

Building resilience against misinformation through critical thinking

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CENTER *for*
CLIMATE CHANGE
COMMUNICATION



Skeptical
Science



INOCULATION THEORY

**Warning
of threat**

+

**Counter-a
rguments**

3 Types of Inoculation

Fact-based

Correcting misinformation with scientific information.

Source-based

Discrediting misinforming sources.

Logic-based

Explaining misleading techniques & fallacies.



Logic-based inoculation: a universal vaccine against misinformation

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.



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 113,997 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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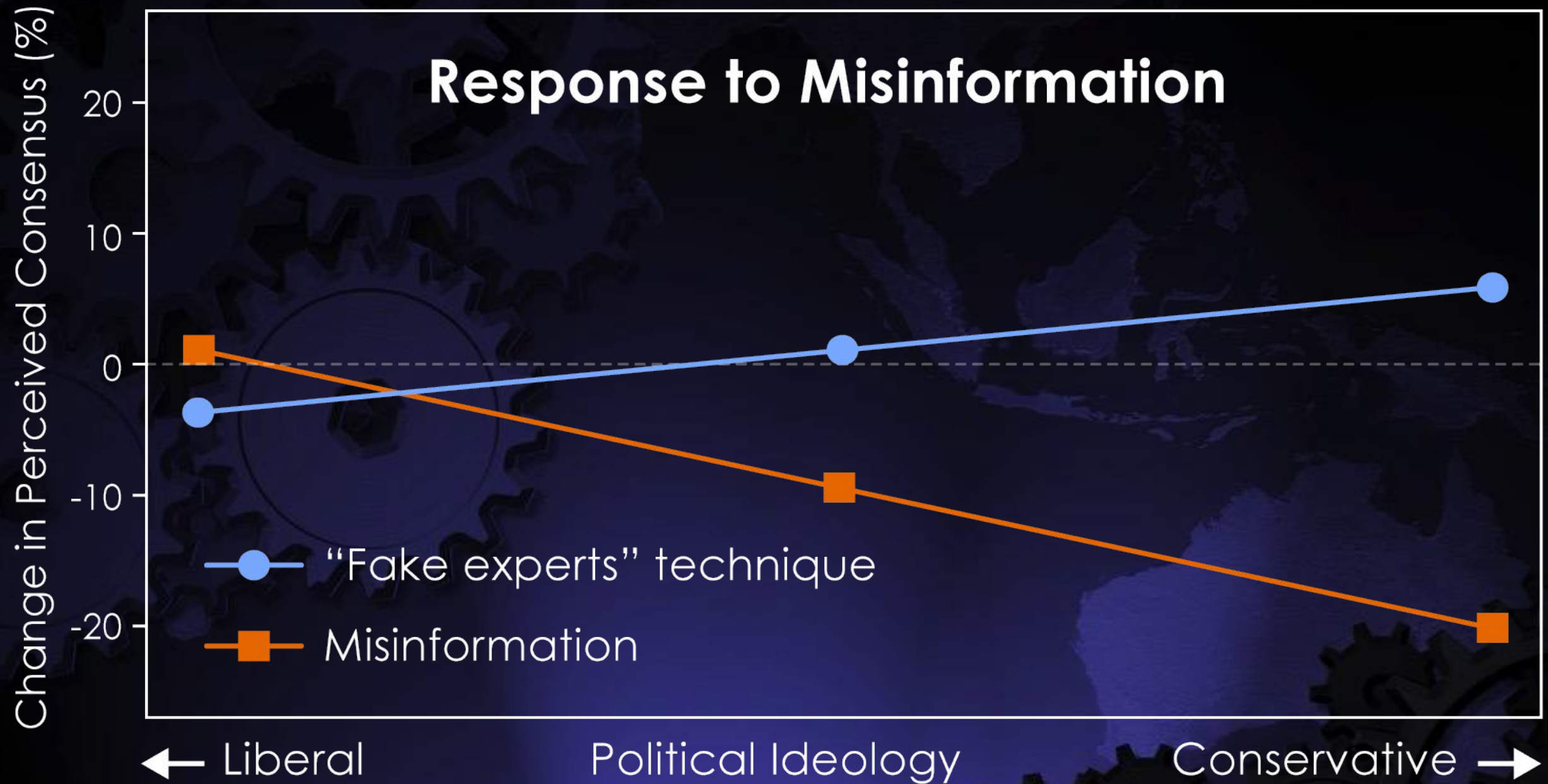
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Response to Misinformation



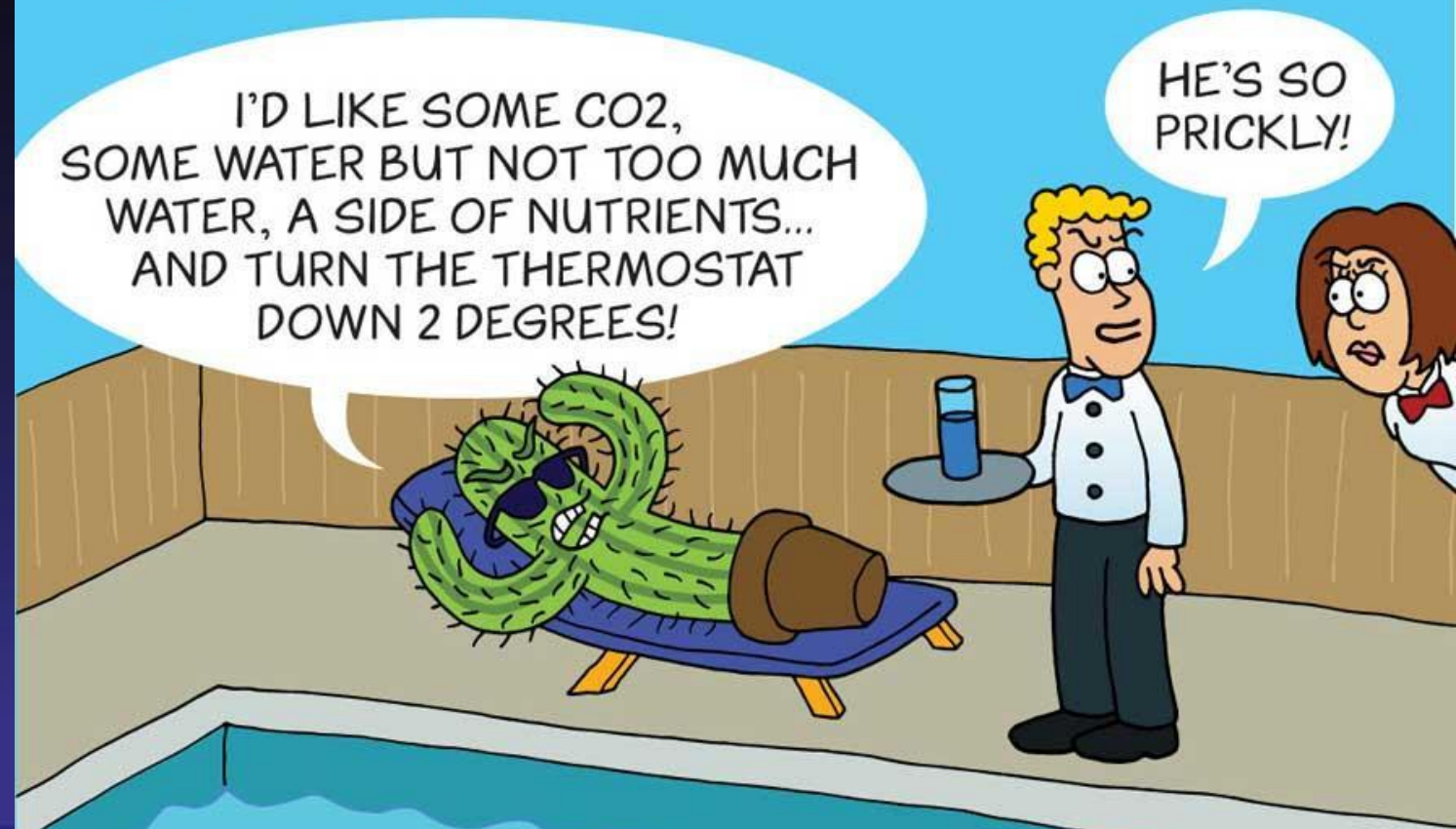


Logic is more resilient
than facts

Fact-based correction

Debunking the myth "CO₂ is plant food"

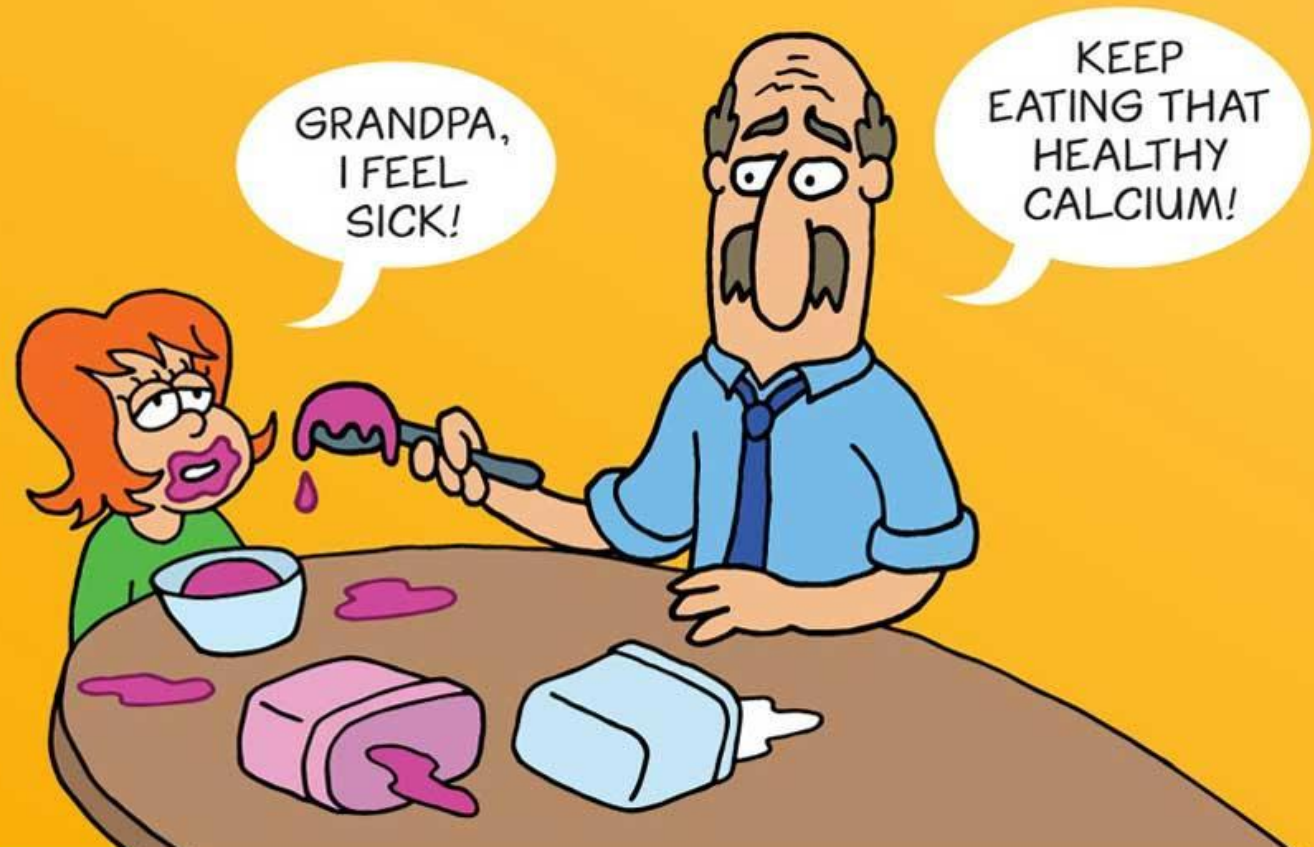
Climate change caused by CO₂ results in heat waves and increased flooding. While plants do use CO₂ to grow, CO₂ emissions ultimately harm plant growth. Plants are fussy—they need a comfortable temperature range and the right amount of water to flourish.



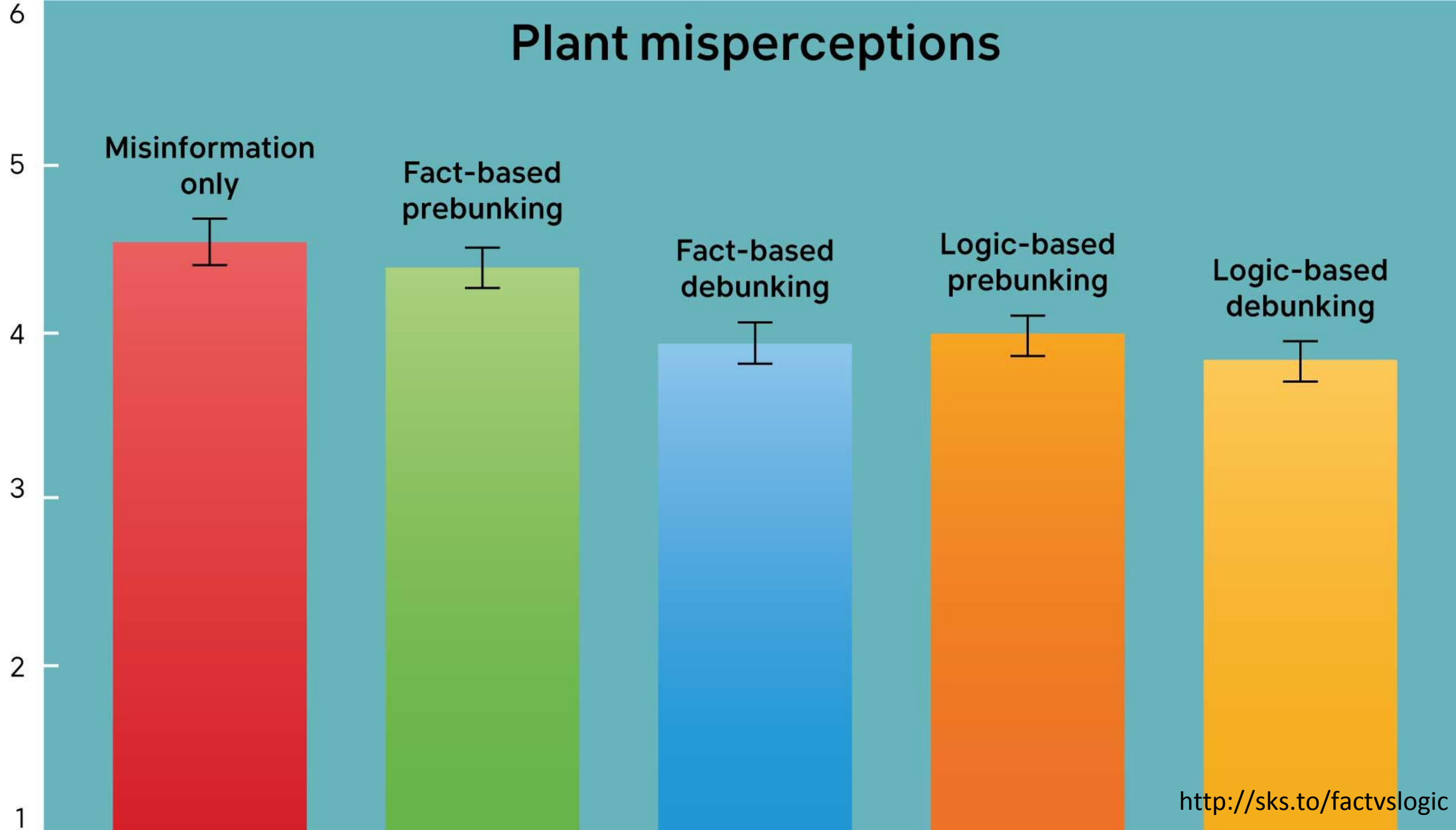
Logic-based correction

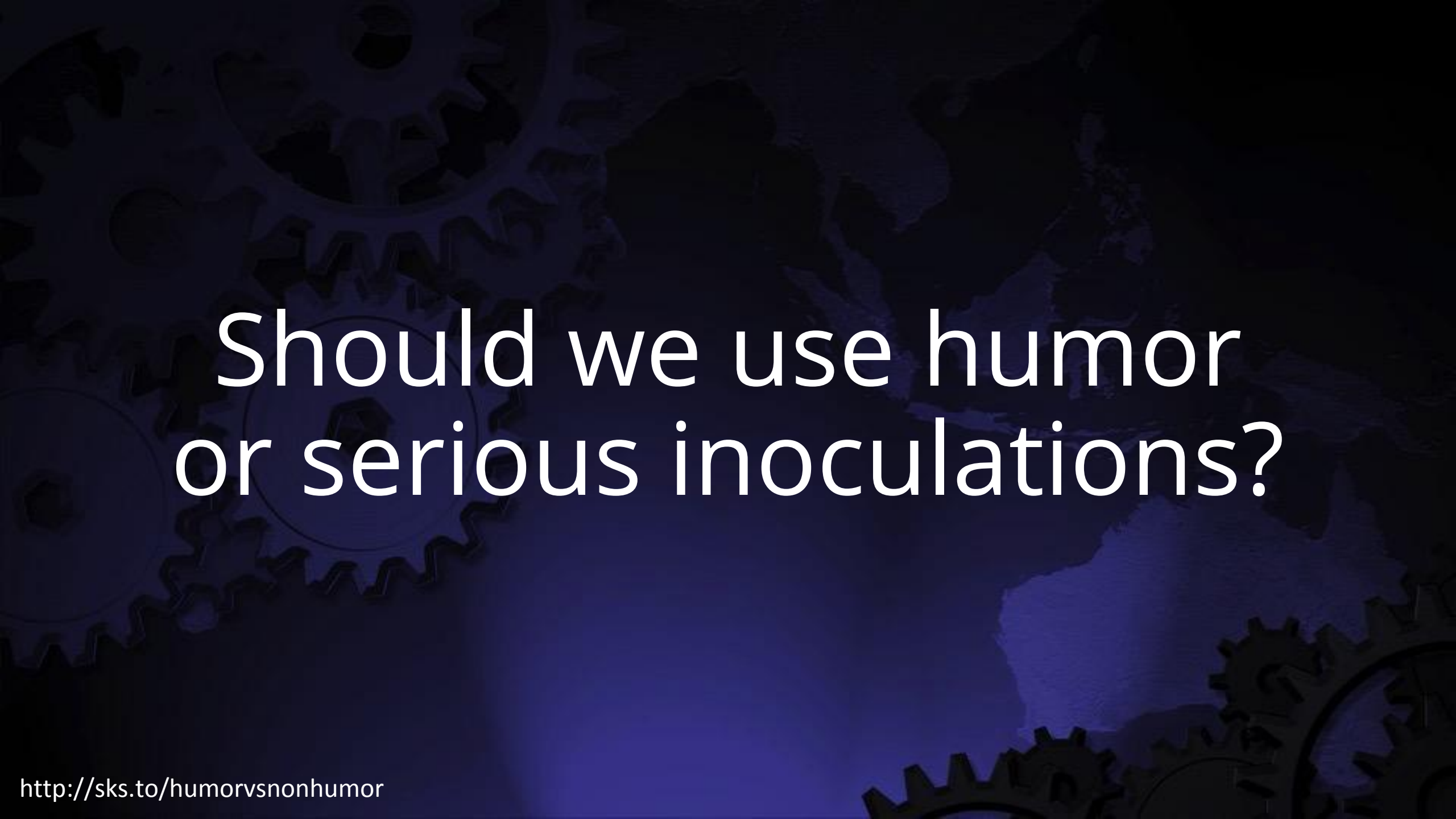
Debunking the myth "CO₂ is plant food"

Climate change caused by CO₂ disrupts the environment, with heat stress and increased flooding harming plant growth. This myth is an oversimplification—it's like saying humans need calcium so all we need to eat is ice cream.



Plant misperceptions





Should we use humor
or serious inoculations?

The background is a dark blue gradient. On the left side, there are several interlocking gears of different sizes. On the right side, there is a faint, light blue silhouette of a world map. The word "Yes" is centered in the middle of the image in a white, sans-serif font.

Yes



Hunter Lee
@H_P_Lee



Yet another teenager is left paralyzed after suffering a reaction from the "safe" HPV vaccine. How many more injuries do we need before we recognize it's causing these injuries? #HPV



Adrian Williams
@AdrianWilliamsEsq • 2h

Large-scale scientific studies find no link between HPV vaccine and auto-immune symptoms. You're mistaking correlation with causation. A vaccination and an injury happening close together doesn't mean one causes the other.

**LOGICAL FALLACY:
Correlation implies causation**





Hunter Lee
@H_P_Lee

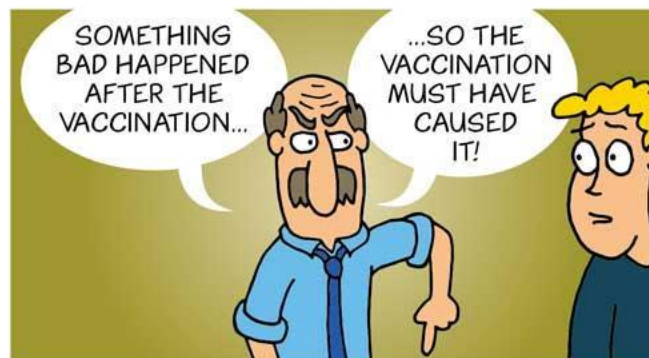


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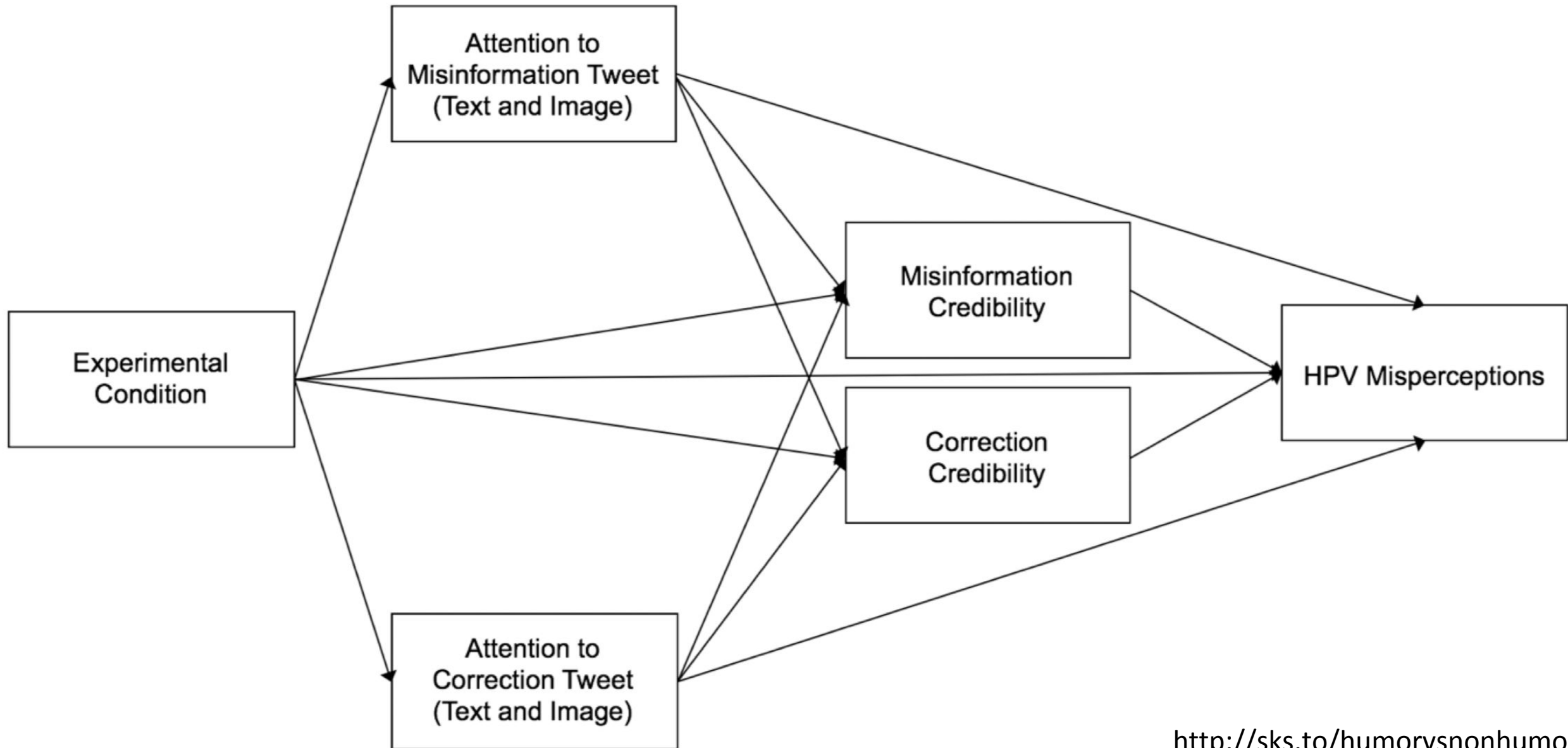


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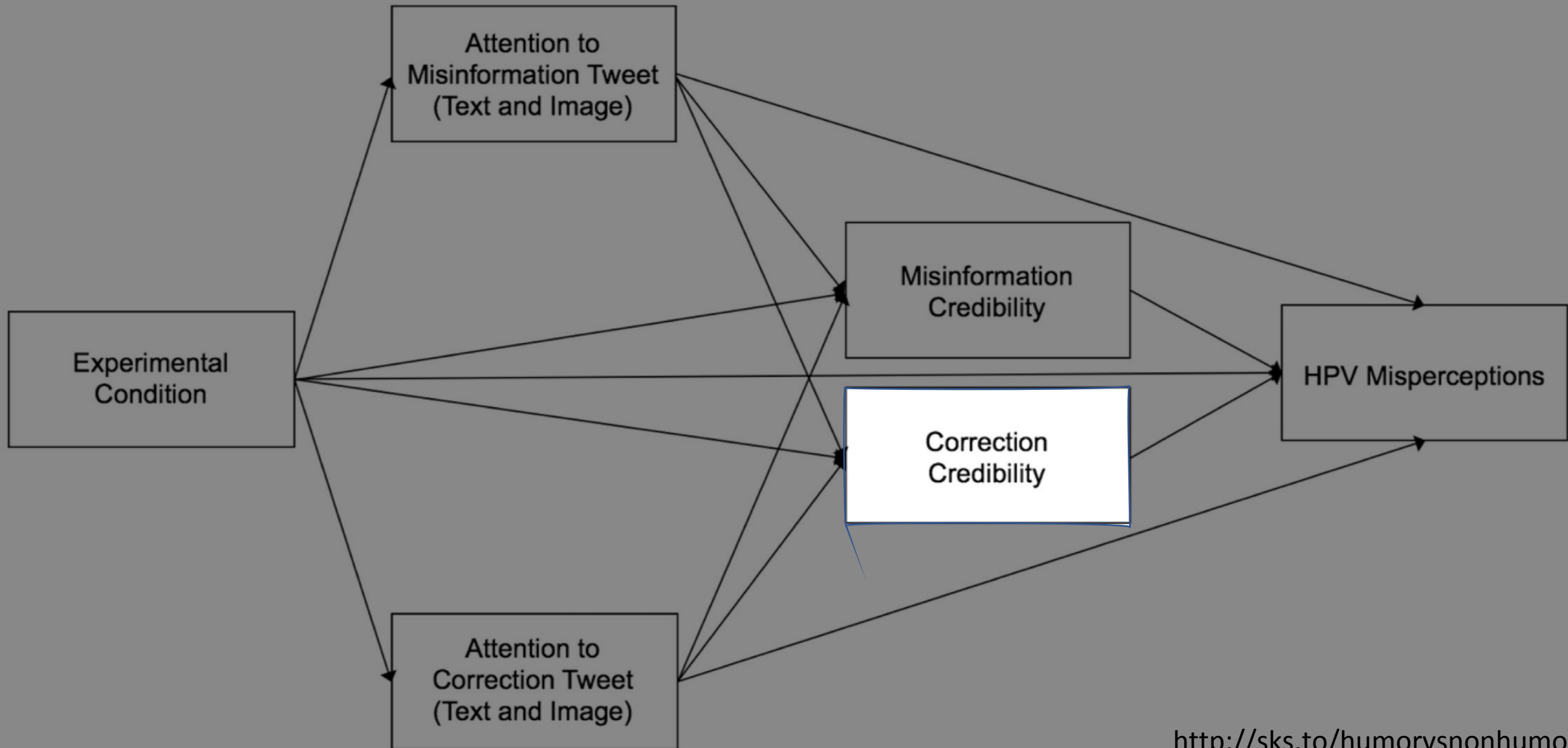
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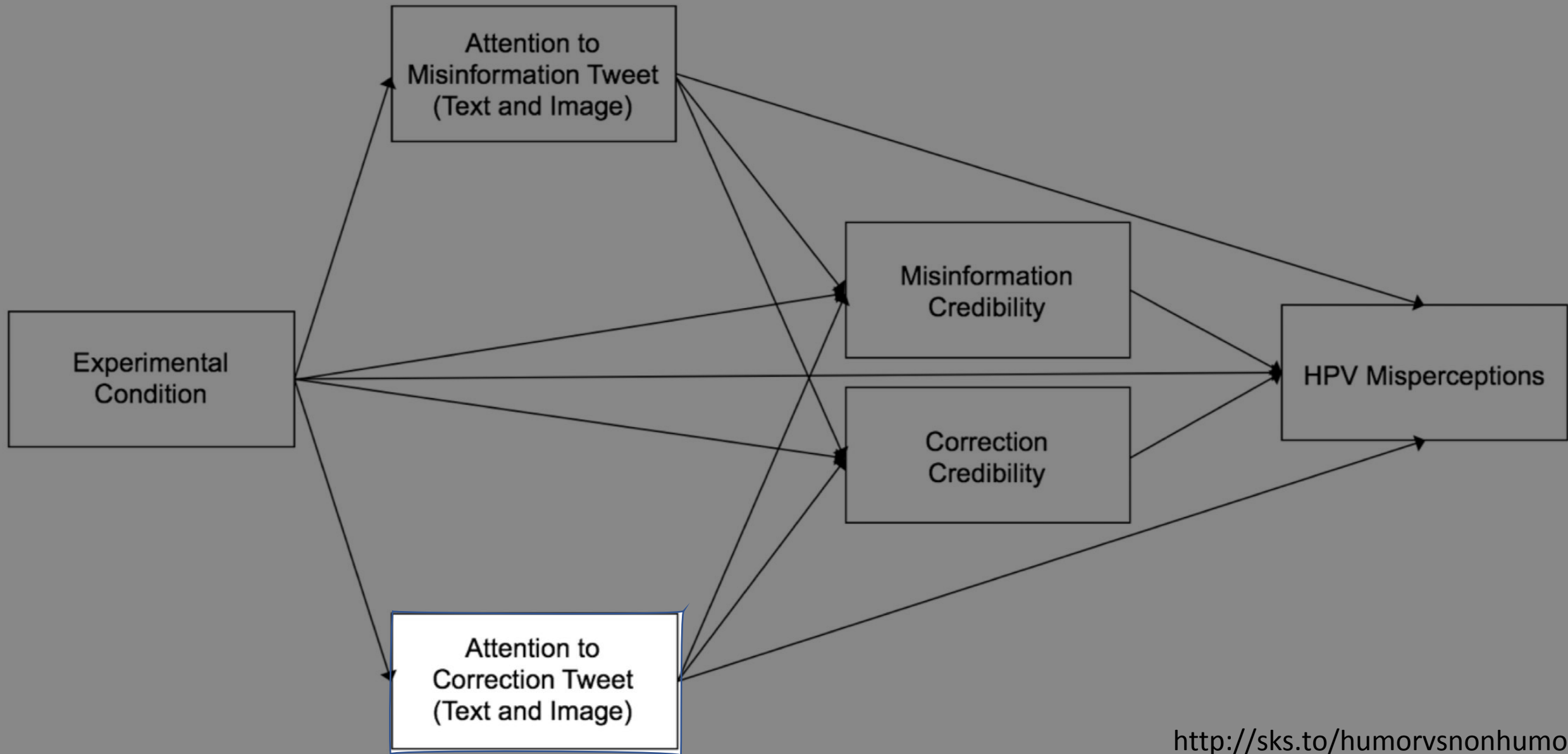
Mediation Model



Non-humorous debunking



Humorous debunking



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

Techniques of Science Denial

F



Fake
Experts

L



Logical
Fallacies

I



Impossible
Expectations

C

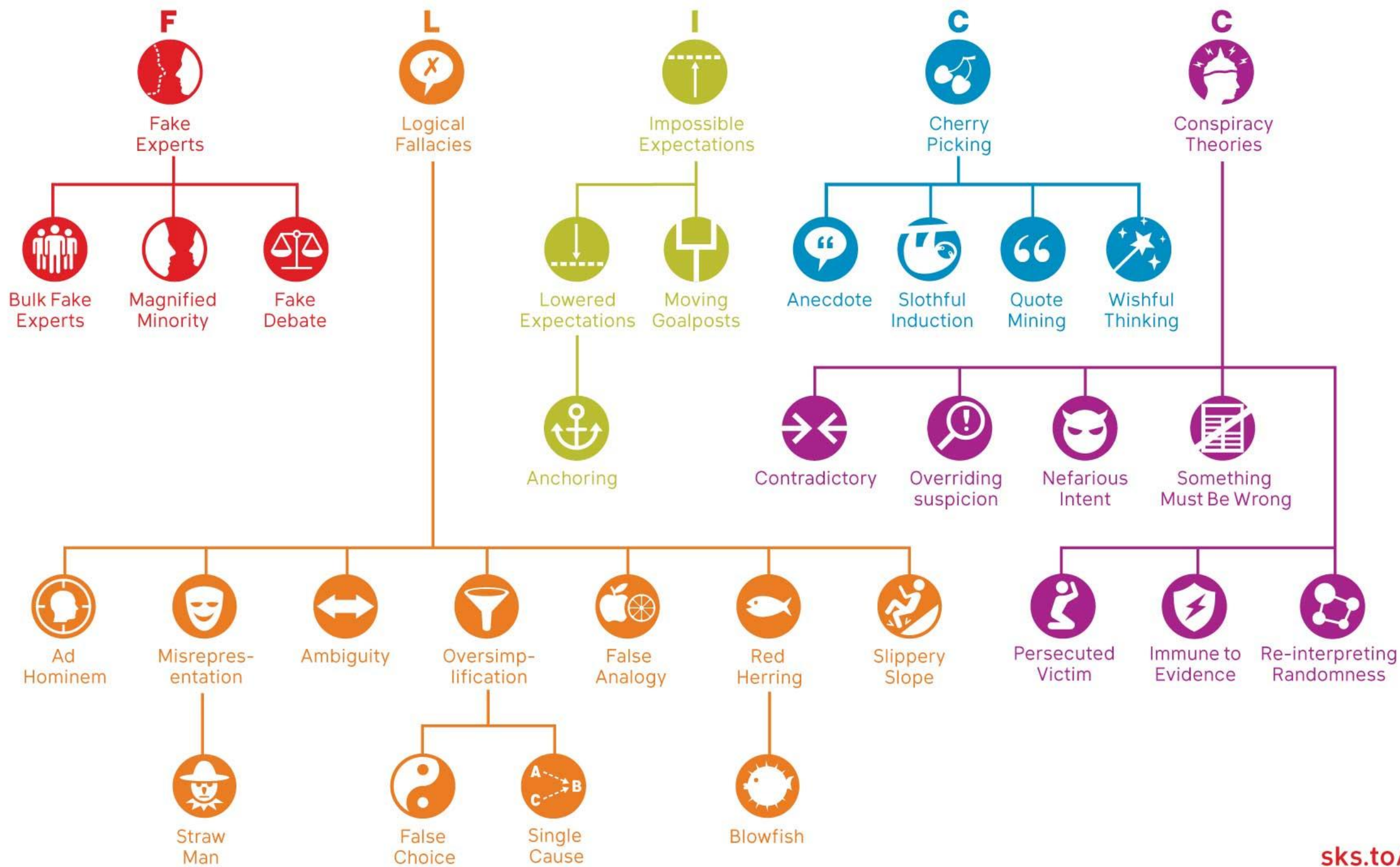


Cherry
Picking

C



Conspiracy
Theories



3 Types of Thinking

Fast Thinking (System 1)

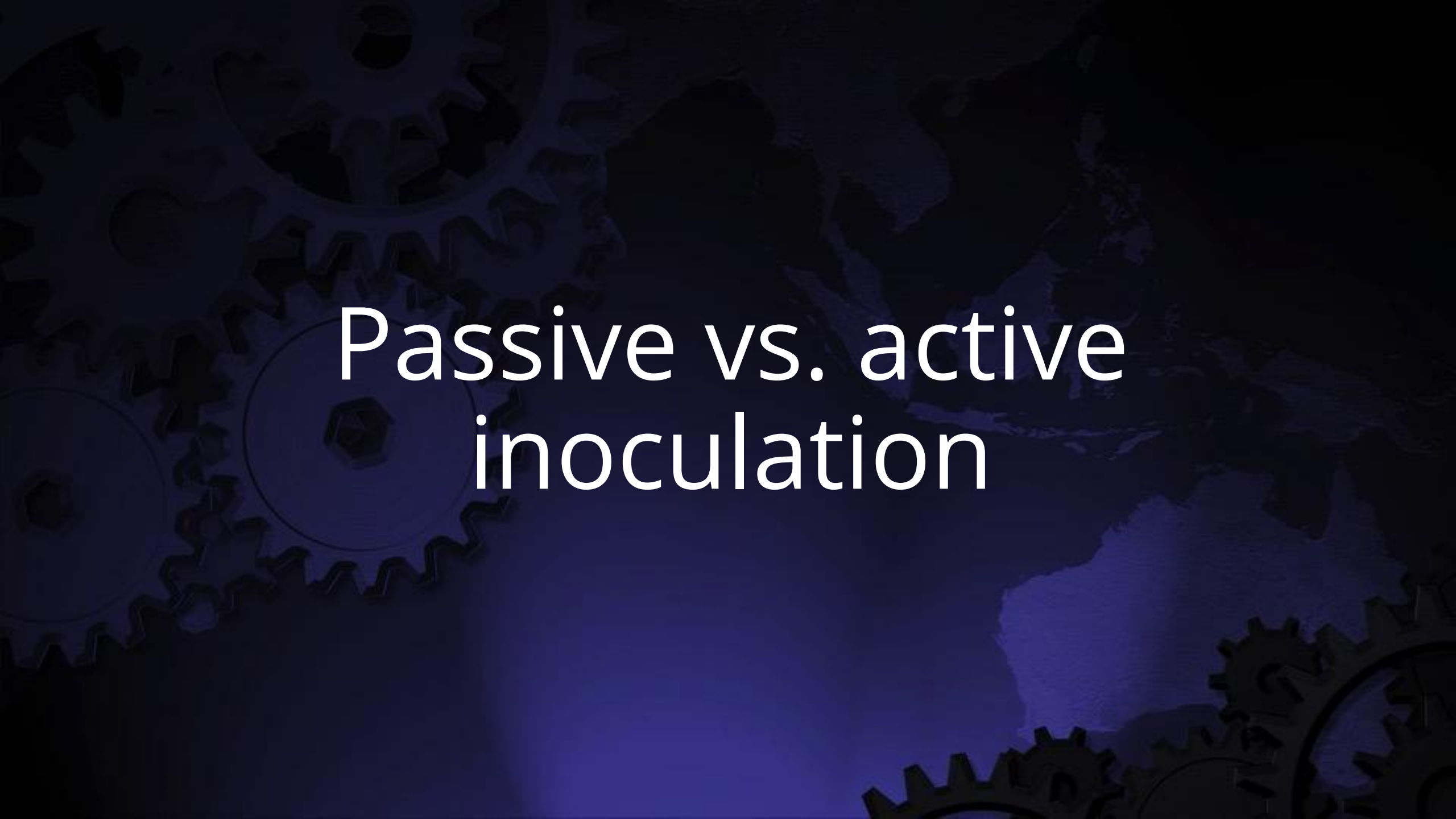
Instantaneous, instinctive, *easy* reactions.

Slow Thinking (System 2)

Slower, rational, *difficult* reasoning.

Expert Thinking

Instant assessments after practice & experience.



Passive vs. active inoculation

ALL BADGES



DISCREDIT



CONSPIRACY



TROLLING



POLARIZATION



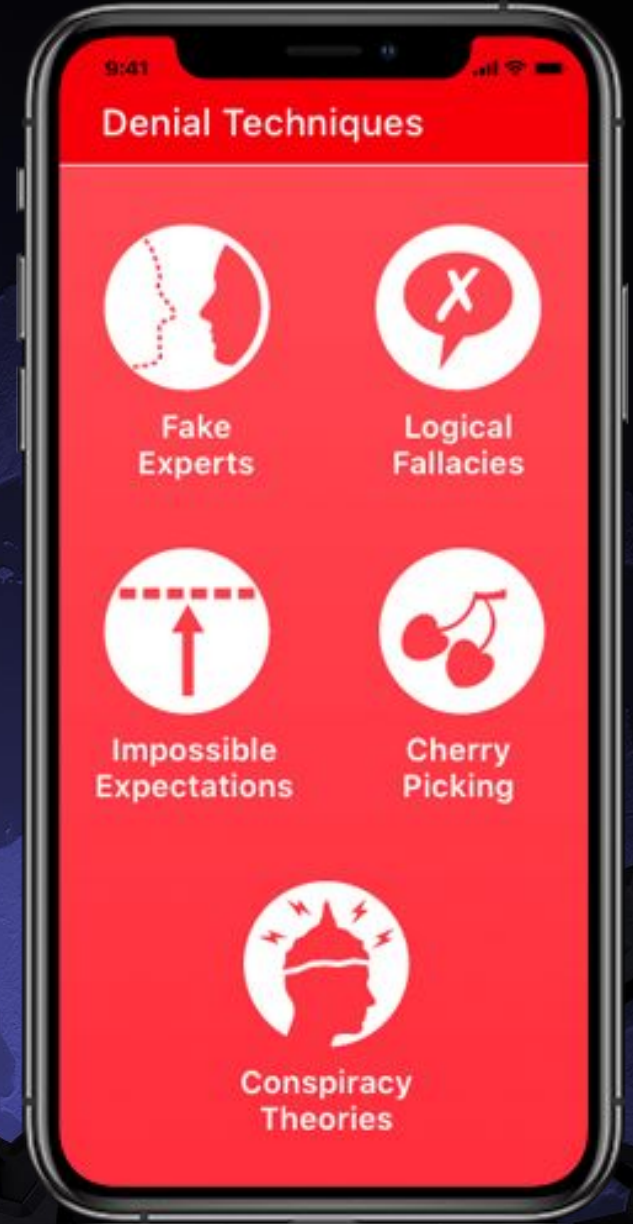
IMPERSONATION



EMOTION

NEXT

crankyuncle.com





THIS
PERSON DIED
OF NATURAL
CAUSES...

...BECAUSE PEOPLE
HAVE ALWAYS DIED OF
NATURAL CAUSES.



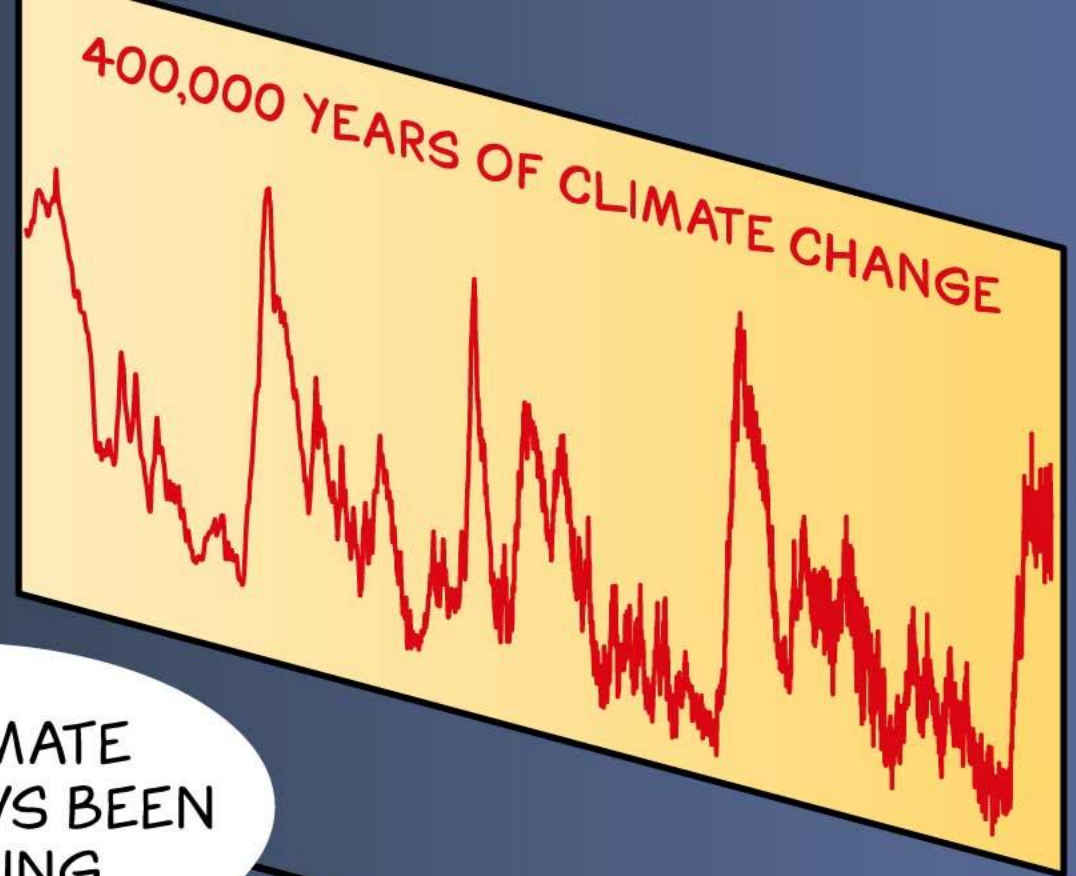
...BECAUSE PEOPLE
HAVE ALWAYS DIED OF
NATURAL CAUSES.



THE
REASON WHY
CLIMATE IS
CHANGING...



...IS CLIMATE
HAS ALWAYS BEEN
CHANGING.





IT'S
DARK...

...THE
SUN DOESN'T
EXIST!



IT'S
COLD...

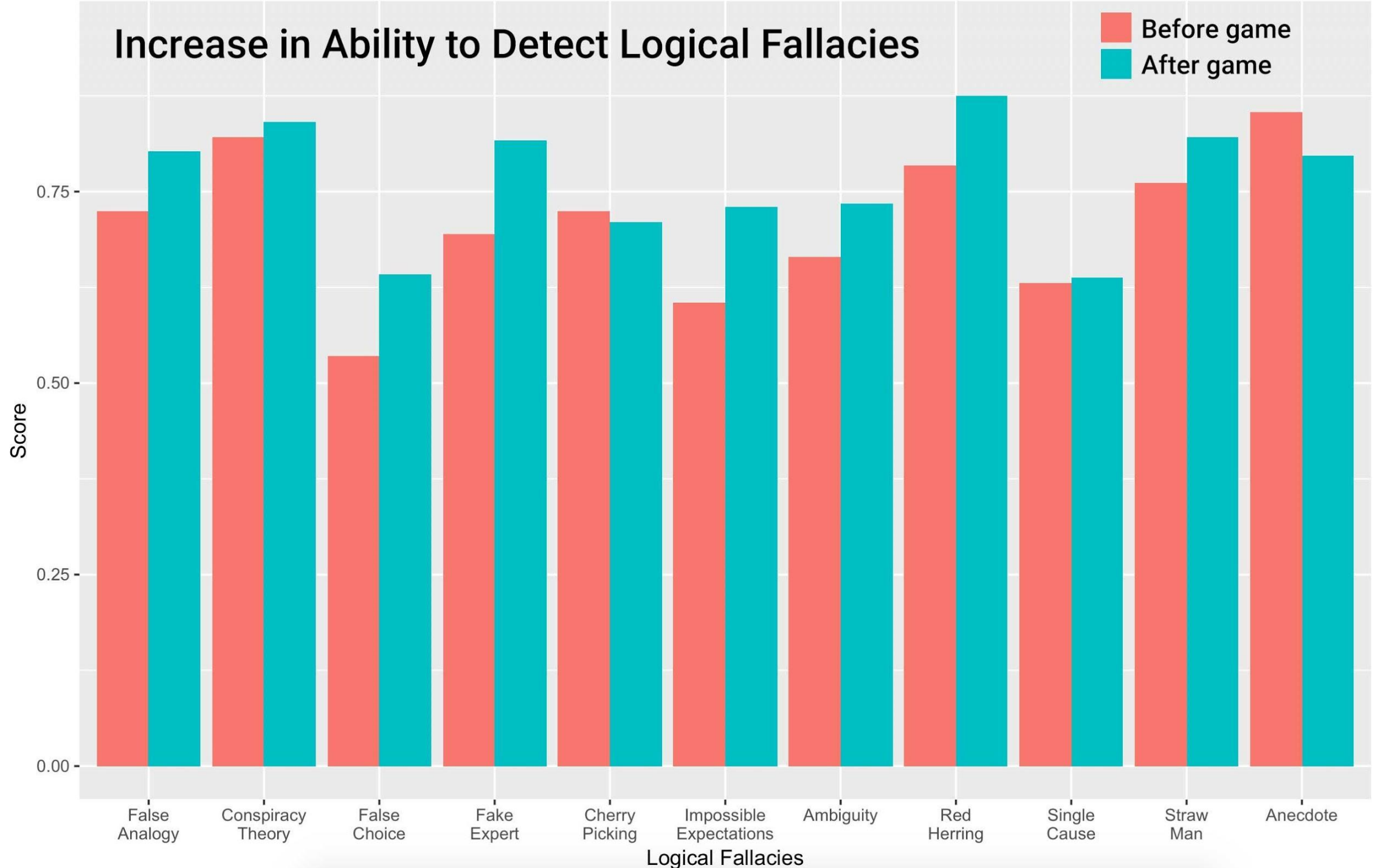
...GLOBAL
WARMING DOESN'T
EXIST!



WHAT DO
YOU MEAN WE'RE
SINKING? I'M MOVING
UPWARDS!

Increase in Ability to Detect Logical Fallacies

Before game
After game



John Cook

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Web: crankyuncle.com



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