


Debunking misinformation about your science

JOHN COOK

 MONASH
CLIMATE CHANGE
COMMUNICATION
RESEARCH HUB

 **Skeptical
Science**

The background of the slide is a dark blue gradient. On the left side, there are several interlocking gears of different sizes, rendered in a slightly lighter blue. On the right side, there is a faint, stylized map of the world, also in a light blue color. The text is centered in the middle of the slide.

How does
misinformation
do damage?

Inoculating the Public against Misinformation about Climate Change

Sander van der Linden, Anthony Leiserowitz, Seth Rosenthal, and Edward Maibach*

Effectively addressing climate change requires significant changes in individual and collective human behavior and decision-making. Yet, in light of the increasing politicization of (climate) science, and the attempts of vested-interest groups to undermine the scientific consensus on climate change through organized “disinformation campaigns,” identifying ways to effectively engage with the public about the issue across the political spectrum has proven difficult. A growing body of research suggests that one promising way to counteract the politicization of science is to convey the high level of normative agreement (“consensus”) among experts about the reality of human-caused climate change. Yet, much prior research examining public

Polarization can be amplified when the inherent uncertainty of science itself is used to cast doubt on the existence of a scientific consensus.^[8] For example, ideologically motivated, vested-interest groups known as “Merchants of Doubt” have orchestrated influential “disinformation campaigns” in which they publicly dispute the scientific consensus on various issues, including human-caused climate change.^[9,10] These campaigns have not only successfully undermined public

Scientific consensus



97%

OF CLIMATE SCIENTISTS
AGREE ON GLOBAL
WARMING

Global Warming Petition Project

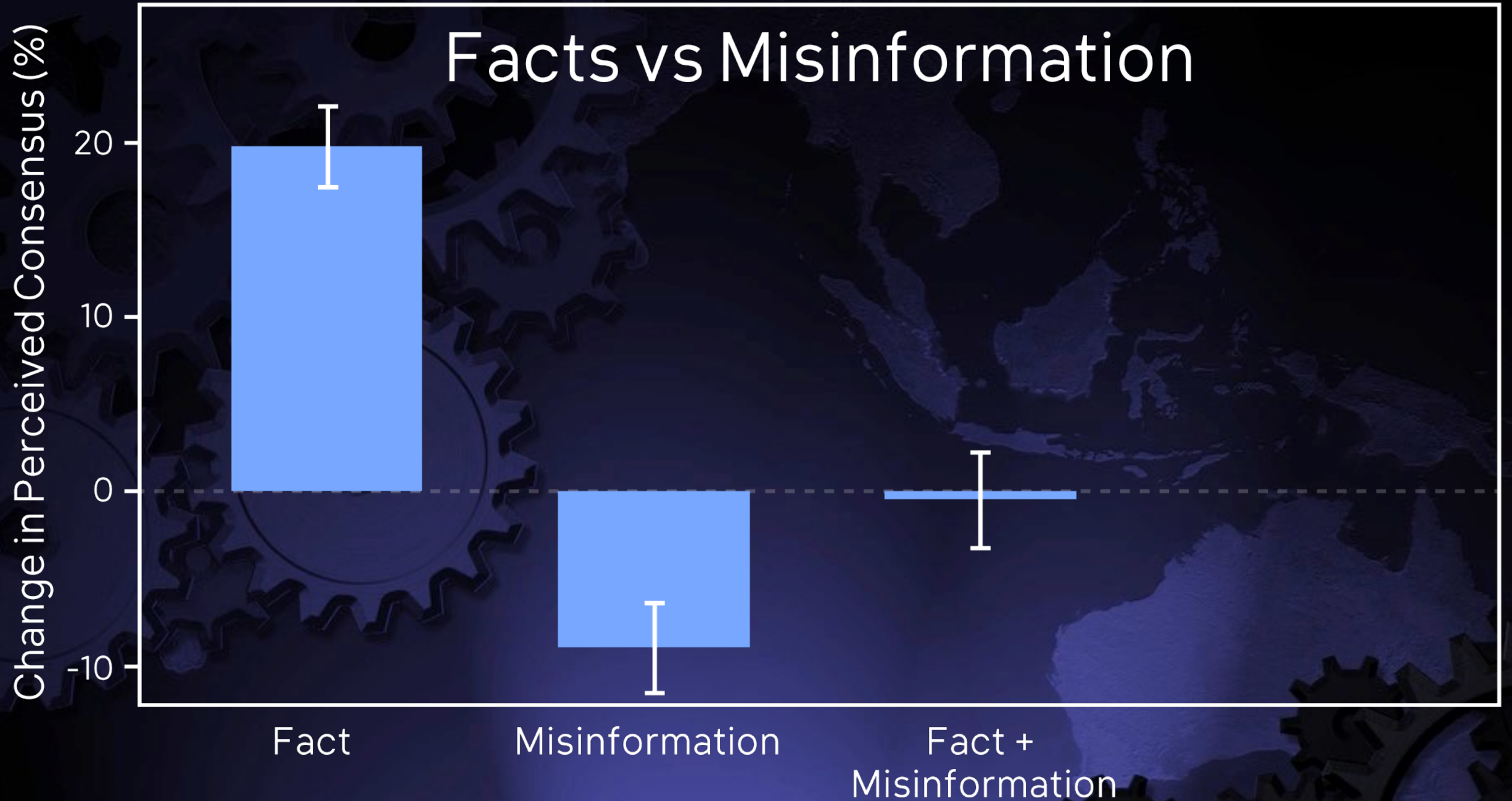
*31,487 American scientists have signed this petition,
including 9,029 with PhDs*

Petition

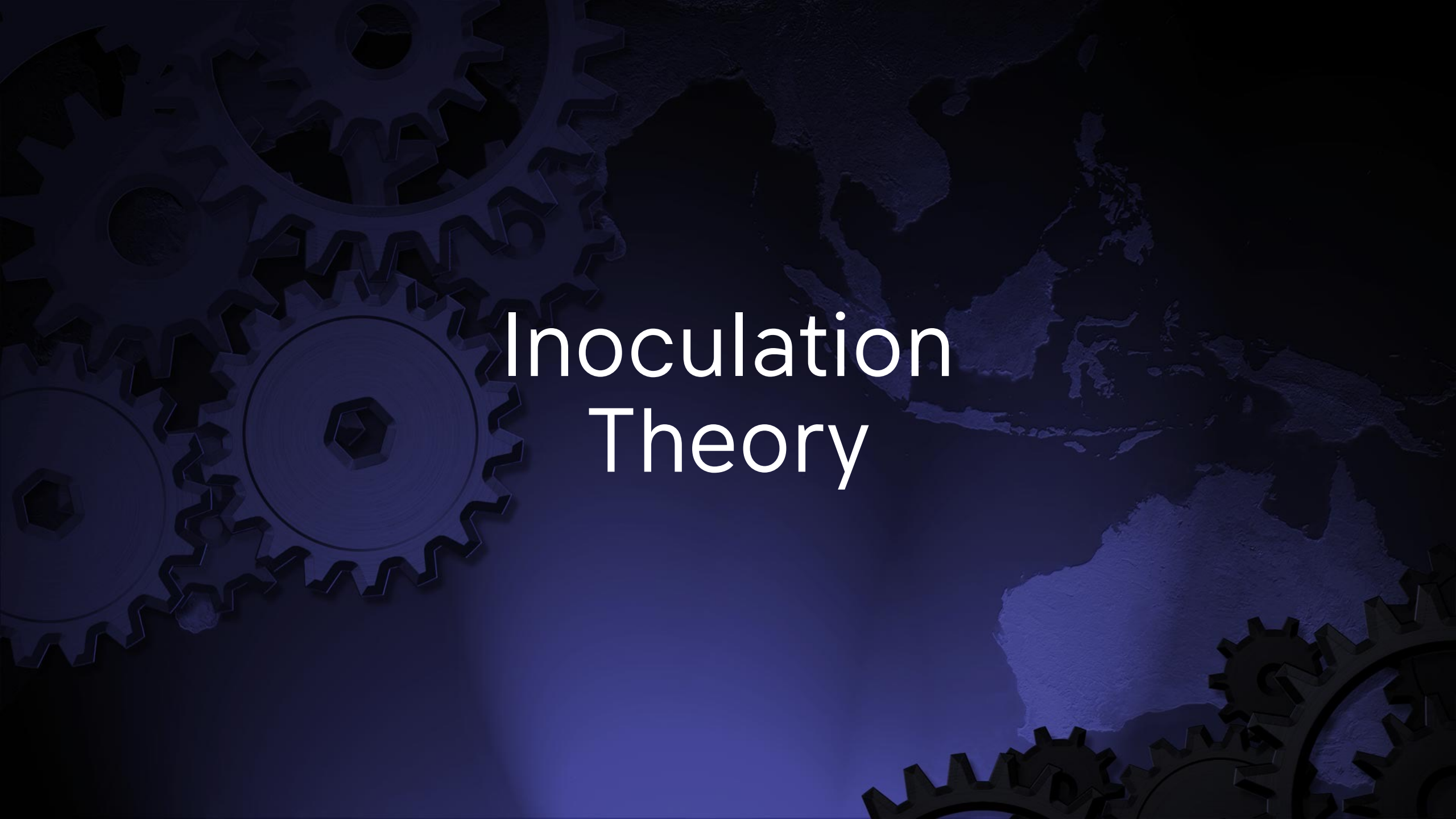
We urge the United States government to reject the global warming agreement that was written in Kyoto, Japan in December, 1997, and any other similar proposals. The proposed limits on greenhouse gases would harm the environment, hinder the advance of science and technology, and damage the health and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

Facts vs Misinformation





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Inoculation Theory

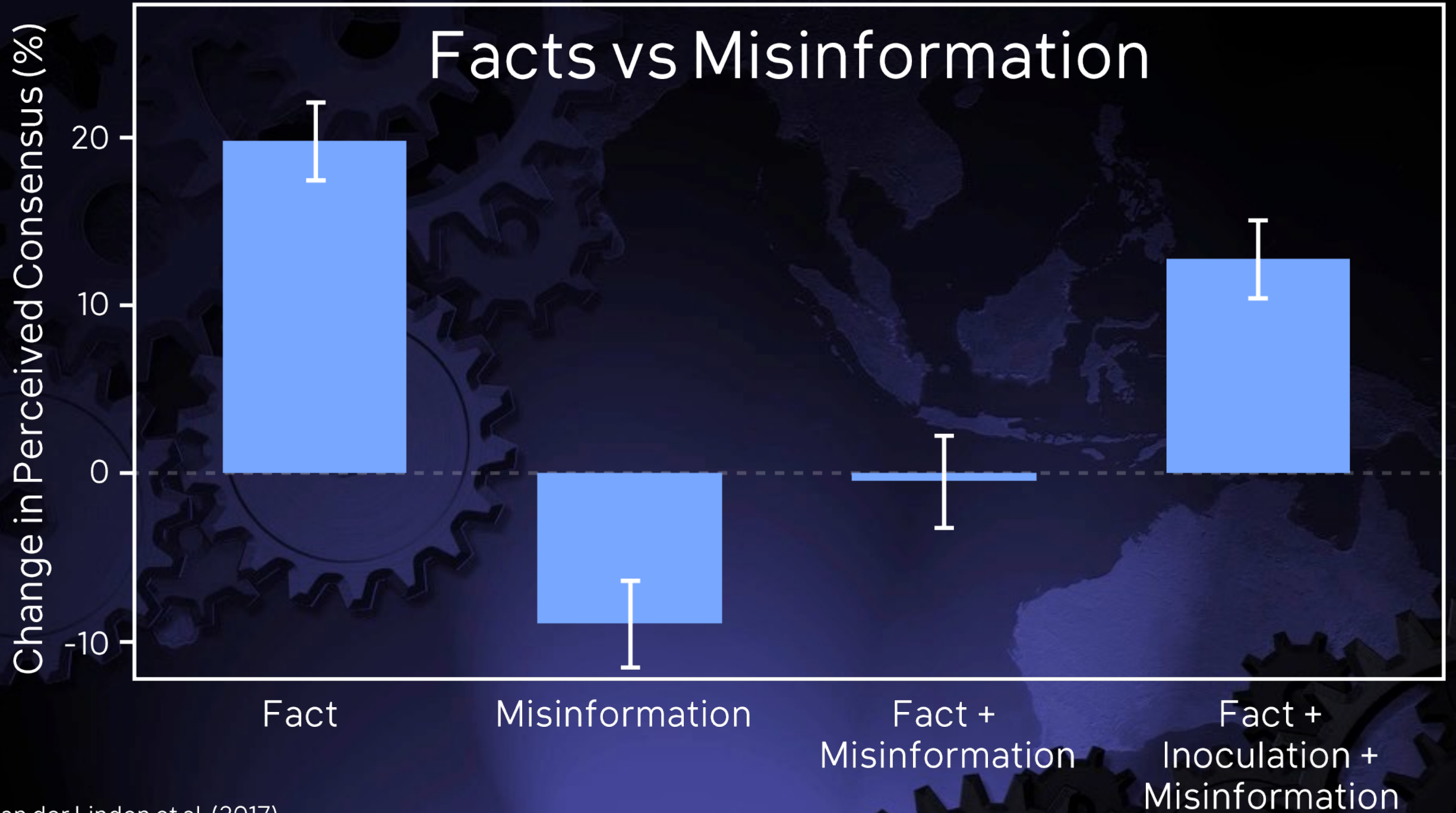
Warning Before Misinformation

... several independent investigations have concluded that the “Petition Project” is extremely misleading. For instance, many of the signatures on the petition are fake (for example, past signatories have included the long deceased Charles Darwin, members of the Spice Girls, and fictional characters from Star Wars). Also, although 31,000 may seem like a large number, it actually represents less than 0.3% of all US science graduates (a tiny fraction). Further, nearly all of the legitimate signers have no expertise in climate science at all.

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Facts vs Misinformation



RESEARCH ARTICLE

Neutralizing misinformation through inoculation: Exposing misleading argumentation techniques reduces their influence

John Cook^{1,2*}, Stephan Lewandowsky^{2,3}, Ullrich K. H. Ecker²

Abstract

Misinformation can undermine a well-functioning democracy. For example, public misconceptions about climate change can lead to lowered acceptance of the reality of climate change and lowered support for mitigation policies. This study experimentally explored the impact of misinformation about climate change and tested several pre-emptive interventions designed to reduce the influence of misinformation. We found that false-balance

Global Warming Petition Project

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Promoting “fake experts” to manufacture doubt about science

Sometimes, inconvenient scientific facts threaten the interests of industry groups and organisations. For example, the scientific evidence linking smoking with lung cancer threatened the profits of the tobacco industry. Similarly, scientific evidence linking fossil fuel emissions with global warming threatens the profits of the fossil fuel industry.

According to a recent nationwide survey:

MORE DOCTORS SMOKE CAMELS THAN ANY OTHER CIGARETTE

YOUR “T-ZONE” WILL TELL YOU ...
T for Taste ...
T for Throat ...
that's your proving ground for any cigarette. See if Camels don't suit your “T-Zone” to a “T.”



● Not a single branch of medicine was overlooked in this nationwide survey made by three leading independent research organizations. To 113,597 doctors from Canada to Mexico, from the Atlantic to the Pacific went the query — *What cigarette do you smoke, Doctor?*
The brand named most was Camel.
Like anyone else, a doctor smokes for pleasure. He appreciates rich, full flavor and cool mildness just as any other smoker. If you don't happen to be a Camel smoker now, try Camels. Let your “T-Zone” give you the answer.

Camels

Costlier
Tobaccos

In these cases, a common tactic for industry groups and organisations is to manufacture doubt about the science through the promotion of “**fake experts**”. Fake experts are spokespeople who convey the impression of expertise in a given area without possessing actual relevant experience. Groups wishing to cast doubt on science often use fake experts to convince the public that the science isn't settled.

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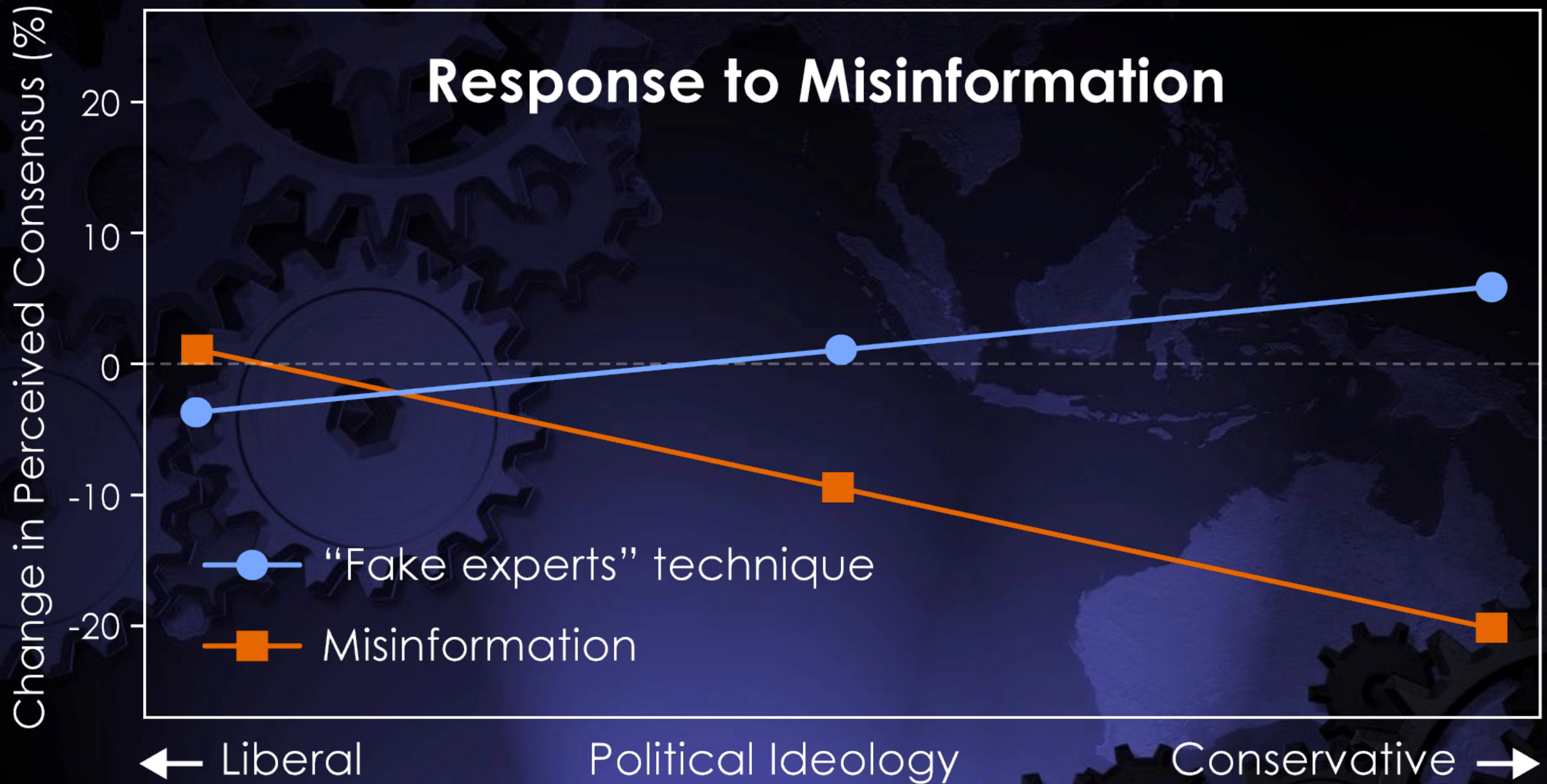
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Camels *Costlier Tobaccos*

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Response to Misinformation



Techniques of Science Denial

F



Fake
Experts

L



Logical
Fallacies

I



Impossible
Expectations

C

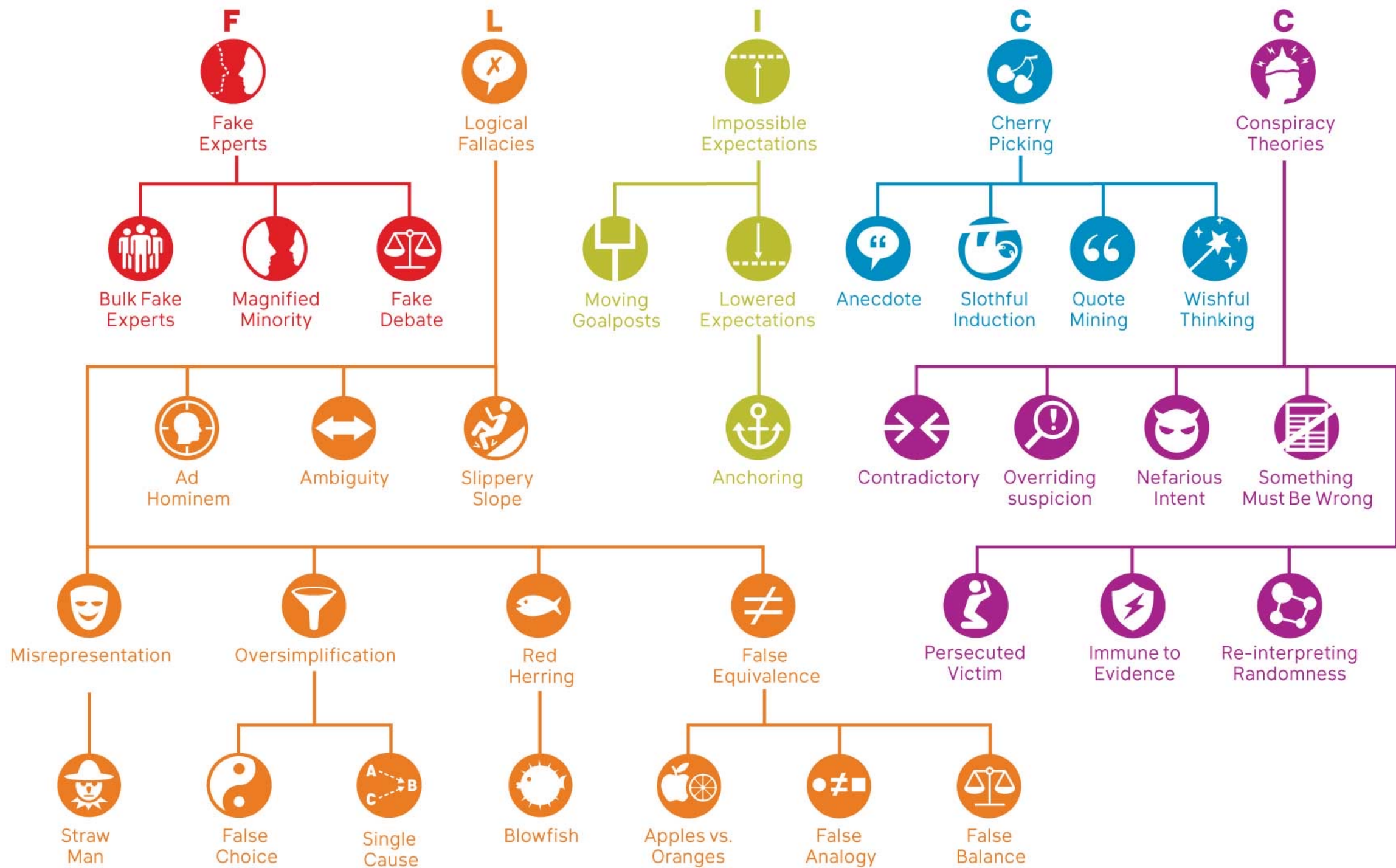


Cherry
Picking

C



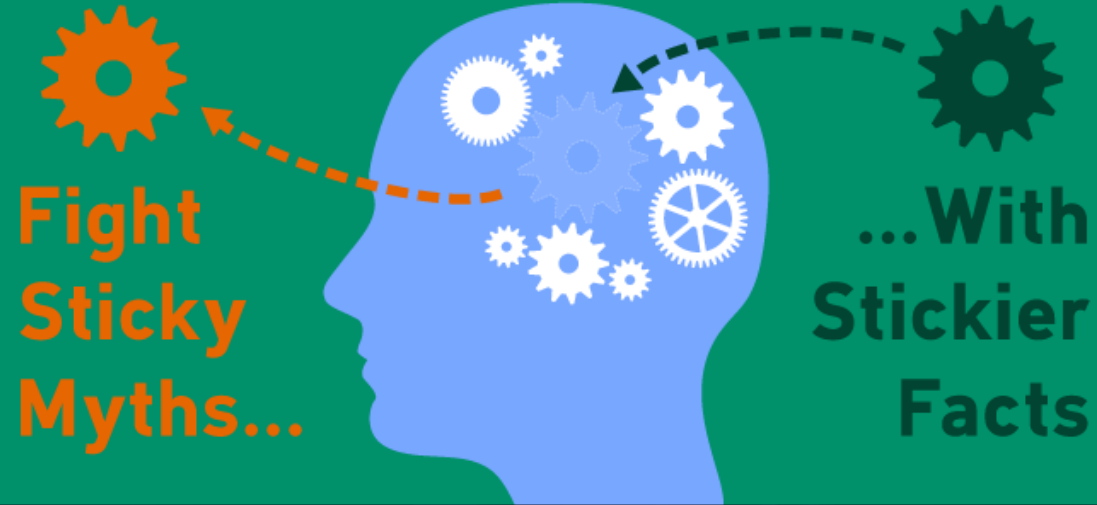
Conspiracy
Theories



3 ELEMENTS TO AN EFFECTIVE DEBUNKING

FACT

Replace the myth with a more compelling and memorable fact



MYTH/MISCONCEPTION

Warn people before mentioning the myth so they're cognitively on guard

FALLACY

Explain the technique used by the myth to distort the fact.



Fake Experts



Logical Fallacies



Impossible Expectations



Cherry Picking



Conspiracy Theories

The PROSTITUTION MYTH

**Get
rich.
Work
in
prostitution.**

The UGLY TRUTH

Pimps keep most of the profits, and prostituted people too often pay with their lives.

Many people in the sex trade were recruited by pimps who use the threat of violence to force them to meet daily quotas. And because violence against prostituted people is common, they far too often pay the ultimate price.

World
Without
Exploitation

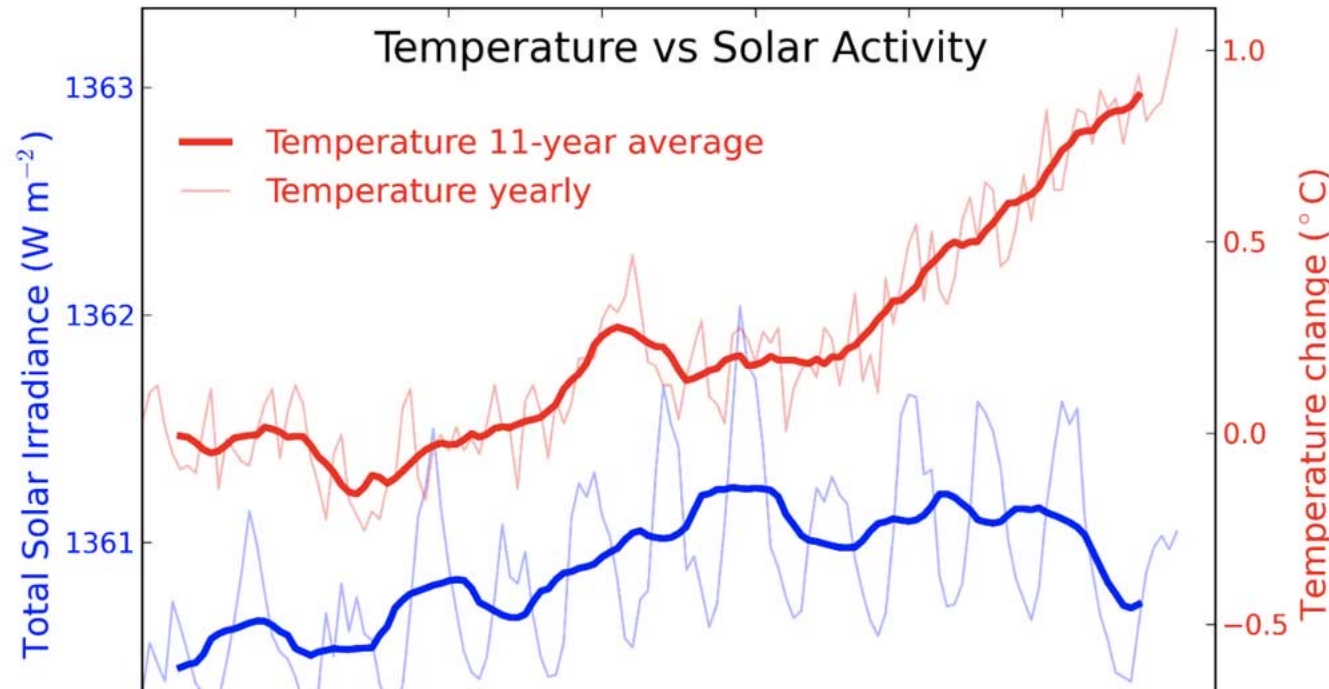
It's the sun

Climate Myth...





"Over the past few hundred years, there has been a steady increase in the numbers of sunspots, at the time when the Earth has been getting warmer. The data suggests solar activity is influencing the global climate causing the world to get warmer." (BBC)

Over the last 35 years the sun has shown a cooling trend. However global temperatures continue to increase. If the sun's energy is decreasing while the Earth is warming, then the sun can't be the main control of the temperature.



Figure 1 shows the trend in global temperature compared to changes in the amount of solar energy that hits the Earth. The sun's energy fluctuates on a cycle that's about 11 years long. The energy changes by about 0.1% on each cycle. If the Earth's temperature was controlled mainly by the sun, then it should have cooled between 2000 and 2008.





Search... **GO**


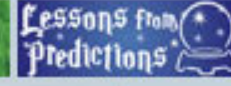






Posts Comments Email



OA not OK

MOST USED Climate Myths

and what the science really says...

- 1 Climate's changed before
- 2 It's the sun
- 3 It's not bad
- 4 It's cooling
- 5 There is no consensus
- 6 Models are unreliable
- 7 Temp record is unreliable
- 8 Animals and plants can adapt
- 9 It hasn't warmed since 1998



Solar activity & climate: is the sun causing global warming?

The skeptic argument...

[Link to this page](#)

It's the sun

"Over the past few hundred years, there has been a steady increase in the numbers of sunspots, at the time when the Earth has been getting warmer. The data suggests solar activity is influencing the global climate causing the world to get warmer." (BBC)

What the science says...

Select a level...

● Basic

■ Intermediate

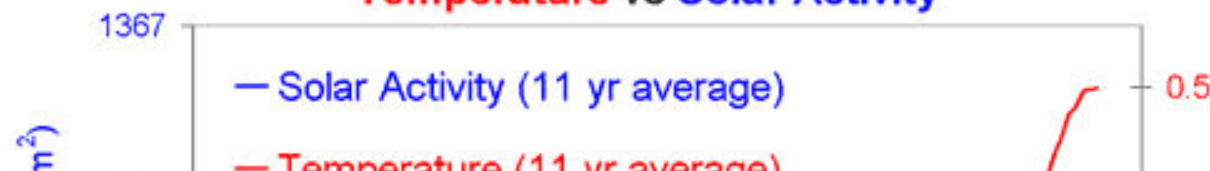
◆ Advanced

In the last 35 years of global warming, sun and climate have been going in opposite directions

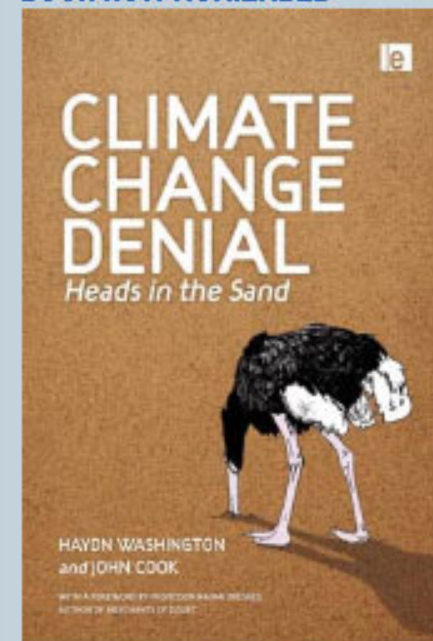
Until about 1960, measurements by scientists showed that the brightness and warmth of the sun, as seen from the Earth, was increasing. Over the same period temperature measurements of the air and sea showed that the Earth was gradually warming. It was not surprising therefore for most scientists to put two and two together and assume that it was the warming sun that was increasing the temperature of our planet.

However, between the 1960s and the present day the same solar measurements have shown that the energy from the sun is now decreasing. At the same time temperature measurements of the air and sea have shown that the Earth has continued to become warmer and warmer. This proves that it cannot be the sun; something else must be causing the Earth's temperature to rise.

Temperature vs Solar Activity



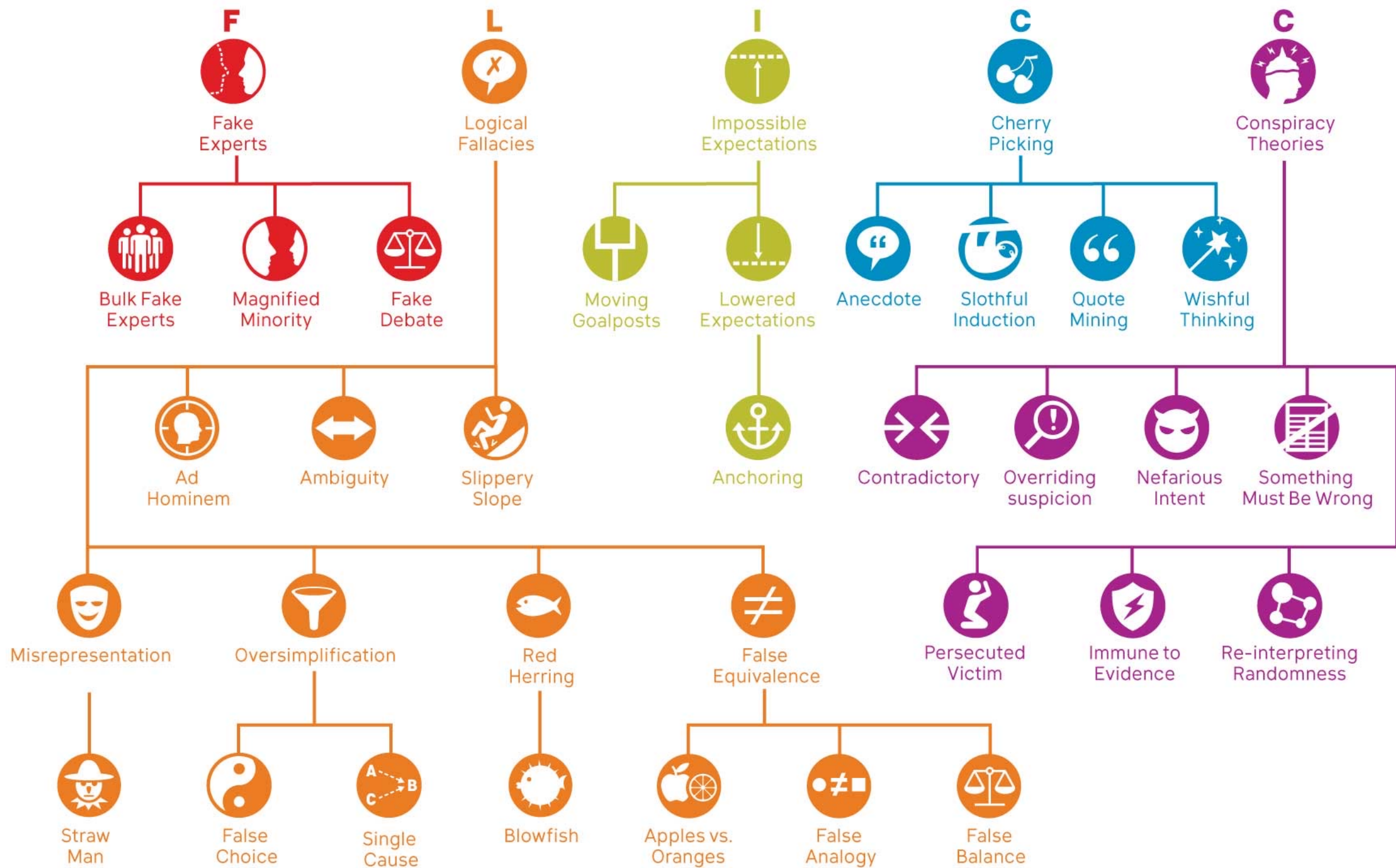
BOOK NOW AVAILABLE



The Scientific Guide to Global Warming Skepticism



Smartphone Apps



Challenges of misinformation

1. Psychological: critical thinking is hard!
2. Structural: how to reach siloed communities.
3. Social: climate change is tribal.

v1.0

"Cranky Classic"

Dec 2020



v2.0

Multi-lingual

Jan 2022



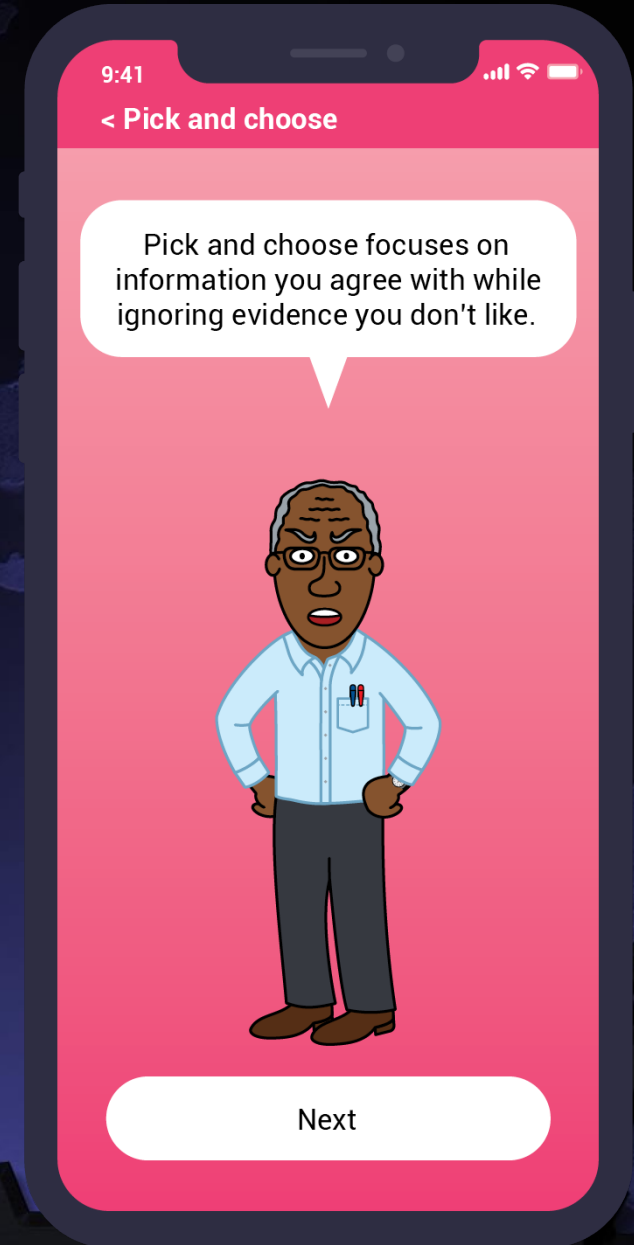
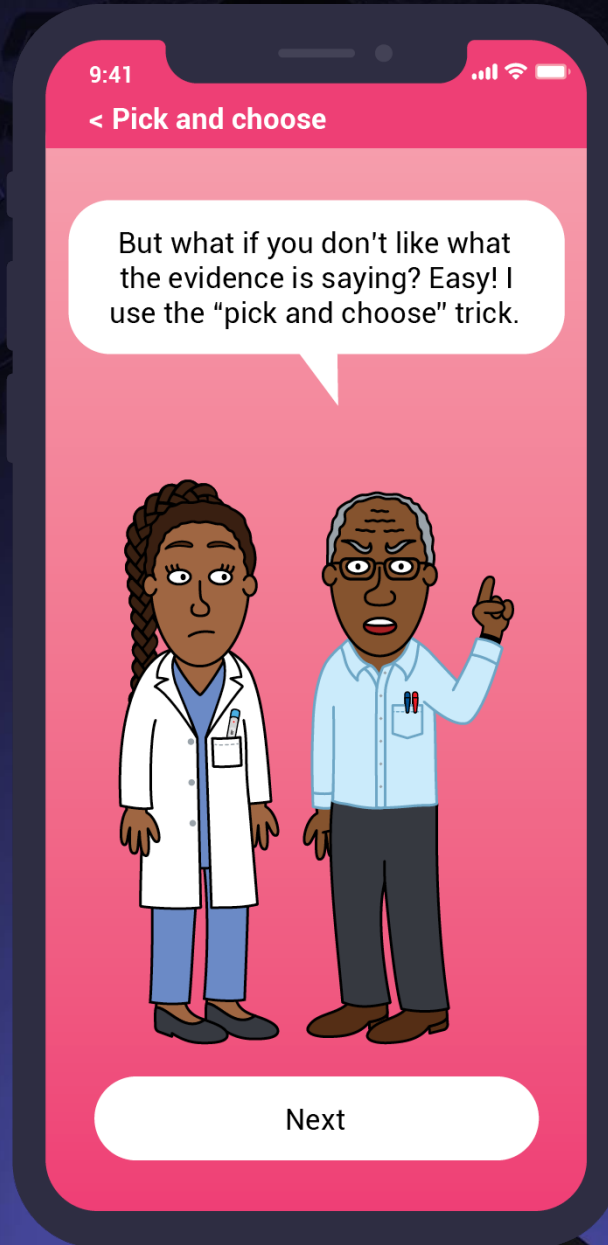
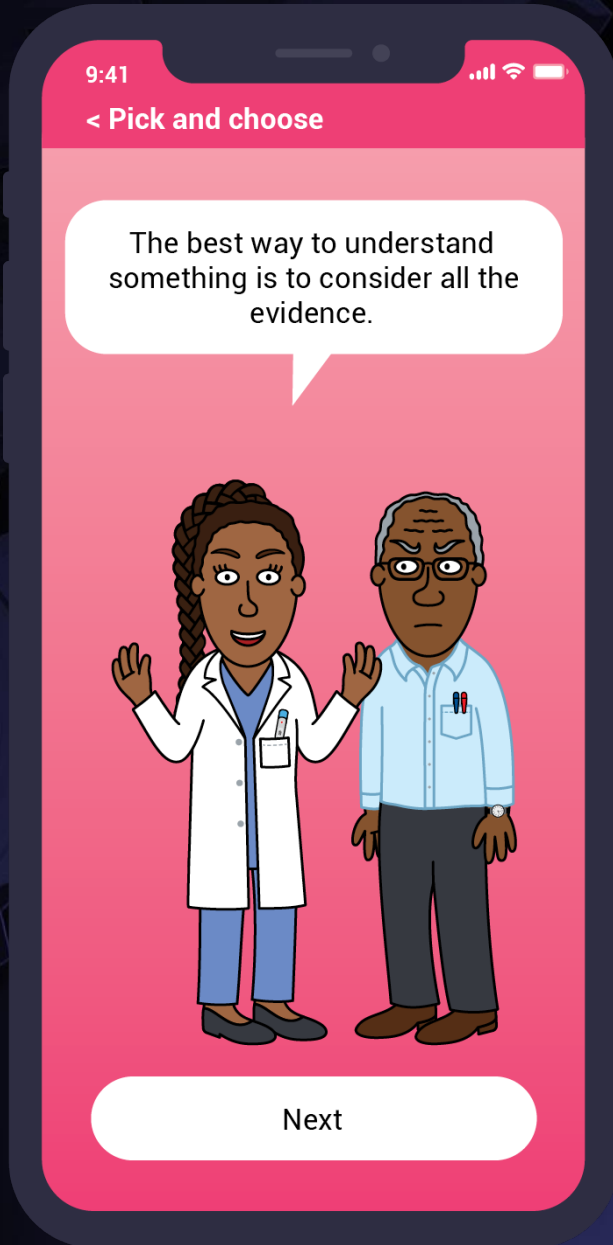
v3.0

Vaccine Edition

Mid-2022



Explanations of misinformation techniques




Quiz questions (practise critical thinking)

9:41

Name That Fallacy!

My favourite movie is perfect if you focus on the good scenes and ignore the bad parts.



False cause

Pick and choose


Evil intent

Misrepresentation

9:41

Name That Fallacy!

I heard someone went vegetarian and got really sick. Vegetarianism is unhealthy!



Impossible expectations

Personal stories


Natural is best

False cause

9:41

Name That Fallacy!

You drive a car so you can't complain about pollution!



Impossible expectations

False cause

Personal attack

Personal stories

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Web: crankyuncle.com

YouTube: [sks.to/youtube](https://www.youtube.com/sks.to/youtube)