

Research Participant Information and Consent Form

Title of the Study: Public perceptions and attitudes toward science

Principal Investigators:

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DESCRIPTION OF THE RESEARCH

You are invited to participate in a research study about various scientific issues. The purpose of this research is to investigate how people get information about science from media. This study will include participants from a randomly selected national sample of people. All research will be conducted on the Internet using an online survey.

WHAT WILL MY PARTICIPATION INVOLVE?

If you decide to participate in this research, you will be asked to complete an online questionnaire. Participation will require answering a series of questions. Your participation will last approximately 15 to 20 minutes.

ARE THERE ANY RISKS TO ME?

We don't anticipate any risks to you from participation in this study.

ARE THERE ANY BENEFITS TO ME?

We don't expect any direct benefits to you from participation in this study.

HOW WILL MY CONFIDENTIALITY BE PROTECTED?

While there will probably be publications as a result of this study, your name will not be used. Only group characteristics will be published.

WHO SHOULD I CONTACT IF I HAVE QUESTIONS?

You may ask any questions about the research at any time. If you have questions about the research, you should contact the Principal Investigators. If you are not satisfied with the response of the research team, have more questions, or want to talk with someone about your rights as a research participant, you should contact the University of Utah IRB Office at 801-581-3655.

Your participation is completely voluntary. If you decide not to participate or to withdraw from the study it will have no effect on any services or treatment you are currently receiving.

Selecting 'Yes' below indicates that you have read this consent form, had an opportunity to ask any questions about your participation in this research and voluntarily consent to participate.

C1. I agree to participate in this study and have read the consent form.

Yes1
No2

Because we try to get responses and opinions from different people all across the U.S., we would like to ask you a few questions that help us to reach people of different ages, genders, neighborhoods, and so on. These responses will be confidential and will only be used for academic research purposes.

[V1, V2 AND V3 ON ONE PAGE]

V1. What year were you born?

[DROP DOWN MENU: RANGE 1900 (98) to 1997 (1)]

V2. With which gender do you identify?

Female..... 1

Male 2

Other **[TEXTBOX]**

V3. In which state do you currently reside?

[DROP DOWN MENU: RANGE Alabama-Wyoming]

1	Alabama	27	Montana
2	Alaska	28	Nebraska
3	Arizona	29	Nevada
4	Arkansas	30	New Hampshire
5	California	31	New Jersey
6	Colorado	32	New Mexico
7	Connecticut	33	New York
8	Delaware	34	North Carolina
9	District of Columbia	35	North Dakota
10	Florida	36	Ohio
11	Georgia	37	Oklahoma
12	Hawaii	38	Oregon
13	Idaho	39	Pennsylvania
14	Illinois	40	Puerto Rico
15	Indiana	41	Rhode Island
16	Iowa	42	South Carolina
17	Kansas	43	South Dakota
18	Kentucky	44	Tennessee
19	Louisiana	45	Texas
20	Maine	46	Utah
21	Maryland	47	Vermont
22	Massachusetts	48	Virginia
23	Michigan	49	Washington
24	Minnesota	50	West Virginia
25	Mississippi	51	Wisconsin
26	Missouri	52	Wyoming

[V4 AND V5 ON ONE PAGE]

V4. Are you Spanish, Hispanic, or Latino?

Yes 1

No 2

V5. Please choose one or more races that you consider yourself to be.

[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 5]

- 1) White
- 2) Black or African American
- 3) American Indian or Alaska Native
- 4) Asian
- 5) Native Hawaiian or Pacific Islander
- 6) Other **[TEXTBOX]**

PRE. We are conducting a study on how people in America feel about scientific issues and how they communicate about them. People have all sorts of views about scientific and technology advancements and policy in the United States. We are asking randomly chosen people to answer questions about these issues to get an idea of what people think about them.

We assure you that all the information you give will be kept completely confidential and that none of it will be released in any way that would permit identification of you or your family. Your participation in this study is, of course, voluntary.

To ensure data quality and validity, **please do not visit other websites while reading and answering our survey questions.**

M1. To begin, here are a few questions about your typical use of media. Please read each item carefully and select the appropriate option to indicate your response.

How many days a week do you read a newspaper, either in print or online?

[DROP DOWN RANGE 0 (1) to 7 (8)] days

M2. How much attention do you pay to news stories about the following topics when you read **newspapers, either in print or online?**

None 0	1	2	3	4	5	6	7	8	9	A lot 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 5]

- 1) International affairs
- 2) National government and politics
- 3) Science and technology
- 4) Political or ethical implications of emerging technologies
- 5) New scientific developments

M3. How much attention do you pay to news stories about the following topics when you watch **television news, either on a traditional television or in online sources** (e.g., Hulu or web sites of television networks, such as ABC, CBS, NBC, Fox or CNN)?

None 0	1	2	3	4	5	6	7	8	9	A lot 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 5]

- 1) International affairs
- 2) National government and politics
- 3) Science and technology
- 4) Political or ethical implications of emerging technologies
- 5) New scientific developments

M4. We are also interested in your use of **blogs, websites and social media**. How much attention do you pay to stories about the following topics when you go **online**? Please exclude online versions of newspapers or television shows and answer this question based on your usage of blogs, websites, or social media.

None 0	1	2	3	4	5	6	7	8	9	A lot 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 5]

- 1) International affairs
- 2) National government and politics
- 3) Science and technology
- 4) Political or ethical implications of emerging technologies
- 5) New scientific developments

M5. How often do you use any of the following sites or platforms, if at all?

Never 0	Less than once a month 1	Once a month 2	2-3 times a month 3	Once a week 4	2-3 times a week 5	Daily 6	Multiple times per day 7
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 7, ANCHOR ITEM 8; REPEAT HEADER FOR LIKERT SCALE]

- 1) Facebook
- 2) Twitter
- 3) LinkedIn
- 4) Google+
- 5) Pinterest
- 6) YouTube
- 7) Instagram
- 8) Other social network sites, please specify: **[TEXTBOX]**

M6. Now, we would like to ask you a couple of questions about online consumer product reviews. We are also interested in how often you...?

Never 0	1	2	3	4	5	6	7	8	9	Very often 10
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[RANDOMIZE AND RECORD ORDER WITHIN 1-3 AND 4-6; RANDOMIZE ORDER OF BLOCKS 1-3 AND 4-6; REPEAT HEADER FOR LIKERT SCALE]

- 4) Read reviews of consumer products posted online
- 5) Post reviews about consumer products online
- 6) Purchase a consumer product because of its reviews
- 7) This is an attention filter. Please select "**Never (0)**" for this statement.

REV. How much do you agree or disagree with each of the following statements as they relate to **online product reviews posted by other consumers**?

Strongly disagree 0	1	2	3	4	5	6	7	8	9	Strongly agree 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 5]

- 1) Most reviews are informative.
- 2) Most reviews are a reliable source of information.
- 3) Most reviews are generally truthful.
- 4) Most online reviewers tend to have negative experiences with the product.

- 5) Online reviews that are rude or offensive should be removed from the site.

FAM. Now, we would like to know how informed you feel you are about several science and health issues. How informed would you say you are about...?

Not at all informed 0	1	2	3	4	5	6	7	8	9	Very informed 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 7; REPEAT HEADER FOR LIKERT SCALE]

- 1) Nanotechnology
- 2) Synthetic biology
- 3) Ebola
- 4) Zika
- 5) Human microbiomes
- 6) Plant and animal microbiomes
- 7) Microbes in the environment
- 8) Microbiome-related products (e.g., probiotics)

TRUST. We would also like to ask how much, if any, you trust the following information sources when it comes to public controversies about scientific issues. How much do you trust...?

Do not trust at all 0	1	2	3	4	5	6	7	8	9	Trust very much 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 8; REPEAT HEADER FOR LIKERT SCALE]

- 1) University scientists
- 2) Government science organizations (e.g., National Science Foundation or the National Institutes of Health)
- 3) Industry scientists
- 4) Religious organizations
- 5) Regulatory agencies (e.g., the Environmental Protection Agency or the Food and Drug Administration)
- 6) Traditional media organizations (TV, radio, and newspapers)
- 7) Blogs and other online-only media including social media
- 8) Professional organizations or nonprofits (e.g., American Society for Microbiology)

SCIDEF. How much do you agree with the following statements?

Strongly disagree 0	1	2	3	4	5	6	7	8	9	Strongly agree 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 AND 2]

- 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.

NFC. We would like to know a little about you. Please rate how much the following statements reflect your personality.

Not at all like me 0	1	2	3	4	5	6	7	8	9	A lot like me 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 10; REPEAT HEADER FOR LIKERT SCALE]

- 1) I would 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.

NFA. Next, please rate how much you agree or disagree with the following statements.

Strongly disagree 0	1	2	3	4	5	6	7	8	9	Strongly agree 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 10]

- 1) Emotions help people get along in life.
- 2) It is important for me to know how others are feeling.
- 3) I find strong emotions overwhelming and therefore try to avoid them.
- 4) I do not know how to handle my emotions, so I avoid them.
- 5) It is important for me to be in touch with my feelings.
- 6) If I reflect on my past, I see that I tend to be afraid of feeling emotions.
- 7) I feel that I need to experience strong emotions regularly.
- 8) I think that it is important to explore my feelings.
- 9) I would prefer not to experience either the lows or highs of emotion.
- 10) Emotions are dangerous—they tend to get me into situations that I would rather avoid.
- 11) This is an attention filter. Please select “**Strongly disagree (0)**” for this statement.

DEF. We are particularly interested in the topic of microbiomes. Here is one definition of microbiomes. Please keep this definition in mind as you take this survey.

Microbiomes are ecosystems or communities made up of microbes (organisms too small for the human eye to see like bacteria, fungi, viruses) that live within and on organisms such as human, animals, and plants, and in various habitats. A broader term, “metagenome” means the entire collection of microbial genes found in association with a particular host (plant, animal, or human) or environment (e.g., soil, ocean water).

IMP. On a scale of 0 to 10, how **important** are the following to you personally?

Not at all important 0	1	2	3	4	5	6	7	8	9	Very important 10
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- a) Human microbiomes
- b) Plant and animal microbiomes
- c) Microbes in the environment

[RANDOMIZE AND RECORD ORDER OF Q NFO1 THRU NFO3; R SHOULD SEE ALL 3 QUESTIONS]

NFO1. How much of a **concern** are the following to you personally?

No concern to me 0	1	2	3	4	5	6	7	8	9	A lot of concern to me 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 3]

- 1) Human microbiomes
- 2) Plant and animal microbiomes
- 3) Microbes in the environment

NFO2. Please tell us how **relevant** the following are to you personally.

Irrelevant to me 0	1	2	3	4	5	6	7	8	9	Relevant to me 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 3]

- 1) Human microbiomes
- 2) Plant and animal microbiomes
- 3) Microbes in the environment

NFO3. How **interesting** are the following to you personally?

Uninteresting to me 0	1	2	3	4	5	6	7	8	9	Interesting to me 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 3]

- 1) Human microbiomes
- 2) Plant and animal microbiomes
- 3) Microbes in the environment

MNEWS. We would like to know more about how much attention you pay to **news about microbiomes**. How much attention would you say you pay to such news in...?

None 0	1	2	3	4	5	6	7	8	9	A lot 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 5]

- 1) Newspapers, either in print or online
- 2) Television, either traditional or online
- 3) Websites, blogs, or social media
- 4) Magazines, either in print or online (e.g., *National Geographic*, *Wired*, *The Economist*)
- 5) Academic journals, such as *Science* or *Nature*

KNOW. Next, you will see a few statements about microbiomes. Of course, it is difficult to know the answers to all of these, but could you tell us for each statement if you think it is true or false?

Definitely false 1	Likely false 2	Likely true 3	Definitely true 4	Don't know 9
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 6; REPEAT HEADER FOR LIKERT SCALE]

- 1) The composition of your microbiome changes throughout your life.
- 2) The modification of microbiomes is currently one solution to obesity.
- 3) Microbiomes contain types of microbes that are both helpful and harmful to their hosts.
- 4) Plants and animals do not require microbiomes to be healthy.
- 5) Currently, there are a few dozen consumer products on the market targeting microbiomes.
- 6) Microbes in the indoor environment affect everyone in the same way.

MOT. Now, please tell us how much you agree with the following statements **as they relate to issues about microbiomes**.

Strongly disagree 0	1	2	3	4	5	6	7	8	9	Strongly agree 10
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[RANDOMIZE ORDER OF ITEMS 1 THRU 6; REPEAT HEADER FOR LIKERT SCALE]

- 1) Understanding what is currently going on with these issues is important to me.

- 2) Making accurate decisions about these issues is important to me.
- 3) It is important to know the facts about microbiomes.
- 4) My position on issues about microbiomes is based on the values with which I try to conduct my life.
- 5) My position on issues about microbiomes reflects who I am.
- 6) The values that are most important to me are what determine my stand on these issues.

DISG. People react differently to various scenarios. Here are several. Please rate how disgusting you find these scenarios.

Not disgusting at all 0	1	2	3	4	5	6	7	8	9	Extremely disgusting 10
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[RANDOMIZE ORDER OF ITEMS 1 THRU 5]

- 1) Shaking hands with a stranger who has sweaty palms.
- 2) Taking a sip from a glass that an acquaintance had been drinking from.
- 3) The cook at a restaurant touching my food with unwashed hands.
- 4) Receiving the transfer of another person's feces to cure my severe illness.
- 5) The idea that cell phones have more germs than public bathrooms.

[RANDOMIZE AND RECORD ORDER, ANCHOR 9]

PROD1. Have you ever purchased a microbiome-related product (e.g., probiotics or prebiotics)?

Yes..... 1

No..... 2

Don't know..... 3

[IF PROD1 = 1]

PROD2. Please tell us what microbiome-related product you purchased. **[TEXTBOX]**

STIM. Next, you will see a short article about microbiomes. **Please read it carefully.** We will ask you more questions after you are finished.

[RANDOMIZE WHICH STIMULUS R IS SHOWN; PRESENT EACH STIMULUS EVENLY AMONG TOTAL R; TIME SPENT ON STIMULUS IS RECORDED]

CTRL The term microbiome was coined in 2000 to describe the collective genomes of microbes in a system. Microbiomes are communities of microbes (organisms too small for the human eye to see like bacteria, fungi, viruses) that live within and on organisms such as humans, animals and plants, and in various habitats. A broader term, "metagenome," refers to the entire collection of microbial genes found in association with a particular host (plant, animal, or human) or environment (e.g., soil, ocean water).

Between 2007 and 2012, research on microbiomes increased by 250%, which suggests the heightened significance of this issue. Following this trend, media coverage of microbiome-related issues has also increased dramatically. We need to further understand the possibilities, limitations, and implications of microbiomes.

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The human body is home to the cells of many germs. For every human cell in the body there are ten bacterial cells. The human gut has up to 1000 types of germs that are essential in defining states of health and disease. Scientists hope that by learning more about the bacteria in our guts we can develop new ways to treat health problems. Doctors are in the process of creating fecal transplant therapies to treat recurring gut

infections. This procedure involves the transplant of a healthy person's feces into the intestinal tract of the sick patient using an enema.

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Animals are home to the cells of many germs. For example, scientists have been studying the bobtail squid, which have a light organ full of a type of light-producing bacteria called *Vibrio fischeri*. This relationship between the squid and the germs is important for protection against predators, the squid's immune system, and guiding early development. Additionally, veterinarians are in the process of creating fecal transplant therapies to treat recurring digestive infections in horses. This procedure involves the transplant of a healthy horse's feces into the intestine of the sick animal using an enema.

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[THOUGHT-LISTING INSTRUCTIONS ON SAME PAGE AS TEXT BOXES]

TL. We are now interested in everything that went through your mind when you read the article. Please list your thoughts and feelings below, including those thoughts and feelings that are not necessarily relevant to the article. Please put only one thought or feeling in each box and do not worry about punctuation, spelling, grammar, or use of complete sentences.

[TEXT BOX 1] (1)

[TEXT BOX 2] (4)

[TEXT BOX 3] (5)

[TEXT BOX 4] (6)

[TEXT BOX 5] (7)

[TEXT BOX 6] (8)

[TEXT BOX 7] (2)

[TEXT BOX 8] (3)

[TEXT BOX 9] (11)

[TEXT BOX 10] (12)

EMO. We would also like to know, **while you were reading the article**, to what extent did you feel the following?

None at all 0	A little 1	Some 2	Quite a bit 3	A lot 4
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 6]

- 1) Disgust
- 2) Joy
- 3) Anger
- 4) Fear
- 5) Surprise
- 6) Distaste

PROC. **Thinking back to the information you just read**, how much do you agree or disagree with each of the following statements?

Strongly disagree 0	1	2	3	4	5	6	7	8	9	Strongly agree 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 8]

- 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 health.
- 6) I did not spend much time thinking about the information.
- 7) The article did not contain useful information on which to base my thinking about the issue.
- 8) While reading the information, I did not think about the details included.

INFO. Some people participate in certain types of information sharing and gathering. **Thinking about the issue of microbiomes**, how likely would you be to do each of the following activities?

Not at all likely 0	1	2	3	4	5	6	7	8	9	Very likely 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 7]

- 1) Seek out information about the human microbiome.
- 2) Seek out information about plant and animal microbiomes.

- 3) Seek out information about microbes in the environment.
- 4) Share news articles related to the topic with others.
- 5) Pay closer attention to the topic when I encounter it in the news.
- 6) Discuss the topic with others.
- 7) Add my own comment to posts or articles about the microbiome.

ATT. Here are a few more statements about microbiomes. Please tell us whether you agree or disagree with the following statements.

Strongly disagree 0	1	2	3	4	5	6	7	8	9	Strongly agree 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 8]

- 1) Overall, I support having microbiome-related products on the market.
- 2) Overall, I am supportive of modifying microbiomes.
- 3) Overall, I support federal funding for microbiome-related research.
- 4) The government should protect the public from the risks of microbiomes, if any.
- 5) Academic research on the microbiome should be regulated.
- 6) Commercial research on the microbiome should be regulated.
- 7) Microbiome-related products should be regulated.
- 8) Advancing research on the microbiome quickly is more important than protecting society from the potential risks.

[RANDOMIZE AND RECORD ORDER OF BEN AND RISK]

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

Not beneficial at all 0	1	2	3	4	5	6	7	8	9	Very beneficial 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 3]

- 1) Modification of human microbiomes
- 2) Modification of plant and animal microbiomes
- 3) Modification of microbes in the environment

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

Not at all risky 0	1	2	3	4	5	6	7	8	9	Very risky 10
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[RANDOMIZE AND RECORD ORDER OF ITEMS 1 THRU 3]

- 1) Modification of human microbiomes
- 2) Modification of plant and animal microbiomes
- 3) Modification of microbes in the environment

[VV and V6 ON ONE PAGE]

VV. Here are a few more questions that help us to reach people of different ages, genders, neighborhoods, and so on. Once again, these responses will be confidential and will only be used for academic research purposes.

V6. How many years of formal education have you completed?

[DROP DOWN MENU: RANGE 0 to 31 or more, LIST 31 or more AFTER 30] years

[V7 AND V8 ON ONE PAGE]

[IF EDUCATION LEVEL = 13 OR HIGHER]

V7. How many college-level science courses have you taken?

[DROP DOWN MENU: RANGE 0 (1) to 8+ (9), LIST 8+ AFTER 7] COURSES**[IF EDUCATION LEVEL = 13 OR HIGHER]**

V8. Is your college degree in a scientific or science-related field?

Yes 1

No 2

[V9 ON ONE PAGE]

V9. What is your annual household income?

Less than \$10,000 1

\$10,000 to \$19,000 2

\$20,000 to \$29,999 3

\$30,000 to \$39,999 4

\$40,000 to \$49,999 5

\$50,000 to \$59,999 6

\$60,000 to \$69,999 7

\$70,000 to \$79,999 8

\$80,000 to \$89,999 9

\$90,000 to \$99,999 10

\$100,000 to \$149,999 11

\$150,000 or more..... 12

[V10 ON ONE PAGE]

V10. How much guidance does religion provide in your everyday life?

No guidance at all 0	1	2	3	4	5	6	7	8	9	A great deal of guidance 10
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[V11 AND V12 ON ONE PAGE]V11. 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 1	Liberal 2	Somewhat Liberal 3	Moderate 4	Somewhat Conservative 5	Conservative 6	Very Conservative 7
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V12. Now, thinking in terms of **social issues**, would you say you are...?

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