



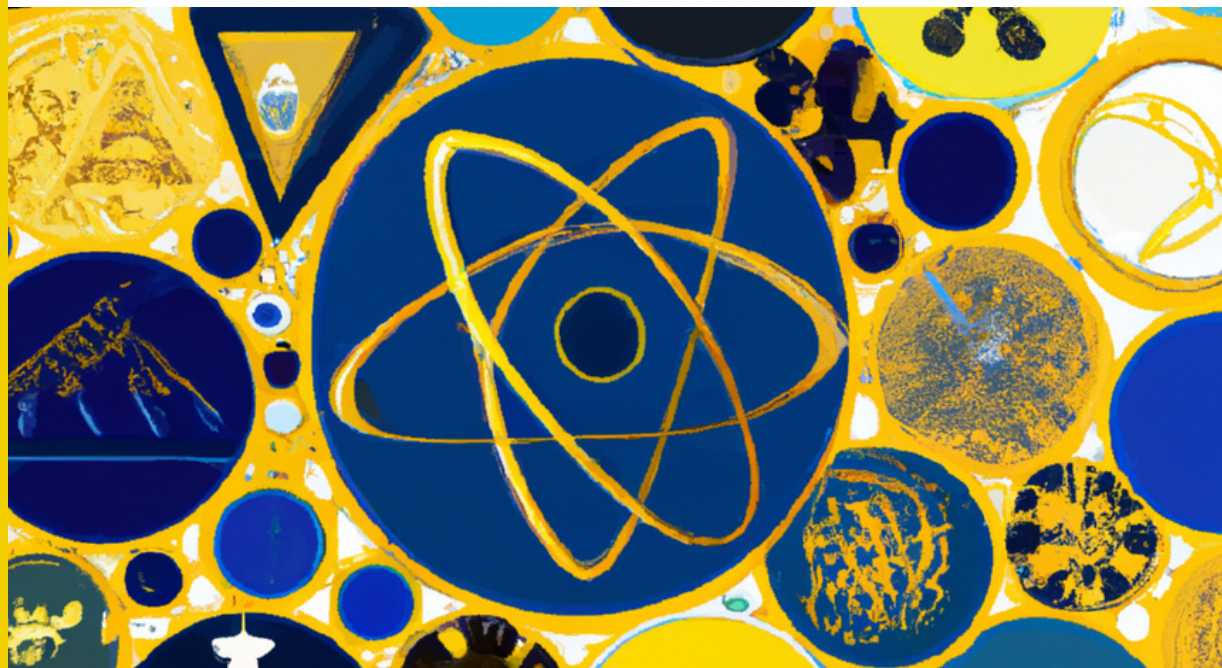
# The Stories We Tell Ourselves About Science

*Listening to  
American Adults*



In the midst of the Covid-19 pandemic, Worldview Studio set out to understand the stories people tell themselves about what science is and the role it plays in their daily lives. We aimed to gain insight into the dynamics underlying trust in science and, by extension, how science might become polarized in social discourse. Although recent polling data were suggesting that global levels of “trust” in science remained high or had even increased, widespread vaccine hesitancy and vitriolic debate about scientifically grounded public policy were painting a different picture. As science communicators ourselves, we hypothesized that people responding to polls asking how much they trust science may have differing conceptions of – and feelings about – *what science is*; therefore, the question about trust may obscure deeper, more influential scientific worldviews.

With a planning grant from the Templeton World Charity Foundation, we listened to U.S. adults from a range of backgrounds and regions, using a human-centered design approach. We aimed to discover what stories Americans tell themselves about science, how they feel and want to feel when engaging science, when and where in their lives they encounter science, how they navigate complex scientific information, whether they perceive conflict



between their personal values and science, and what or who is responsible when science gets something wrong. **Our goal in asking these questions was to help us move toward a set of refined hypotheses about the relationship between how people experience, evaluate, and trust science, so that all those who are involved in science communication can design more informed and effective practices.**

#### **DESIGNING A HUMAN-CENTERED, RESEARCH APPROACH**

At the outset of our listening process, we articulated four hypotheses, based on our own experience communicating science and interviews with scholars:

1) Most people could articulate a story about what science is.

2) Most stories would fall into one of three categories:

**Science is a process of generating knowledge.**

**Science is a collection of content or subject matter knowledge.**

**Science is an industry or profession comprising individuals who do science.**

3) Among a diverse sample of Americans, we would find mixed emotions about science, from deep mistrust, skepticism, or even anger, to excitement, hope or gratitude.

4) We would hear reports of conflict between science and other deeply held worldviews



Our early interviews, combined with social media scans, suggested that people with advanced post-secondary training and/or who worked professionally in science were highly likely to understand science as a process and feel positive emotions about science and the role it should play in guiding personal and policy decisions. We focused our research efforts, therefore, on people who are not professionally involved in science, and who had little or no post-secondary training in science.

We used three methodologies from ethnographic and design research (see the appendix for more detail). First, we conducted 10 in-depth, open-ended interviews with men and women of different ages and from different parts of the country, recruited through on an online platform. Next we solicited 80 videos from another diverse sample of people in response to the question, "When you think about science, what comes to mind?" (and follow-up prompts). We invited 11 of these adults to create "Seeing Science" digital collages, using images of science from online sources, and followed up with five in-depth interviews. Finally, we surveyed more than 500 adults from different educational backgrounds (high school/some college and college graduates/some post-graduate education) about their feelings toward science, with questions shaped by our earlier interviews.



#### **WHAT WE LEARNED: CONFIRMATION AND SURPRISES**

This qualitative "listening" process lent preliminary support to several of our hypotheses, as well as yielding interesting nuances and surprises that we hope to explore in further, more focused research efforts.

**First, Americans do tell themselves very different stories about science.** We heard the stories we anticipated – that science is a process (~20% of respondents), or that science is a collection of content (~50%), or that science is a profession or industry (~5%). But we also heard another story – that science is everywhere, in everything, that science is the basis for matter and process in the universe (~20%, with the remaining 5% falling into no discernible categories). In this story, “science” isn’t just the study of everything, or the accessibility of matter and process to scientific inquiry, it is everything. This type of story was associated with expressions of awe and wonder, and expressions of surprise at just how “everywhere” science is. And while we expected the collage exercise to include a lot of stock images of people in lab coats with test tubes, the chosen images were far more diverse and sometimes personal.

**“It's what makes things work. You know, what makes the sun rotate, the stars, the planet, the mechanics of electricity, the mechanics of everything that we do in life, even the way our bodies work, that's science.”**

**For many American adults, however, science is not “top of mind;” they don’t think about science unless or until they are prompted to do so.** We began our interviews with broad, open-ended questions, being very careful not to prime or prompt answers. While some interviewees could tell a coherent story about what science is quickly and clearly, most could not. Responses often wandered, referencing ideas about science from school, recent situations in which they had reason to think about science (e.g., a medical diagnosis, news story, or walk in nature), or technologies they use in daily life. Some interviewees even shifted mid-interview between different stories about what science is. We interpret these patterns as pointing to the importance of context and framing in the situations in which people encounter science.



**For Americans who don't work in science or engage deeply with scientific media, even bringing images of science in action to mind is difficult.** We found that people with advanced education or professional science experience overwhelmingly understood science as a process and could articulate how that process works. But for the majority of people without more education or proximity to science (e.g., through family or friends), questions about science elicited connections to health, technology (e.g., cell phones, electric cars), food and cooking, entertainment, and experiences of nature. These interviewees could often describe hypothesis testing, when prompted, but did not connect it to the dynamic, collective process of scientific inquiry. They frequently started by describing objects or experiences in daily life that helped them inductively reason towards a definition of science.

**“I'm not actively seeking out how things work and I'm not developing any type of hypotheses and doing any type of experiments to figure things out or anything.”**

**Importantly, we heard very little native distrust or antiscience sentiment.** This was a surprise, especially since we sampled broadly and offered opportunities to express antiscience sentiment or a lack of trust in science. We believe this may be because most people don't hold a clear concept of what science is, leading the stories they tell themselves to be highly influenced by the immediate context. Our questions stayed general and high level; we didn't prompt people to think about science in relation to hot-button issues like Covid or climate change. Within a neutral context, science itself was considered neutral or positive. We also believe that the positive association that many people hold between science and the technologies they experience in daily life, as well as common feelings of awe and wonder associated with science, may serve as barriers to generalized anti-science sentiments. We suspect some undersampling may also be at work; observer bias also could have skewed results in live interviews. But since these results were consistent across three different platforms and sampling techniques, we believe that this is a real phenomenon, and worth exploring in more detail.



**Science, when described at its most general level, is associated with overwhelmingly positive emotions.** When presented with a list of 15 emotions (6 with positive valence, 8 with negative valence, and a “neutral” option) and asked to choose up to three emotions they feel when encountering science, survey respondents most often chose Curious, Amazed, Excited, Optimistic, and Awed. “Skeptical” was not among the top five chosen emotions. However, when segmented by education level, “Confused” emerged as the third most chosen emotion among people with some college or below. This suggests opportunities to delve deeper into the sources of confusion, and to build on and amplify positive feelings toward science.

**Over half of our survey respondents also held views about science and faith being complementary, rather than in conflict.** When asked, “For you personally, which of the following best describes the relationships between science and faith?” 53% of respondents chose “They are complementary sources of knowledge or wisdom,” or “They apply to separate kinds of situations.” Another 19% of respondents chose “Science is the only way to reliably know things,” while 8% chose “Faith is the only way to reliably know things” and 12% responded that they were “fundamentally conflicting approaches to knowing something.” (The remaining 8% chose “Other” or “I don’t know.”) While these data pointed towards perceived conflicts between science and faith as a potential source of polarization, such themes did not emerge on their own in our interviews. We have more work to do to understand when and in what contexts these perceived conflicts could be polarizing.

***“I don't see that there's a discord with religion... I actually see it as very complementary. ...As a Christian, I believe God created the world and he created the wonderful plants and the animals and all this wonderful life. And there's this infinite wisdom and science has proven to me, wow, this is just so wise. ”***



**People differ in their opinions about the relevance of science and the role it should play in different domains of decision-making.** When asked, “Which of the following topics do you think science has something relevant to say about? Check all that apply,” the topics that a majority (>50%) of survey respondents found relevant were health, particularly nutrition and healthy eating, environmental issues, technology use, and the origins of the universe. Interpersonal topics (“Relationships with friends and family,” “Child-care/parenting strategies”) were among the least selected topics.

**“One of our dogs had a problem with the food he ate. So we had to experiment with different foods, do a lot of research on what might be affecting him.”**

Interestingly, survey respondents with less education chose all topics less often than respondents with a college degree. This may reveal attitudes about science being less relevant than other inputs, beliefs, or experience in guiding life choices, understanding the world, and assessing policy decisions. Similarly, in some of our extended interviews, respondents suggested that science is valuable, but needs to “stay in its lane.”

**Yet, concerns about bias are common.** Multiple interviewees expressed concerns about bias in media reporting on science. Survey results also pointed to concerns about researcher bias as a “reason for science to get something wrong.” In long-form interviews, people expressed a need to “do their own research” and appreciated when science communicators introduced multiple viewpoints or lines of evidence and invited them to make their own judgment. Both the message and the messenger matter.

**Finally, from a listening and learning perspective, the mix and sequencing of qualitative research approaches were instrumental in testing insights.** The in-depth interviews allowed for deeper, probing conversations. The collages tapped into internet search behaviors and visual forms of thinking, and provided multiple opportunities for reflection. The survey allowed us to query a larger, diverse sample of Americans to further refine our insights.







## NEXT STEPS: FROM STORIES TO SCIENCE POLARIZATION

As we look ahead, we see several opportunities to better understand the process of how science comes into consciousness for people who don't work in science or enjoy exploring science in their spare time. One potential hypothesis centers on the idea that, **for most people, science stays in the background until it is pulled into consciousness by a pressing need (e.g., a health crisis), an experience with technology or nature, or media/social media attention.** We want to better understand how this "bringing to attention" process could play a role in polarizing science. What other factors make science vulnerable to polarization and, critically, what might science communicators do to prevent or diminish that?

We also hope to dig deeper into how people understand the limits of science, especially as one way of knowing among others, and we would like to explore practical techniques for communicating in ways that relieve (or at least acknowledge) concerns about bias.

We also want to better understand what people mean when they talk about "doing their own research," how they behave in this process, and what criteria they use as they come to an acceptable understanding of the issue they seek to understand. Our interviews suggest that the "research" people most often

undertake that brings them into contact with science pertains to their bodies – what is safe to eat or do, what’s happening in a given disease process, how to improve their mental or physical health, etc. We also want to dig deeper into what people actually want when they make these queries, which often start on the internet, and what role they see science playing in informing them.

Ultimately, our goal is to better understand how to best communicate the value and utility of science to society. The next step is to develop new, testable theories about science engagement and practical individual and social epistemology, or ways of knowing. By listening, experimenting and learning – in essence, integrating the processes of design and science – we can develop more effective tools and practices for science communication and engagement.



## NOTES ON METHODOLOGY

The stories people tell themselves about anything are a complex mix of experience, knowledge, belief, personality, identity, emotion, and context. Even a topic as seemingly objective as “science” becomes highly subjective. That’s why we chose a human-centered design approach, using three different, but commonly used, ethnographic and design research methodologies across three different online platforms.

As noted in the brief description of our approach described in the main document, we launched our inquiry with a select set of interviews with scholars in neuroscience, psychology and communication and social media scans. The timing was propitious, as debates about Covid-19, masking, vaccines and “alternative” treatments were raging. These insights were supplemented by our own experience as science practitioners and communicators, including recent work developing a website and resources to help business leaders promote Covid-safe workplaces and employee/community vaccination.

To reiterate, we formulated four hypotheses based on these inputs:

- 1) Most people could articulate a story about what science is.
- 2) Most stories would fall into one of three categories: science is a process of generating knowledge; science is a collection of content or subject matter knowledge; science is an industry or profession comprising individuals who do science.
- 3) Among a diverse sample of Americans, we would find mixed emotions about science, from deep mistrust, skepticism, or even anger, to excitement, hope or gratitude.
- 4) We would hear reports of conflict between science and other deeply held worldviews.

What follows below is a more in-depth description of the methodologies and approaches we used.



## **IN-DEPTH, QUALITATIVE INTERVIEWS WITH AMERICAN ADULTS**

We began our research by conducting 10 in-depth, open-ended interviews with US adults not professionally involved in science. We use an online recruitment platform with a pool of 850,000 people across the U.S.

We selected 10 adults to interview who provided some geographic, educational, gender and racial diversity. We specifically chose participants who did not have strong educational or professional experience in science. These 60-minute, open-ended interviews included questions on:

- » Their perceptions of science (what science is, what doing science means, the value of science)
- » Their personal relationship to/experience with science
- » The kinds of information they sought – and how and where – for both personal interest and decision making
- » Their consumption of media about science.

At the end of the interview we asked if they had changed any of their perceptions or description of science.

## **“SEEING SCIENCE” VIDEO RESPONSES, COLLAGE EXERCISE, AND FOLLOWUP**

For this three-part exercise, we used a different online recruitment platform, which includes 100,000+ US adults. We screened potential respondents by employment, education, region, personal interests and priorities, excluding those with strong science educational or professional experience.

### **Part 1: Personal Videos**

We solicited 30-second selfie video responses to the questions, “When you think about science, what comes to mind? Where does your mind first go – and why do you think that is? What role does science play in your life?” Our team assessed whether each of 84 video responses that met our inclusion criteria fell into one of the three story types we hypothesized. We invited 11 respondents to move on to the image/collage exercise.



## **Part 2: Images of Science**

These eleven participants were asked to choose and upload up to 10 images that represent science (prompts were provided), and explain the reason for selecting them based on what it meant to them and how it related to the broader concept of science.

## **Part 3: Science Collages**

Participants then assembled a digital or physical collage using these 5-10 images – or new ones – to show what science means to them, how they define it and how it makes them feel. After uploading the digital collage (or a photo, if physical), they also described their collages and any surprises or challenges they experienced in creating it. Finally, having completed the exercise, they added a brief explanation of what science is and isn't and how science makes them feel.

## **Part 4: Follow-up Interviews**

The Worldview team interviewed five of the collage creators who submitted very different visual and descriptive perspectives. These open-ended interviews delved more into their choices, experience, and second thoughts after building the collage and their their perspectives about:

- » The influence of science information on their opinions/decisions
- » When, where, and from whom they seek science information
- » The relationship between truth and science
- » Their early experiences with science
- » When science has – or has not – helped society

## **ONLINE SURVEY**

Based on findings from the video review and collage interviews, we constructed a survey using an online tool that taps into an audience of 175M+ people in 130+ countries using over 50 attributes.

Our sample included 260 US adults with high school education or some college, and another group of 279 adults with a college degree or higher. Once again, adults professionally engaged in science were not included in the sample.



The survey included multiple choices questions and one scale regarding:

- » When they thought about or encountered science and why
- » The emotions that science elicited
- » When science was useful or not
- » Why science got things wrong
- » Their confidence in science

**For more information on this project's findings, methodology or next steps, please contact us at: [info@worldview.studio](mailto:info@worldview.studio)**

