

Host: Robert Frederick

Hello and welcome to The Conjectural — an experiment to figure out a better way to decide what science news is and how we should talk about science. The data for this experiment? Your feedback to TheConjectural.com. I'm Robert Frederick. In this episode, a story about the science of taking the public's opinion.



Did you get surveyed last month by The Gallup Organization about climate change? Since 2001, Gallup has been surveying the public annually about their opinions on climate change, though their first poll about it goes back to 1987 when they used the term “global warming,” instead.

Much has been made overall about the change of terms, including by presidential hopeful Ted Cruz. Here he is talking with Yahoo's Katie Couric last summer.

Speaker: Ted Cruz

So now, it has changed into what is the perfect political pseudoscientific theory, which is climate change.

Host: Robert Frederick

“Pseudoscientific,” Cruz says, because the climate is always changing.

Speaker: Ted Cruz

Climate change is the perfect political theory because it can never be disproven—whether it gets hot or cold, whether it gets wet or dry, no matter how it changes, it's always proven right.

Host: Robert Frederick

It appears most Americans don't buy that argument. No, no, I can't say that. Indeed, if I've learned anything about polls and polling results, its that one must be very careful with one's language. So, it appears that representatives of the American public don't distinguish between the terms “global warming” and “climate change” when it comes to polling their opinions about it. That's according to Lydia Saad of The Gallup Organization. She and the others in this story spoke at a press briefing I attended at the 2016 Triple-A-S (AAAS) meeting in Washington D.C..

Speaker: Lydia Saad

We started off talking about it in our polling in terms of “global warming” — quote/unquote — and then as the semantics changed to “climate change” we've done split-sample experiments to demonstrate our questions — that results are not affected by the wording. And so we continue to use “global warming” but for new questions we segued into “climate change.”

Host: Robert Frederick

Sociologists may debate the best way to change out terms in a poll, such as swapping out “global warming” for “climate change,” but it's widely acknowledged that if you are going to swap out terms in a poll, then the scientifically responsible thing to do is what The Gallup Organization did: you must run a separate study to see whether there's any difference in how the terms poll. Turns out, there wasn't.

Speaker: Lydia Saad

But because of the debate — I think there's a lot of misconception about public opinion with the idea that there's one group of people that believe in it one group that doesn't believe in it and it's sort of a toss up — when in fact if you look at our trends there is broad belief — acceptance —

that global warming is real. And some of the highlights are when we ask when do you think the effects of global warming will be manifest in the world, in the environment, most think those effects have already begun — 55% — and another 28% think they will happen someday, either in a few years or in their lifetime, or future lifetimes. Only something like 16% say they will never happen. So you get over 80% of Americans acknowledging the effects of global warming are or will be manifest.



Host: Robert Frederick

But whatever the percentages for whatever the issue, public opinion polls are about people's opinions or beliefs. So when asking people about topics that are not about people's opinions or beliefs — such as questions about scientific knowledge — Peter Muhlberger says it's important to ensure that the questions don't overlap with people's beliefs, especially their religious beliefs. The results can be disastrous.

Speaker: Peter Muhlberger

One thing that has come up is that Americans do unusually poorly with respect to a knowledge question about human evolution.

Host: Robert Frederick

Muhlberger works for the National Center for Science and Engineering Statistics, and here is talking about the results from a set of international survey experiments that were published by the U.S. National Science Foundation in the 2016 Science and Engineering Indicators report.

Speaker: Peter Muhlberger

The question is 'humans evolve from other animals,' more or less, I'm giving a paraphrase here, 'true or false?' And compared to Europeans, Canadians, people in Japan, the Americans do about 20 percentage points plus less well on that question. So people have raised the issue of perhaps Americans know less about evolution as a scientific theory or perhaps the question itself is not very well posed. And what is happening is that people who personally do not believe in human evolution are answering 'no' to the question even though they know about the scientific theory of evolution, they're still answering 'no' to the question and it appears that they are not very knowledgeable about human evolution as a consequence, even though they might be.

Host: Robert Frederick

So Muhlberger and his colleagues experimented by dividing the latest survey respondents into two groups, one of which got the same question about human evolution.

Speaker: Peter Muhlberger

And the other got the same question but with the word "elephant" substituted for "human." And so it becomes a question about elephant evolution. And it turns out that Americans do much better with the elephant evolution question, in fact, 23 percentage points better.

Host: Robert Frederick

But that result by itself didn't mean that the elephant evolution question is a better way of capturing people's knowledge of science. For that, researchers looked at the correlation between people's answers to the elephant evolution question and people's disbelief in evolution. They also looked at the correlation between people's answer to the elephant evolution question and their general knowledge of science and of evolution through a series of other questions. At long last:

Speaker: Peter Muhlberger

And so it does appear that we now have better way of asking about evolution than we did in the past.

**Host: Robert Frederick**

That past, unfortunately, goes back decades with the oldest Science and Engineering Indicators report on the National Science Foundation's website dating back to 1996. And sure enough, the [1996 report](#)—along with all the others—was using the human evolution question. And from the 1996 report, quote, “less than half of American adults agree that human beings evolved from earlier species,” end quote.

But, of course, we have no idea about the percentage of American adults in 1996 or between then and now who agree that elephants evolved from earlier species.

Speaker: Cary Funk

There really is not one-size-fits-all explanation of what's going on in public understanding of science topics.

Host: Robert Frederick

Cary Funk is the associate director of research for The Pew Research Center.

Speaker: Cary Funk

There are lots of issues that are strongly aligned with political divides, and we see energy and climate kind of foremost examples of those. There are issues that are strongly aligned with religious divides. There are issues that are strong aligned with gender and generational divides. And so it really is all over the map and we need to make sure that we're aware that there is that kind of variation going on in how the public thinks about these topics.

Host: Robert Frederick

In other words, the science of polling is like other sciences: it's challenging to do well but is self-correcting. And this self-correcting mechanism may be the most important characteristic of science. John Besley is a communications professor at Michigan State University.

Speaker: John Besley

You know, confidence in a lot of institutions — confidence in government, confidence in the press, I'm afraid, has gone down over the decades. But if you look — the one group that's really stayed the same is confidence in science as an institution.

Host: Robert Frederick

Because sociologists are polling people about their confidence in institutions, too, though the relevant question asked since 1973 is, quote — “As far as the people running these institutions are concerned, would you say that you have a great deal of confidence, only some confidence, or hardly any confidence at all in them?” — end quote. Each year since 1973, about 40% of American respondents have said that they have a great deal of confidence in the scientific community.

Speaker: John Besley

You know, overwhelming numbers of Americans like science. They have positive views about science. Very few people have negative views about science.

Host: Robert Frederick

But the question involved here, which hasn't changed since 1979, is whether the benefits of scientific research outweigh the harmful results of scientific research. Over the years, around 70% of American respondents have said yes, the benefits strongly or slightly outweigh the harmful results of scientific research. Does that mean Americans like science, or is there a better question to ask?



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