

Misinformation Self Scoring sheet

Parts derived from, Carl Sagan's Fine Art of Baloney Detection, in The Demon-Haunted World: Science as a Candle in the Dark.

Thinking Critically

- Wherever possible there must be **independent confirmation of the "facts."**
- Encourage substantive debate on the evidence by **knowledgeable proponents of all points of view.**
- **Arguments from authority** carry little weight—"authorities" have made mistakes in the past. They will do so again in the future. Perhaps a better way to say it is that in science there are no authorities; at most, there are experts.
- Spin **more than one hypothesis**. If there's something to be explained, think of all the different ways in which it could be explained. Then think of tests by which you might systematically disprove each of the alternatives. What survives, the hypothesis that resists disproof in this Darwinian selection among "multiple working hypotheses," has a much better chance of being the right answer than if you had simply run with the first idea that caught your fancy.*
- Try not to get **overly attached to a hypothesis** just because it's yours. It's only a way station in the pursuit of knowledge. Ask yourself why you like the idea. Compare it fairly with the alternatives. See if you can find reasons for rejecting it. If you don't, others will.
- Quantify. If whatever it is you're explaining has some measure, some numerical quantity attached to it, you'll be much better able to discriminate among competing hypotheses. What is **vague and qualitative is open to many explanations**. Of course there are truths to be sought in the many qualitative issues we are obliged to confront, but finding them is more challenging.
- If there's a **chain of argument**, every link in the chain must work (including the premise)—not just most of them.
- **Occam's Razor**. This convenient rule-of-thumb urges us when faced with two hypotheses that explain the data equally well to choose the simpler.
- Always ask whether the hypothesis can be, at least in principle, falsified. Propositions that are **untestable, unfalsifiable**, are not worth much. Consider the grand idea that our Universe and everything in it is just an elementary particle—an electron, say—in a much bigger Cosmos. But if we can never acquire information from outside our Universe, is not the idea incapable of

disproof? You must be able to check assertions out. Inveterate skeptics must be given the chance to follow your reasoning, to duplicate your experiments and see if they get the same result.

Fallacies

- **ad hominem**—Latin for “to the man,” attacking the arguer and not the argument (e.g., The Reverend Dr. Smith is a known Biblical fundamentalist, so her objections to evolution need not be taken seriously);
- **argument from authority** (e.g., President Richard Nixon should be re-elected because he has a secret plan to end the war in Southeast Asia—but because it was secret, there was no way for the electorate to evaluate it on its merits; the argument amounted to trusting him because he was President: a mistake, as it turned out);
- **argument from adverse consequences** (e.g., A God meting out punishment and reward must exist, because if He didn’t, society would be much more lawless and dangerous—perhaps even ungovernable.* Or: The defendant in a widely publicized murder trial must be found guilty; otherwise, it will be an encouragement for other men to murder their wives);
- **appeal to ignorance**—the claim that whatever has not been proved false must be true, and vice versa (e.g., There is no compelling evidence that UFOs are not visiting the Earth; therefore UFOs exist—and there is intelligent life elsewhere in the Universe. Or: There may be seventy kazillion other worlds, but not one is known to have the moral advancement of the Earth, so we’re still central to the Universe.) This impatience with ambiguity can be criticized in the phrase: absence of evidence is not evidence of absence.
- **special pleading**, often to rescue a proposition in deep rhetorical trouble (e.g., How can a merciful God condemn future generations to torment because, against orders, one woman induced one man to eat an apple? Special plead: you don’t understand the subtle Doctrine of Free Will. Or: How can there be an equally godlike Father, Son, and Holy Ghost in the same Person? Special plead: You don’t understand the Divine Mystery of the Trinity. Or: How could God permit the followers of Judaism, Christianity, and Islam—each in their own way enjoined to heroic measures of loving kindness and compassion—to have perpetrated so much cruelty for so long? Special plead: You don’t understand Free Will again. And anyway, God moves in mysterious ways.)

- **begging the question**, also called assuming the answer (e.g., We must institute the death penalty to discourage violent crime. But does the violent crime rate in fact fall when the death penalty is imposed? Or: The stock market fell yesterday because of a technical adjustment and profit-taking by investors—but is there any independent evidence for the causal role of “adjustment” and profit-taking; have we learned anything at all from this purported explanation?);
- **observational selection**, also called the enumeration of favorable circumstances, or as the philosopher Francis Bacon described it, counting the hits and forgetting the misses* (e.g., A state boasts of the Presidents it has produced, but is silent on its serial killers);
- **statistics of small numbers**—a close relative of observational selection (e.g., “They say 1 out of every 5 people is Chinese. How is this possible? I know hundreds of people, and none of them is Chinese. Yours truly.” Or: “I’ve thrown three sevens in a row. Tonight I can’t lose.”);
- **misunderstanding of the nature of statistics** (e.g., President Dwight Eisenhower expressing astonishment and alarm on discovering that fully half of all Americans have below average intelligence);
- **inconsistency** (e.g., Prudently plan for the worst of which a potential military adversary is capable, but thriftily ignore scientific projections on environmental dangers because they’re not “proved.” Or: Attribute the declining life expectancy in the former Soviet Union to the failures of communism many years ago, but never attribute the high infant mortality rate in the United States (now highest of the major industrial nations) to the failures of capitalism. Or: Consider it reasonable for the Universe to continue to exist forever into the future, but judge absurd the possibility that it has infinite duration into the past);
- **non sequitur**—Latin for “It doesn’t follow” (e.g., Our nation will prevail because God is great. But nearly every nation pretends this to be true; the German formulation was “Gott mit uns”). Often those falling into the non sequitur fallacy have simply failed to recognize alternative possibilities; · **post hoc, ergo propter hoc**—Latin for “It happened after, so it was caused by” (e.g., Jaime Cardinal Sin, Archbishop of Manila: “I know of ... a 26-year-old who looks 60 because she takes [contraceptive] pills.” Or: Before women got the vote, there were no nuclear weapons);

Other methods not from Sagan

- **Follow the money**—Is there financial gain for taking a point of view. Eg. scientists paid by big tobacco to conduct tobacco research and celebrities with “alternative” and expensive cures.
- **Correlation is not causation**
- **Appeal to emotions** - you should be very afraid!
- **Appeal to tribalism (us vs them)**
- **The two expert problem** - People and particularly journalists desire to show all sides of an issue. They may find an expert to represent 99% of all scientists and then someone that represents 1% but create the illusion of parity. 50% of scientists believe one thing and 50% the other.

Toolbox of interventions against online misinformation and manipulation

This is an online supplement for the expert review project “Toolbox of Interventions Against Online Misinformation and Manipulation”

Coordinating authors: Anastasia Kozyreva¹, Philipp Lorenz-Spreen¹, Stefan Herzog¹, Ullrich Ecker², Stephan Lewandowsky^{2,3,4}, and Ralph Hertwig¹

The dynamic tables in this toolkit do not work well on phones. A computer screen is better.

https://interventionstoolbox.mpib-berlin.mpg.de/table_concept.html

Climate denialism tools

[Cranky Uncle game](#)

The [Cranky Uncle game](#) uses cartoons and critical thinking to fight misinformation. The game was developed by Monash University scientist John Cook, in collaboration with creative agency [Goodbeast](#). The game is now available for free on [iPhone](#) and [Android](#). <https://crankyuncle.com/>

[Skeptical Science: Getting skeptical about global warming skepticism](#)

Explaining climate change science & rebutting global warming misinformation
Global warming is real and human-caused. It is leading to large-scale climate change. Under the guise of climate "skepticism", the public is bombarded with misinformation

that casts doubt on the reality of human-caused global warming. This website gets skeptical about global warming "skepticism".

Our mission is simple: debunk climate misinformation by presenting peer-reviewed science and explaining the techniques of science denial. <https://skepticalscience.com/>

Climate change MOOC

MOOCs on covering the climate crisis attract more than 3,800 and can now be taken at anytime, from anywhere. A recent multilingual course on covering the climate crisis is now available as a self-directed course after reaching 3,810 students from 151 countries.

The massive open online courses (MOOCs), "How to cover the climate crisis – and fight disinformation," ran for four weeks, from Aug. 8 to Sept. 4, 2022. They were organized by the Knight Center for Journalism in the Americas with support from Google News Initiative.

<https://knightcenter.utexas.edu/moocs-on-covering-the-climate-crisis-attract-more-than-3800-and-can-now-be-taken-at-anytime-from-anywhere>

By Teresa Mioli October 20, 2022

Some Library Media Literacy Tools

CRAAP test – Currency, Relevancy, Accuracy, Authority, and Purpose

SIFT method – Stop, Investigate the source, Find better coverage, and Trace claims to original source.

CCOW method – Credentials, Claims, Objectives, and Worldview