Fact-Checking 102

The Concepts behind Reliability





In Fact Checking 101, you learned to:

1) **S**top, take your bearings, and find out who is making a claim, and why
2) **I**nvestigate the credibility of the source online
3) **F**ind multiple sources or
   Trace the origin of information to confirm simple facts
4) **E**stablish a source's expertise
5) **D**etermine the consensus of the relevant scientific experts

Now it's time to explore the concepts in more detail.

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1) ***Who is making the claim and why?***

If misinformation is a concern, why should we care about an author's motivation (or implicit purpose)?

Why might someone try to mislead you?

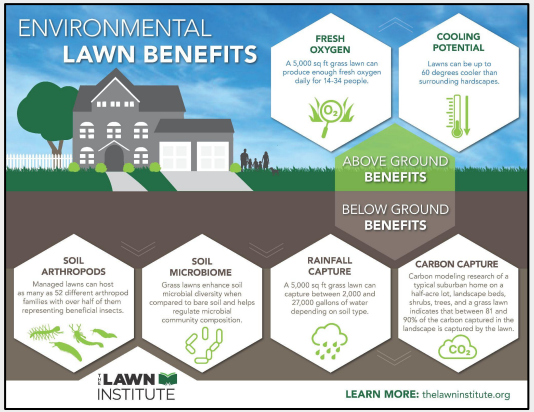
Why might someone try to mislead you?

- a salesperson?
- a CEO deciding their own salary?
- an investment advisor?
- a candidate for political office?
- a public policy that benefits the decision-maker's business or family?
- compensation for supporting a political position (like a bribe or kickback)

Summary: Having a stake in the outcome (profit, power, privilege) defines an ***interest***.

A ***conflict of interest*** exists when someone who serves you is at odds with your welfare.

Drug research *paid for by the manufacturer,* without appropriate critical checks.



The "benefits" of lawns, *presented by the turf industry*, without considering the environmental harm or alternative.

Research on football helmet safety, *sponsored by the National Football League*.

Claims about the safety of hydraulic fracking waste disposal, *from a "dot.org" website funded by the oil industry.*

Do you know or can you find other cases?

Do you know or can you find other cases?

- dietary advice, from the sugared beverage industry?
- exceptional health effects of vitamins, from a vitamin store?
- criticism from a bitter mother of an autistic child who blames a vaccine?
- denial of climate change, from the oil industry?
- low heart disease risks, from the meat industry?

How will you identify a conflict of interest and assess its significance?

How will you identify a conflict of interest and assess its significance?

- Look for signs of bias—commercial, ideological, religious? Race, class, gender?
- Consider the source of funding? (Is it presented openly?)
- Who is the publisher, the host website, or social media feed?
- Is the author's affiliation hidden or obscured?
  (Apply lateral reading?!)
- Check sources with alternate interests.

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Review (1): *Summarize the concept of conflict of interest and describe 2 examples involving public scientific claims.*

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2) Investigate credibility.

What do we mean by “credibility”?

What do we mean by “credibility”?

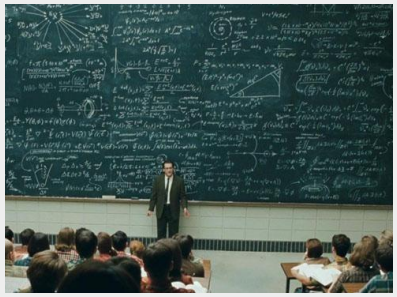
- trust ?
- trust with respect to truth and accuracy?
- quality of information?
- completeness of information?
- transparency?
- openness about sources & interests?

What kinds of trust are there?

What kinds of trust are there?

- promise-keeping?
- loyalty?
- contractual?
- moral judgment?
- fairness?
- leadership?
- knowledge & objectivity?

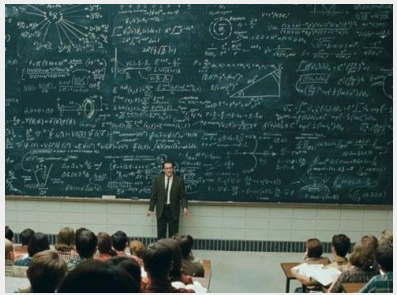





Yes, there are many kinds of trust.
One kind of trust does not imply another.

promise-keeping | loyalty | contractual
moral | fairness | leadership | knowledge





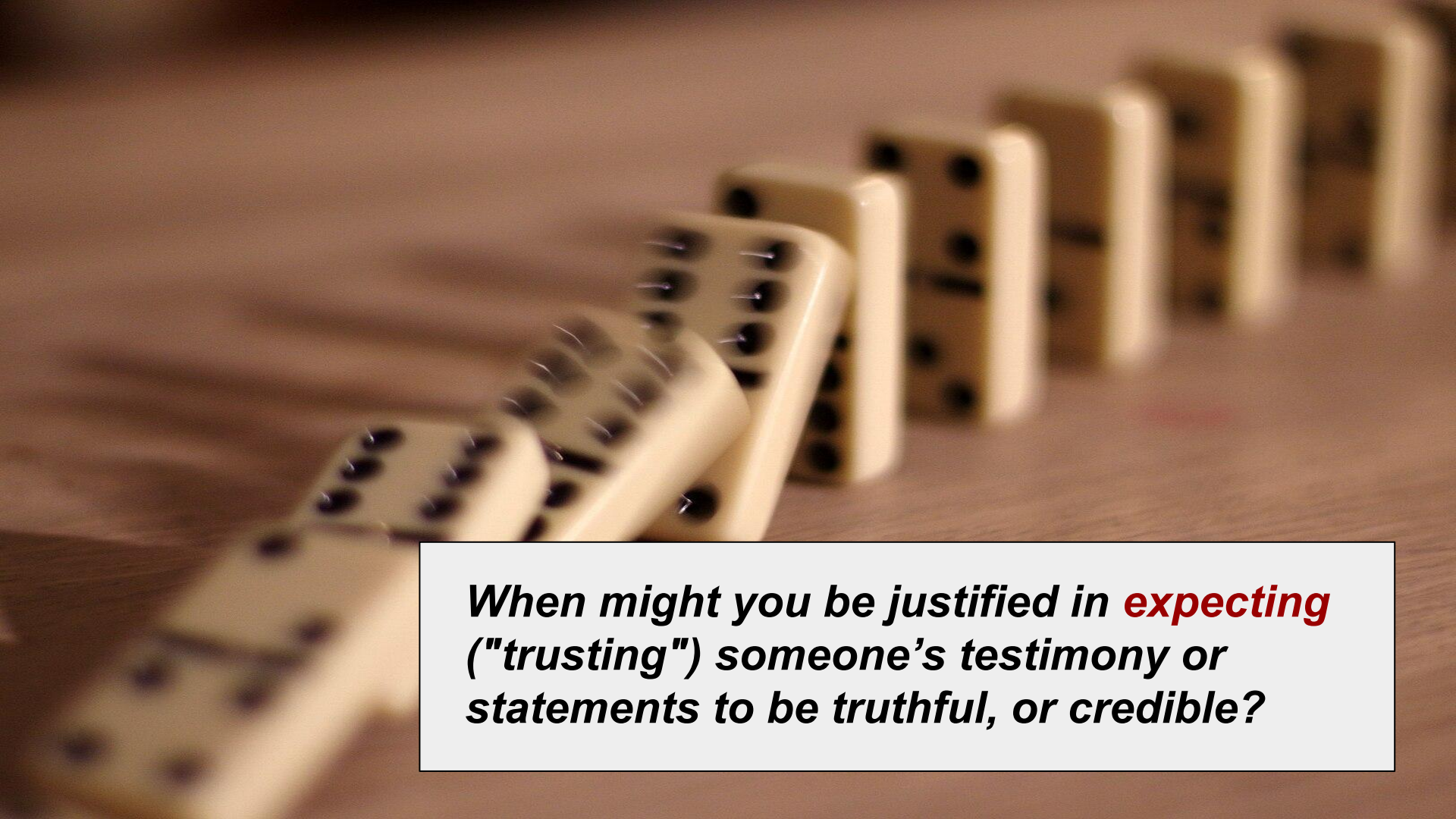

How does trust <u>about knowledge</u> differ from other forms of trust?

How does trust <u>about knowledge</u> differ from other forms of trust?

- based on expertise (depth of knowledge, awareness of possible errors & pitfalls) that can be documented publicly
- **NOT** based on personal relationships or social group (or political affiliation)
- **NOT** based on personal values or personality
- **NOT** based on moral virtues (other than respect for truth maybe)
- **NOT** based on prestige or social status

What is the relationship of trust and expectation?

Similarities? Differences?


When might you be justified in expecting ("trusting") someone's testimony or statements to be truthful, or credible?

When might you be justified in expecting (trusting) someone's testimony or statements to be truthful, or credible?

- track record; or a documented history or pattern of truth-telling (by inductive reasoning)
- system of accountability (negative sanctions for lying or misleading) (by context)
- checking ("calibrating") sources against other sources you know (by analogy)
- recommendations from other trusted sources

Is trust (or “trustworthiness”) a personal judgment, or one that can be assessed objectively, through observable behaviors accessible to all?

Ideally, trustworthiness should be

- ➔ ***justified publicly,***
- ➔ ***transparent, and***
- ➔ ***accountable***

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Review (2): *Summarize the concepts of trust and credibility. Name several core criteria that justify when you can expect reliable scientific claims.*

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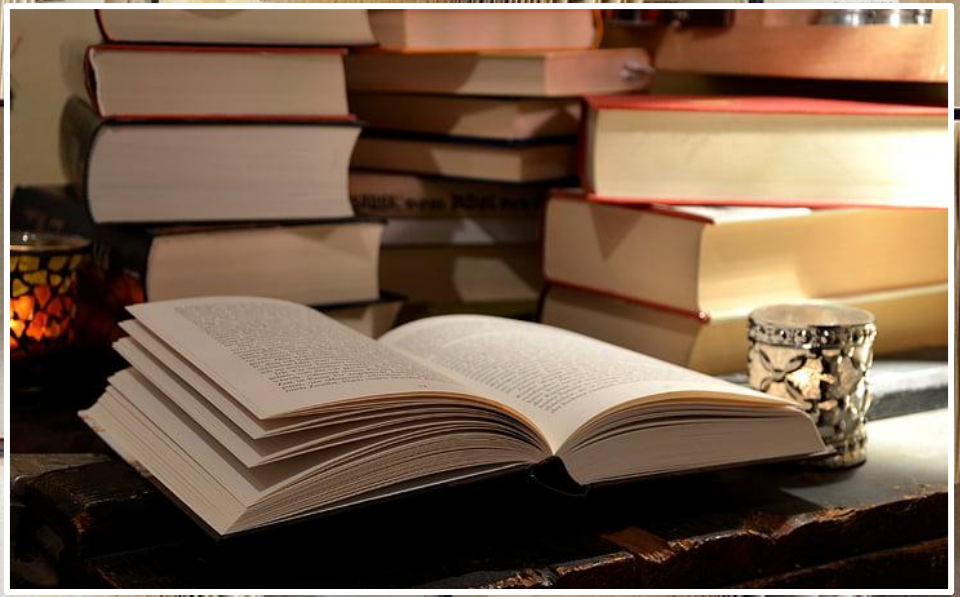
3) Find multiple sources.

Why would consulting only one source leave us vulnerable to misleading information?

So how do multiple sources help? (Why is that valuable?)



So how do multiple sources help? (Why is that valuable?)

- Information is more likely to be complete – fewer "blind spots" or errors.
- Less likely to rely on "cherry-picked" evidence.
- The sampling of views will be more diverse.
- Easier to spot individual biases.
- Independent confirmation adds to reliability.
- Shared conclusions from contrasting positions are more "objective."
- More likely to detect uncertainties, disagreement.

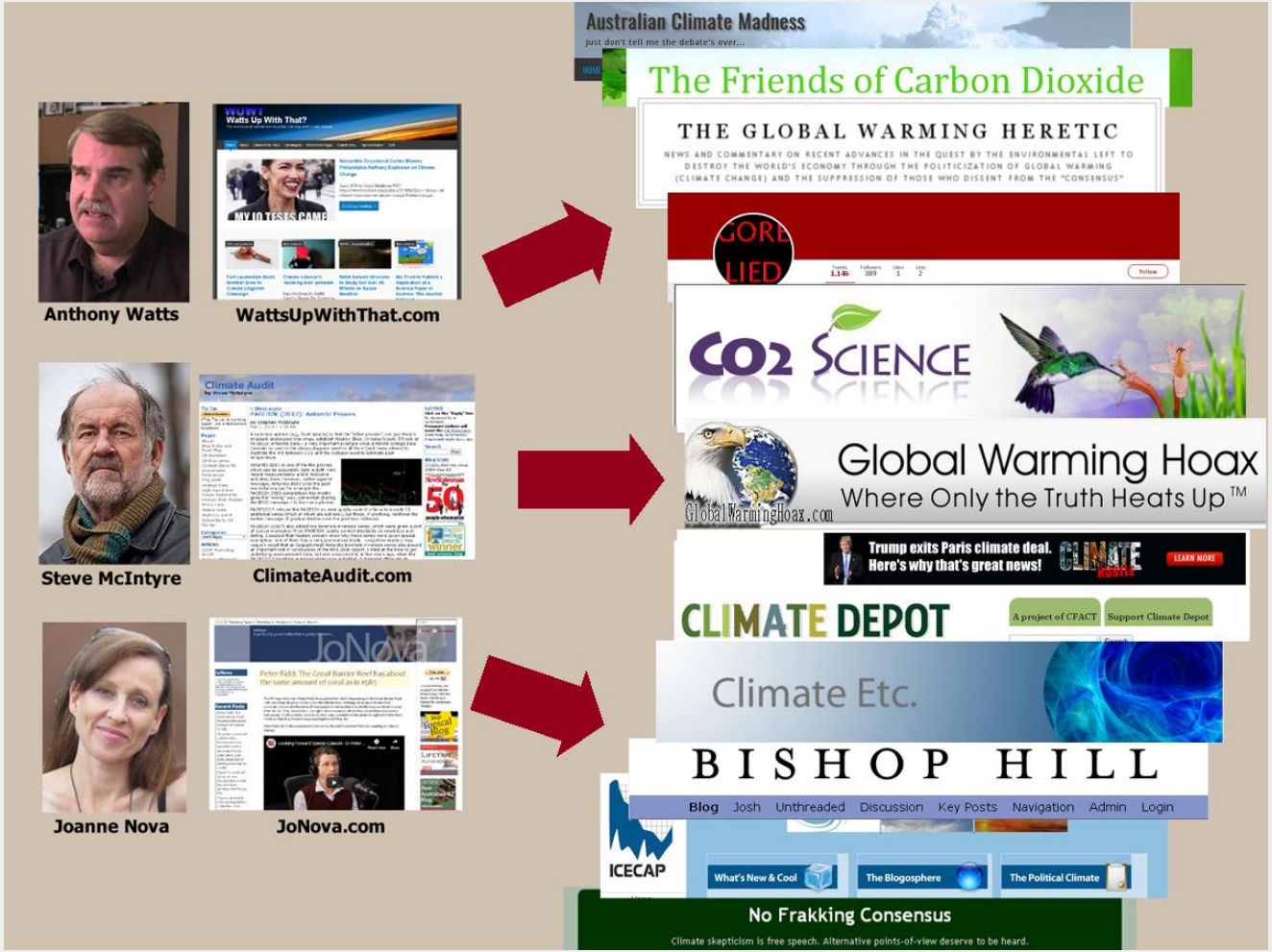
How should you manage multiple sources?

Google

Bing

DuckDuckGo

Internet search engines often foster ***confirmation bias***. They may reflect your prior views – giving what you *want* to find (what your keywords "asked" for), not objective information.



You may find dozens of websites critical of climate change.

However, most of the information comes from just 3 sources.

They give a false impression of agreement among "multiple" sources.

Two-thirds of the social media disinformation on COVID in early 2021 originated from just 12 individuals.

(After they were identified publicly in a research report in May 2021, the social media platform quickly closed the accounts.)

How should you manage multiple sources?

- Seek relatively *neutral* or *“disinterested”* or *“third-party”* perspectives.
- Seek a *diversity* of perspectives.
- Seek *complementary* perspectives, or those that balance each other’s biases.
- Seek *independent* perspectives.

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Review (3): *Describe the value of using multiple sources. Explain the importance of independent sources and of comparing complementary perspectives.*

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4) Establish expertise.

What is expertise?





dentist | lawyer | tech repair | bridge welder | scientist | pilot | accountant | military intel

What criteria should you use to identify experts, or someone with specialized knowledge?

What criteria should you use to identify experts, or someone with specialized knowledge?

- a documented track record, or portfolio
- advanced degree/training
- certification (testing)
- licensing (accountability)
- credentials
- peer recommendations
- professional awards or prizes
- positions of leadership
- (valid) user reviews
- relevant experience

How might someone imitate scientific expertise when they have none?

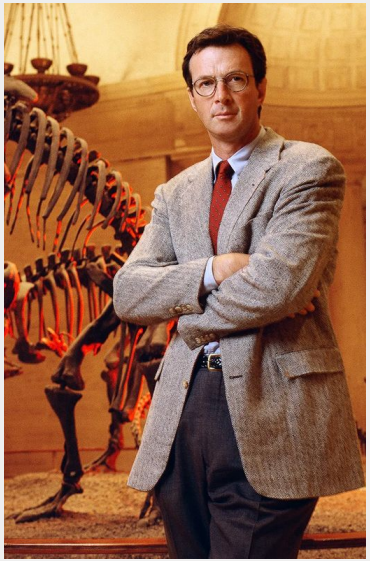
How might someone imitate scientific expertise when they have none?

- present fake credentials?
- invent bogus institutions with impressive names?
- create journals where “peer review” is done by like-minded reviewers?
- others?

***Who* is an expert?**

"Credentials" are not enough.
They must be scientific experts...

Vocal
climate change
"naysayers"



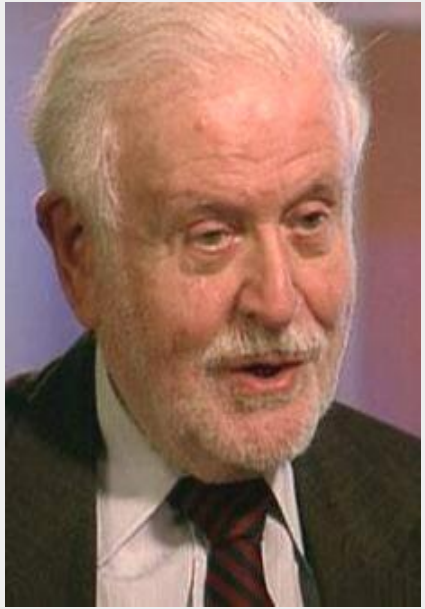
Michael Crichton, renowned science fiction writer – not a scientist

Steve Milloy, founder of junkscience.com – paid for by a libertarian group

James Inhofe, U.S. senator – but not a scientist

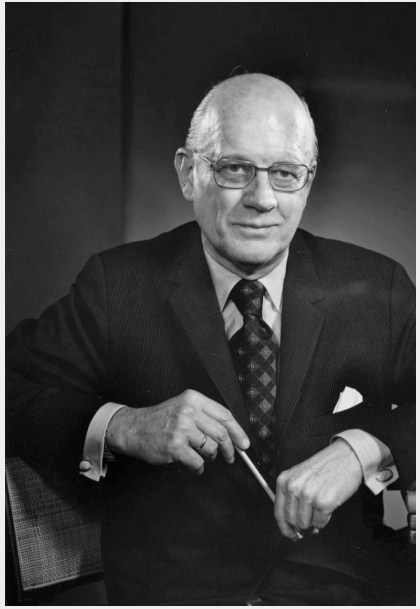
Relevant expertise matters.

More prominent climate change "naysayers"



Fred Singer–an expert on atmospheric physics, but not climate

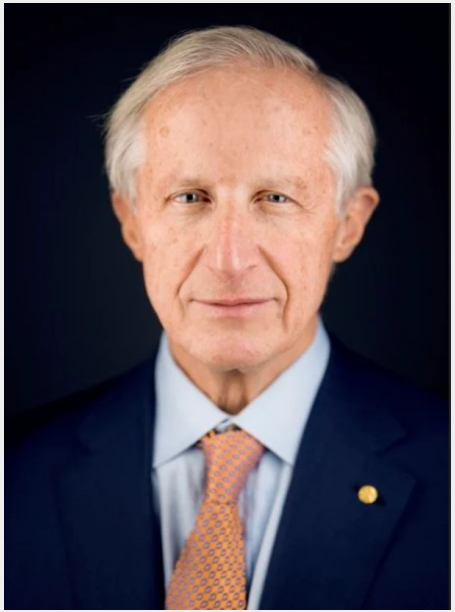
John Coleman–founder of the Weather Channel, but not a climatologist



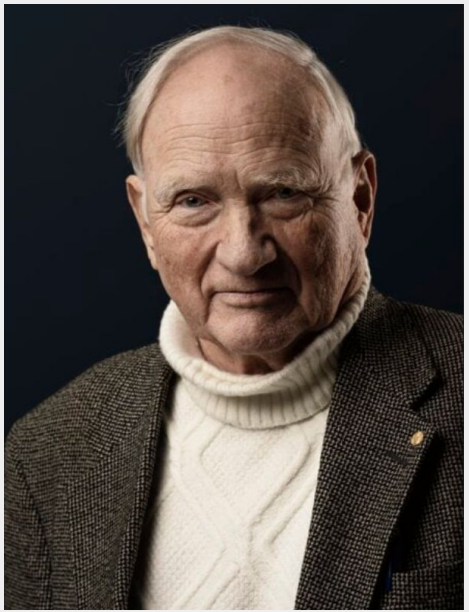
Fred Seitz
solid-state physicist,
defender of tobacco industry

Climate-naysaying Nobel scientists?

Ivar Giaever



William Nordhaus



John Clauser

Even a Nobel Prize does not confer universal scientific expertise.
An expert must have the ***relevant expertise*.**

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Review (4): *Explain what constitutes expertise and how non-experts find and validate experts.*

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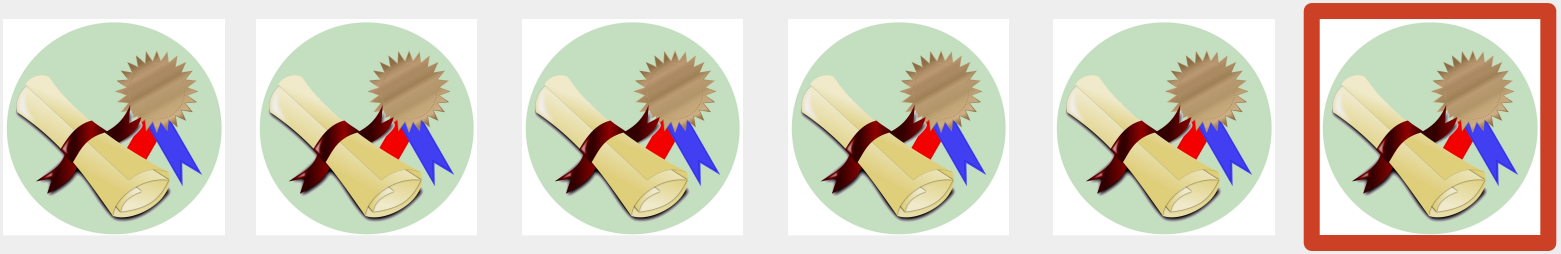
5) Determine the consensus of the relevant scientific experts.

Why might consulting only one expert – even if they have credentials, experience, and so on – leave us vulnerable to misleading information?



Scientists seek **consensus**.

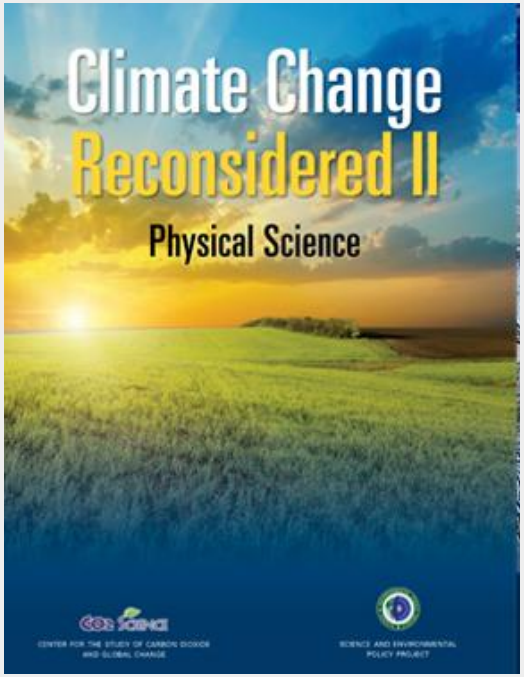
One isolated study, one sample, one expert judgment is not enough.

If there is uniform agreement among a certain group of people, is that a consensus?

Expertise matters.
A genuine consensus depends on the *relevant experts*.

The International Panel on Climate Change (IPCC)--

written by and vetted by experts



An imitation, by the self-named "Nongovernmental International Panel on Climate Change" (NIPCC) -- created by a political think-tank

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THE LEIPZIG DECLARATION ON GLOBAL CLIMATE CHANGE

As independent scientists concerned with atmospheric and climate problems, we – along with many of our fellow citizens – are apprehensive about emission targets and timetables adopted at the Climate Conference held in Kyoto, Japan, in December 1997. This gathering of politicians from some 160 signatory nations aims to impose on citizens of the industrialized nation – but not on others – a system of global environmental regulations that include quotas and punitive taxes on energy fuels to force substantial cuts in energy use within 10 years, with further cuts to follow. Stabilizing atmospheric carbon dioxide – the announced goal of the Climate Treaty –would require that fuel use be cut by as much as 60 to 80 percent – worldwide!

Energy is essential for economic growth. In a world in which poverty is the greatest social pollutant, any restriction on energy use that inhibits economic growth should be viewed with caution. We understand the motivation to eliminate what are perceived to be the driving forces behind a potential climate change; but we believe the Kyoto Protocol – to curtail carbon dioxide emissions from only part of the world community – is dangerously simplistic, quite ineffective, and economically destructive to jobs and standards-of-living.

More to the point, we consider the scientific basis of the 1992 Global Climate Treaty to be flawed and its goal to be unrealistic. The policies to implement the Treaty are, as of now, based solely on unproven scientific theories, imperfect computer models – and the unsupported assumption that catastrophic global warming follows from an increase in greenhouse gases, requiring immediate action. We do not agree. We believe that the dire predictions of a future warming have not been validated by the historic climate record, which appears to be dominated by natural fluctuations, showing both warming and cooling. These predictions are based on nothing more than theoretical models and cannot be relied on to construct far-reaching policies.

As the debate unfolds, it has become increasingly clear that – contrary to the conventional wisdom – there does not exist today a general scientific consensus about the importance of greenhouse warming from rising levels of carbon dioxide. In fact, most climate specialists now agree that actual observations from both weather satellites and balloon-borne radiosondes show no current warming whatsoever–in direct contradiction to computer model results.

Historically, climate has always been a factor in human affairs – with warmer periods, such as the medieval "climate optimum," playing an important role in economic expansion and in the welfare of nations that depend primarily on agriculture. Colder periods have caused crop failures, and led to famines, disease, and other documented human misery. We must, therefore, remain sensitive to any and all human activities that could affect future climate.

However, based on all the evidence available to us, we cannot subscribe to the

Leipzig Declaration (1995)-- an "agreement" on climate change by weathermen, dentists and oil company employees?

Petition

We urge the United States government to reject the global warming agreement that was written in Kyoto, Japan in December, 1997, and any other similar proposals. The proposed limits on greenhouse gases would harm the environment, hinder the advance of science and technology, and damage the health and welfare of mankind.

There is no convincing scientific evidence that human release of carbon dioxide, methane, or other greenhouse gases is causing or will, in the foreseeable future, cause catastrophic heating of the Earth's atmosphere and disruption of the Earth's climate. Moreover, there is substantial scientific evidence that increases in atmospheric carbon dioxide produce many beneficial effects upon the natural plant and animal environments of the Earth.

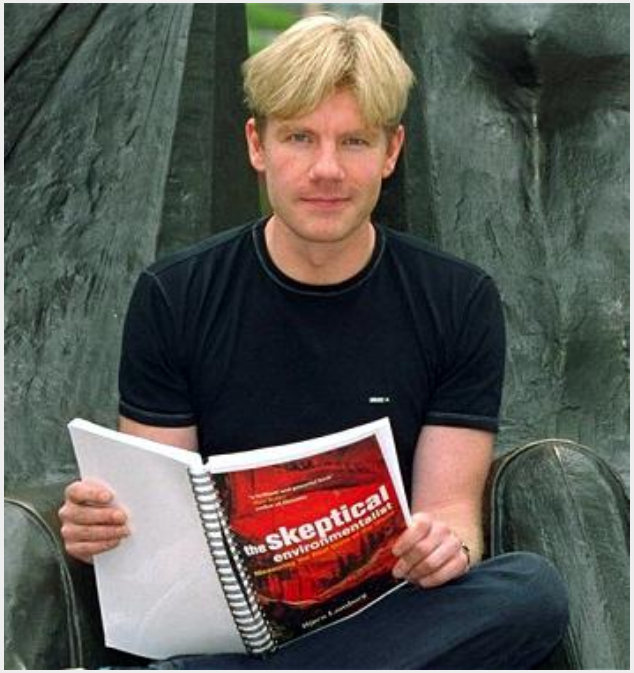
Please sign here

☒ Please send more petition cards for me to distribute.

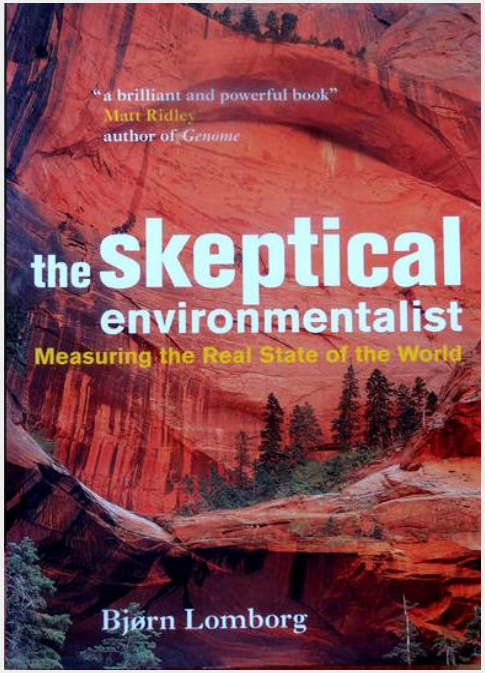
My academic degree is B.S. ☐ M.S. ☐ Ph.D. ☒ in the field of PHYSICS

Oregon Petition (1998, 2007)– over 30,000 signatures

Beware of bogus "consensus" statements, signed by non-experts – no matter how many people signed it.



Bjorn Lomborg



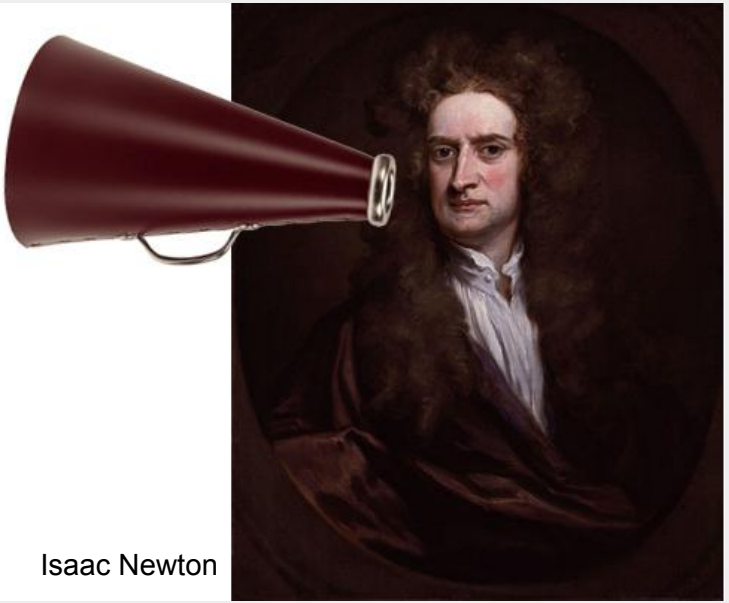
John Christy

Individual scientists, even if they are experts, are not a consensus.

Science also seeks a *critical consensus*.

A reliable claim must withstand scrutiny by considering contrasting views of the evidence.

Gottfried Leibniz



Isaac Newton

Is a simple majority a consensus?

Is a simple majority a consensus?

(NO – it does not necessarily reflect a *critical consensus of the relevant experts*.)

How would you go about finding the scientific consensus – a critical consensus of the scientific experts?

Major U.S. scientific institutions that embody consensus

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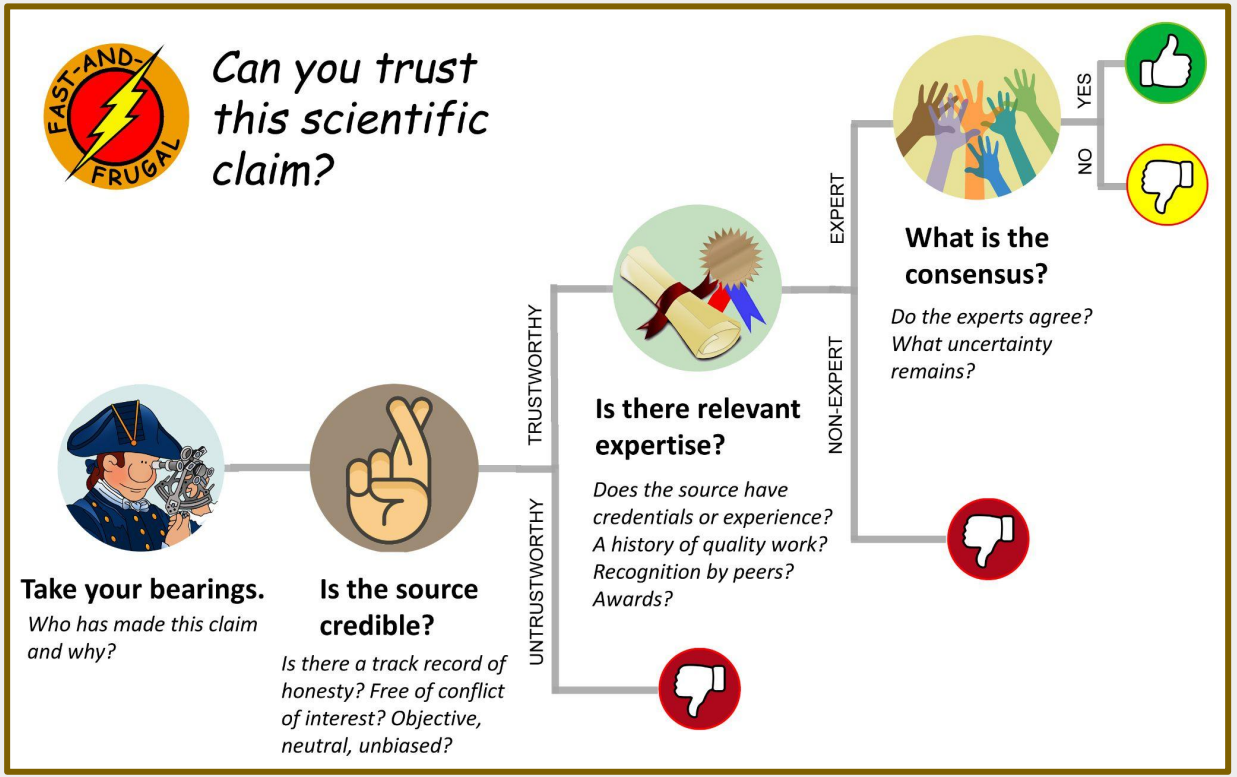
Review (5): ***Describe the role of consensus in science. Explain what reflects a critical consensus.***

In Fact-Checking 101, you encountered a "fast-and-frugal" guide. How might you improve that now?



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Conflict of Interest

Credibility & Trust

Multiple Sources

Expertise

Consensus

Review:

- ***What have you learned about the reliability of sources?***