate how much you agree or disagree with each of the following statements.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) We should trust the work of scientists who research global warming.
- 2) We should trust that scientists who research global warming are being **honest** in their work.
- 3) We should trust that scientists who research global warming are being **ethical** in their work.
- 4) When scientists form a hypothesis about global warming, they are just guessing.
- 5) We **cannot** trust climate scientists because they are biased in their perspectives.
- 6) Scientists who study global warming will protect each other even when they are wrong.

Q97. And how much do you agree or disagree with the following statements?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) Overall, I support research on global warming.

- 2) Overall, I support federal funding to address global warming.
- 3) We have a moral responsibility to address global warming.
- 4) Global warming research is morally acceptable.
- 5) Recent cold weather is evidence that the climate is not warming.
- 6) Global warming makes hot days more likely and cold days less likely.

Q98. Continuing with the issue of **global warming**, please indicate how much you agree or disagree with each of the following statements about regulation.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) Existing U.S. policy ensures public safety from global warming risks.
- 2) Regulating research on global warming will significantly slow down scientific progress.
- 3) Academic research on global warming should be regulated.
- 4) Commercial research on global warming should be regulated.
- 5) People should take additional steps to protect the environment from global warming.
- 6) I should take additional steps to protect the environment from global warming.
- 7) Government should do more to reduce greenhouse gas emissions and other potential sources of global warming.
- 8) I should reduce greenhouse gas emissions through my own actions.
- 9) It is already too late to do anything about global warming.

Q99. Now, we'd like to ask a few questions about how you feel about **scientists in general**. Please rate how much you agree or disagree with each of the following statements.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) We should trust the work of scientists who research artificial intelligence.
- 2) We should trust that scientists who research artificial intelligence are being honest in their work.
- 3) We should trust that scientists who research artificial intelligence are being ethical in their work.
- 4) When scientists form a hypothesis about artificial intelligence, they are just guessing.
- 5) We cannot trust artificial intelligence scientists because they are biased in their perspectives.
- 6) Scientists who study artificial intelligence will protect each other even when they are wrong.

Q100. And how much do you agree or disagree with the following statements?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) Overall, I support research on artificial intelligence.
- 2) Overall, I support the use of artificial intelligence.
- 3) Overall, I support federal funding for artificial intelligence.
- 4) Artificial intelligence is morally acceptable.

Q101. Continuing with the issue of **artificial intelligence**, please indicate how much you agree/disagree with each of the following statements about regulation.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) Existing U.S. policy ensures public safety from artificial intelligence risks.
- 2) Regulating research on artificial intelligence will significantly slow down scientific progress.
- 3) Academic research on artificial intelligence should be regulated.
- 4) Commercial research on artificial intelligence should be regulated.
- 5) AI will reduce people's job security.
- 6) I fear that someday people will lose their jobs to AI.
- 7) AI will make me less needed as a worker.
- 8) The use of AI will mean less and less work for people.
- 9) Using AI may decrease people's control over day-to-day decisions they make on the job.

Q102. Now, we'd like to ask a few questions about how you feel about **scientists in general**. Please rate how much you agree or disagree with each of the following statements.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) We should trust the work of scientists who research microbiomes.
- 2) We should trust that scientists who research microbiomes are being honest in their work.
- 3) We should trust that scientists who research microbiomes are being ethical in their work.
- 4) When scientists form a hypothesis about microbiomes, they are just guessing.
- 5) We cannot trust microbiome scientists because they are biased in their perspectives.
- 6) Scientists who study microbiomes will protect each other even when they are wrong.

Q103. And how much do you agree or disagree with the following statements?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) Overall, I support research on microbiomes.
- 2) Overall, I support federal funding for microbiome research.
- 3) Overall, I support having microbiome-related products on the market.
- 4) Microbiome research is morally acceptable.

Q104. Continuing with the issue of **microbiomes**, please indicate how much you agree/disagree with each of the following statements about regulation.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

- 1) Existing U.S. policy ensures public safety from microbiome risks.
- 2) Regulating research on microbiomes will significantly slow down scientific progress.
- 3) Academic research on microbiomes should be regulated.

- 4) Commercial research on microbiomes should be regulated.
- 5) The speed at which microbiome research is taking place is dangerous.
- 6) Commercial microbiome products on the market are not well monitored.
- 7) Modifying microbiomes may create new illnesses and disease.
- 8) Products of microbiome research may reduce my control over my health.
- 9) The risks associated with modifying microbiomes are not known.

Q105. Because we try to get responses and opinions from different people, we would like to ask you a few questions that help us to reach people of different ages, genders, and so on. Once again, these responses will only be used for academic research purposes.

Q106. How much guidance does religion provide in your everyday life?

No guidance at all						A great deal of guidance
1	2	3	4	5	6	7

Q107. The terms “liberal” and “conservative” may mean different things to people, depending on the kind of issue one is considering. In terms of **economic issues**, would you say you are...

Very liberal	Liberal	Somewhat liberal	Moderate	Somewhat conservative	Conservative	Very conservative
1	2	3	4	5	6	7

Q108. Now, thinking in terms of **social issues**, would you say you are...

Very liberal	Liberal	Somewhat liberal	Moderate	Somewhat conservative	Conservative	Very conservative
1	2	3	4	5	6	7

Q109. Generally speaking, do you consider yourself a(n)...?

- | | |
|---------------------------------------|---|
| Democrat | 1 |
| Republican | 2 |
| Independent | 3 |
| No preference..... | 4 |
| Other party | 5 |
| Don't know/Prefer not to answer | 9 |

Q110. How old are you?

[DROPDOWN MENU WITH OPTION RANGE 18 to 100]

Q111. What is your sex?

- | | |
|--------------|---|
| Male | 1 |
| Female | 2 |
| Other..... | 3 |

Q112. Are you Spanish, Hispanic, or Latino?

- | | |
|----------|---|
| Yes..... | 1 |
| No | 0 |

Q113. Please choose one or more races that you consider yourself to be.

White	1
Asian	2
Black or African-American	3
Native Hawaiian or Pacific Islander	4
American Indian or Alaskan Native	5
Other.....	9

Q114. What was your total household income before taxes during the past 12 months?

Less than \$25,000	1
\$25,000 to \$34,999.....	2
\$35,000 to \$49,999.....	3
\$50,000 to \$74,999.....	4
\$75,000 to \$99,999.....	5
\$100,000 to \$149,999.....	6
\$150,000 to \$199,999.....	7
\$200,000 or more	8

Q115. Thank you very much for participating in our study. The purpose of this study is to learn more about the role of humor in science communication and its influence on how people feel about science and scientists. The Twitter conversation you viewed was taken or paraphrased from real Twitter posts. However, the scientist and users who retweeted or liked the post were fictional.

We would like to remind you that your participation in this research is completely voluntary. If you would like to withdraw from this study, please let any of the Principal Investigators know and we will destroy any data collected about you during this study. The decision to withdraw from this research will involve no penalty or loss of any benefits to which you are otherwise entitled. This will not affect your relationship with the investigators.