



Facts, Thoughts, & Beliefs in Science

Fast facts

How do we approach science?

Many people are troubled by the upsurge in citizens who are rejecting facts in favour of conspiracy theories but are also unsure how to tell if scientific research is valid or “junk science.” Others are clashing with friends or relatives with very different conclusions about the world, even some they hold to be dangerous.

Debates about the validity of climate change, vaccines, and even the earth being flat have made their way into mainstream news. Here are a few fast facts on thoughts and beliefs when it comes to science.

- If you have doubts about a study’s conclusions, don’t be afraid to do follow up research or ask hard questions. As Cornelia Betsch and Philipp Schmid explain in their study “Effective strategies for rebutting science denialism in public discussions,” **skepticism** (asking hard questions and checking validity) is a healthy part of scientific research. **Denial** is when people spread misinformation, in other words, when “driven by how the denier would like things to be rather than what he has evidence for.”
- If someone you care about rejects evidence-based science, it’s important to find common ground on that issue before discussion. Dismissing or ridiculing can be tempting, but unsurprisingly, it rarely helps generate good conversation. Also, be wary of categorizing someone, including your loved ones, as a certain type of person. There is often a social component to denying facts that helps people feel at home in their community, and they may shut down if they think you’re criticizing who they are.
- Betsch and Schmid found that, when challenged by a science denier in front of an audience, two strategies worked to keep most of the audience from accepting the false arguments (note: the strategies had no effect on the person making the false claims). The first is called **topic rebuttal**, familiar to those who have taken debate class: “an advocate can aim to overwhelm the opposing position by providing support only for her own view or she can aim to refute the opposing position by attacking its plausibility and explaining why it is wrong.” The second, **technique rebuttal**, involves pointing out the logical fallacies or tricks that the denier is using and why they may sound appealing but are incorrect. For example, if someone argues that a health product isn’t proven 100% safe, you can point out that inductive reasoning never proves something safe, only that nothing has been found to indicate it is unsafe—it does not follow that something is dangerous because it hasn’t been “proven safe.”
- Parents who are hesitant about the safety of vaccines (“**vaccine hesitant**” or the pejorative “anti-vaxxer”) still statistically show a high level of trust in their child’s doctor but are suspicious of the doctor’s advice on vaccines. This is often because the doctor presents “pros” rather than the “cons,” and parents feel information has been withheld, even if the amount of pro and con information wasn’t equal to begin with.
- All 50 states have laws requiring children attending public school to be vaccinated against diphtheria, tetanus, and pertussis (generally in a DTaP vaccine); polio (an IPV vaccine); measles and rubella

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(generally in an MMR vaccine); and varicella (chickenpox). All 50 states allow medical exemptions, 45 allow for religious exemptions, and 15 allow for philosophical (or personal belief) exemptions. Washington state allows all three exemptions, with the exception of a philosophical exemption for the MMR vaccine (due to the recent MMR bill).

- Due to the measles outbreak in Washington, the Washington State Legislature passed a bill that removes the personal and philosophical exemption for children from the MMR (measles, mumps, and rubella) vaccine required for school and childcare entry, starting in June 2019. Approximately 95% of the population needs to be immunized to prevent outbreaks of the measles. High vaccination rates provide protection to vulnerable populations, such as those who cannot receive vaccinations for medical reasons, those whose immune systems do not respond to vaccines (vaccine failure), and children who are too young to be vaccinated. Much of the debate around vaccine exemption do not revolve around whether vaccines are safe but around personal freedom versus public safety.
- **Climate scientists** project that the number of acres burned by wildfires each year in the Northwest may reach 1.1 million acres by the 2040s.
- Rising temperatures due to climate change means more precipitation falls as rain rather than snow, reducing snowpack levels, and threatening water supplies for many parts of Washington. In many areas, climate change is likely to increase water demand while water supplies are shrinking. In other areas, an increase in precipitation can lead to flooding, degrading water quality and damaging communities and infrastructure.
- **Washington's Department of Ecology** is partnering with other agencies to prepare for sea level rise along Washington's 3,300 miles of coastline.

SOURCES

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