

# How to communicate effectively when faced with misinformation & myths

Bärbel Winkler - based on presentations by John Cook  
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GEORGE MASON UNIVERSITY  
CENTER *for*  
CLIMATE CHANGE  
COMMUNICATION

# Mental Model in our Mind



# Familiarity Backfire Effect

**“The side effects are worse than the flu.”**

The worst side effect you're likely to get with injectable vaccine is a sore arm. The nasal mist flu vaccine might cause nasal congestion, runny nose, sore throat and cough. The risk of a rare allergic reaction is far less than the risk of severe complications from influenza.



# Familiarity Backfire Effect



**"The side effects are worse than the flu."**

The familiarity backfire effect is a cognitive bias where people's attitudes and beliefs become more negative as they become more familiar with a stimulus. This is often seen in advertising, where repeated exposure to a product can lead to a decrease in its perceived quality. The effect is thought to be caused by a combination of factors, including the mere proximity effect and the fluency heuristic. The mere proximity effect is the tendency to like things that are close to us, while the fluency heuristic is the tendency to like things that are easy to process. Together, these two effects can lead to a decrease in the perceived quality of a product as it becomes more familiar.

# Continued Influence Effect



# Continued Influence Effect





# Continued Influence Effect



# Continued Influence Effect





# The golden rule of debunking



**Fight  
Sticky  
Myths...**



**...With  
Stickier  
Facts**

Why Some Ideas Survive  
and Others Die

MADE

to

STICK

Chip Heath & Dan Heath

Read by Charles Kahlenberg

AN UNABRIDGED PRODUCTION

- Simple
- Unexpected
- Credible
- Concrete
- Emotional
- Story

**S.U.C.C.E.S.**



Usual reaction:  
Explain the science



Usual reaction:  
Explain the science



Inoculation:  
Also explain how the science gets distorted



# INOCULATION THEORY

**Exposure to a  
weak form of  
misinformation**

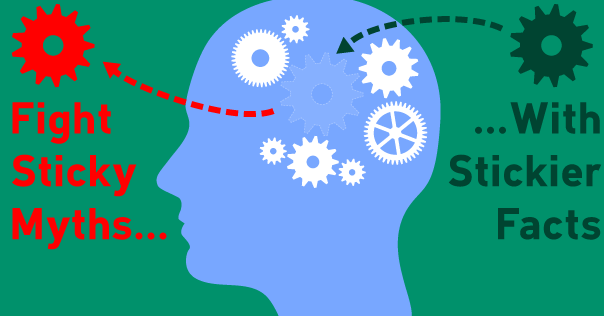
**+**

**Highlighting the  
fallacy or  
misconception**

# 3 ELEMENTS TO AN EFFECTIVE DEBUNKING

## FACT

Replace the myth with a factual alternative that meets all the causal requirements left by the myth. Ideally, the fact is more compelling and memorable than the myth.



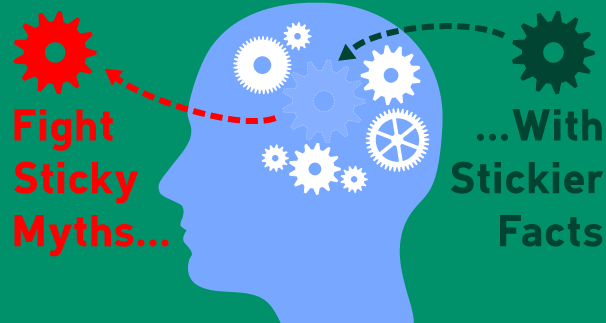
**THE  
GOLDEN  
RULE OF  
DEBUNKING**



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## MYTH/MISCONCEPTION

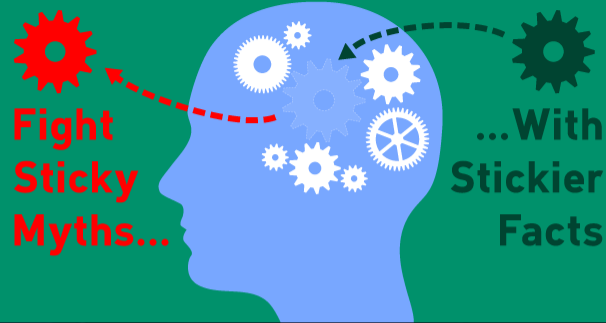
Mentioning the myth risks a familiarity backfire effect. Here are three techniques to reduce the risk of a backfire effect:

- Emphasise the fact rather than the myth
- Warn people before mentioning the myth
- Explain the myth's fallacy

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## FALLACY

Explain the technique used by the myth to distort the fact. This enables people to reconcile the fact with the myth.



Fake  
Experts



Logical  
Fallacies



Impossible  
Expectations



Cherry  
Picking



Conspiracy  
Theories

# 5 CHARACTERISTICS OF SCIENCE DENIAL

F



Fake Experts



Magnified Minority

L



Logical Fallacies



Red Herring

I



Impossible Expectations



Misrepresentation

C



Cherry Picking



Jumping to Conclusions

C



Conspiracy Theories



False Dichotomy

# 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.

# Response to Misinformation





# Promoting “fake experts” to manufacture doubt about science

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

Castler  
Tobaccos

© 1954 American Tobacco Co.  
Raleigh, N. C.

# 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.

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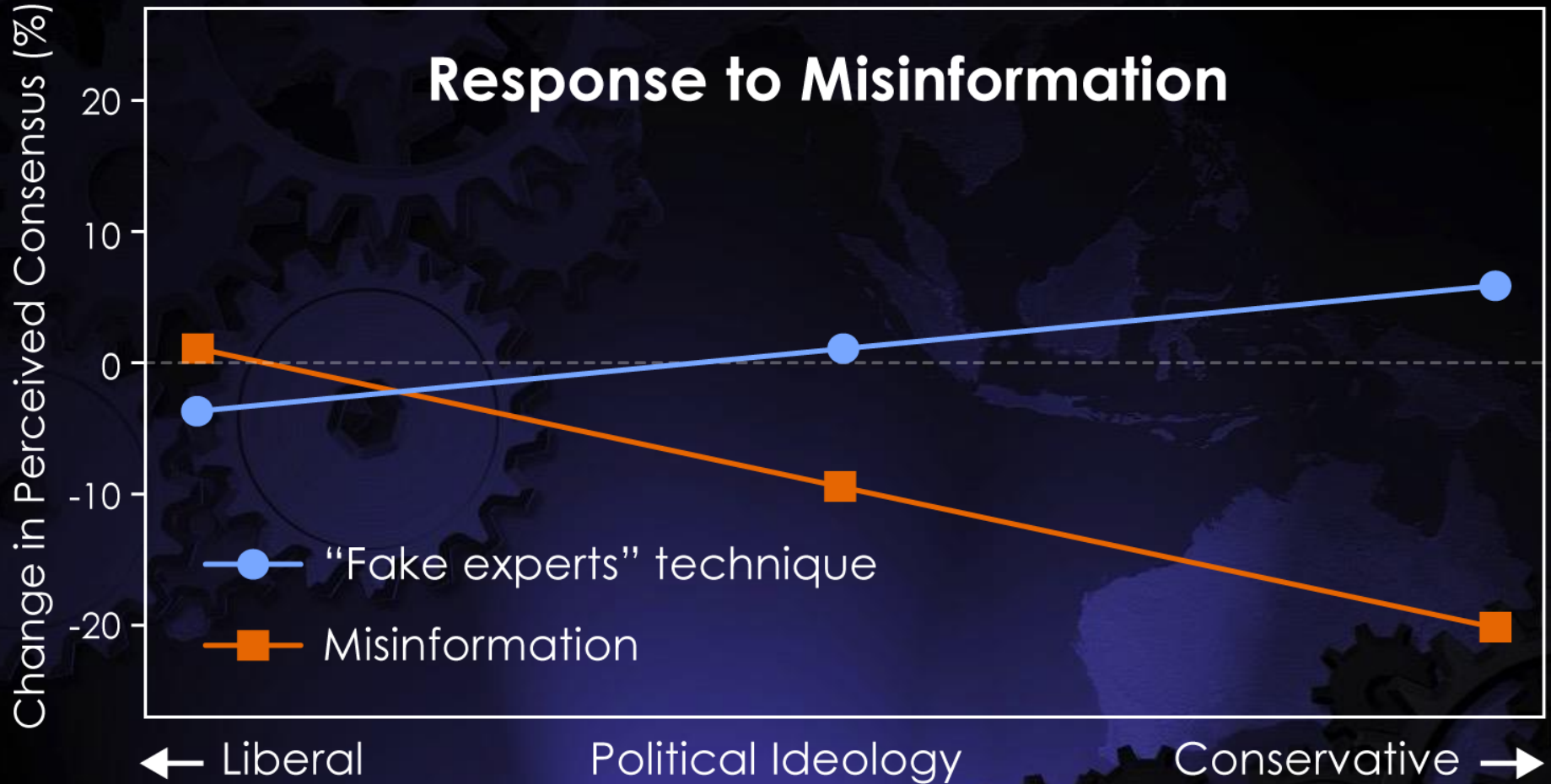
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**Camels** *Castlier Tobaccos*

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.

# Response to Misinformation



## FACT

Between 90 and 100 % of climate experts agree that we are mostly responsible for current global warming.

## MYTH

More than 31,000 scientists disagree with the consensus.

## FALLACY

The myth relies on fake experts and a magnified minority. Just about 0.1 % of signees are actively publishing climate scientists while most of them work in other areas.

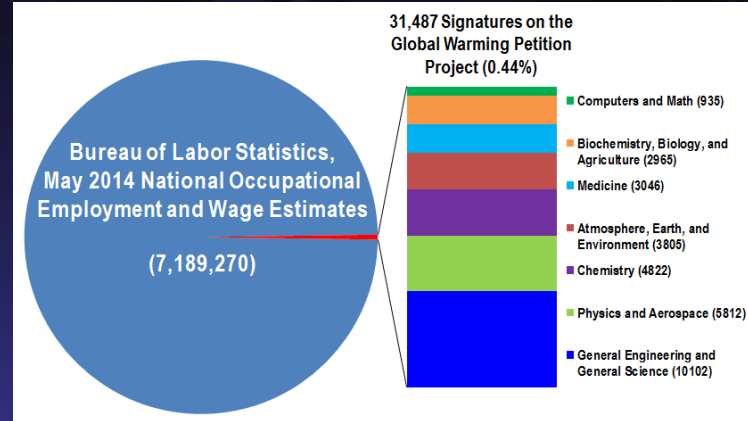
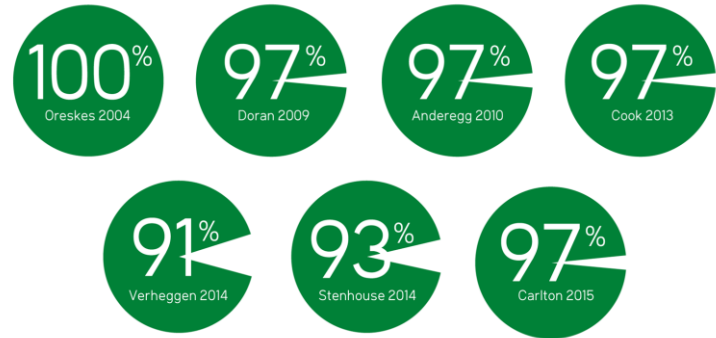


Fake  
Experts



Magnified  
Minority

### Studies into scientific agreement on human-caused global warming



Brian Angliss – Scholars & Rogues (2015)

<http://sks.to/consensus>



# Massive open online course (MOOC) Denial101x

Courses ▾ Programs ▾ Schools & Partners About ▾BaerbelW ▾

Home > All Subjects > Communication > Making Sense of Climate Science Denial



## Making Sense of Climate Science Denial

Climate change is real, so why the controversy and debate? Learn to make sense of the science and to respond to climate change denial.



Self-Paced

**Enroll Now**

I would like to receive email from The University of Queensland and learn about other offerings related to Making Sense of Climate Science Denial.

## Next paced-run starts on April 17, 2018!

**About this course**

<http://sks.to/denial101x>

In public discussions, climate change is a highly controversial topic. However, in the scientific community, there is little controversy with 97% of climate scientists concluding humans are causing global warming.

- Why the gap between the public and scientists?
- What are the psychological and social drivers of the rejection of the scientific consensus?
- How has climate denial influenced public perceptions and attitudes towards climate change?













This course examines the science of climate science denial.

We will look at the most common climate myths from “global warming stopped in 1998” to “global warming is caused by the sun” to “climate impacts are nothing to worry about.”

We'll find out what lessons are to be learnt from past climate change as well as better understand how climate models predict future climate impacts. You'll learn both the science of climate change and the techniques used to distort the science.

Length:	7 weeks
Effort:	2 to 4 hours per week
Price:	FREE Add a Verified Certificate for \$49 USD
Institution:	UQx
Subject:	Communication
Level:	Introductory
Language:	English
Video Transcripts:	English

# Global warming is happening

FACT	MYTH	FALLACY	VIDEO
<p>Our planet has continued to build up heat since 1998 - global warming is still happening.</p>	<p><u>"Global warming stopped in 1998."</u></p>	<p><b>Cherry picking</b> Looking at one region or a short period ignores the full picture.</p> 	<p>UQx DENIAL101x 2.2.1.1 Heat Bul...  </p> 
<p>Global warming is like rigging the weather dice, making it more likely to get hot days.</p>	<p><u>"It's cold outside, so global warming must have stopped."</u></p>	<p><b>Impossible Expectations</b> Global warming doesn't mean no more cold weather, just fewer cold days compared to hot days.</p> 	<p>UQx DENIAL101x 2.2.2.1 Hot recor...  </p> 
<p>Overall, glaciers across the globe are shrinking at an accelerating rate, threatening water supplies for millions of people.</p>	<p><u>"Glaciers around the world are increasing, disproving global warming."</u></p>	<p><b>Cherry picking</b> Picking a handful of growing glaciers ignores the vast majority of glaciers that are shrinking.</p> 	<p>UQx DENIAL101x 2.3.1.1 Shrinking...  </p> 



## Fact - Myth - Fallacy Compilation of Slides

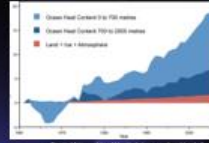


### 5 CHARACTERISTICS OF SCIENCE DENIAL



1998	Cold	Glacier	Greenland	Antarctica
Temp	LHF	Winter	Name	
CDI	Volcano	Residence	Thermo	Satellite
LAG	Photop	Trace	Suit	
Final	LIA	Past CO <sub>2</sub>	MWT	Model
Harmon 1999	Weather	15/0a	Range	Underestimate
Vapor	Cloud	Species	Clear	Acid
Impacts	Polluters	Plant	Zebra	Consensus

**FACT**  
Our planet has continued to build up heat since 1998 - global warming is still happening.



**MYTH**  
Global warming stopped in 1998.

**FALLACY**  
Looking at one region or a short period ignores the full picture.



http://sks.to/299

**FACT**  
Overall, glaciers across the globe are shrinking at an accelerating rate, threatening water supplies for millions of people.



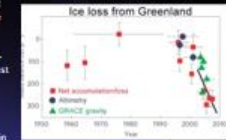
**MYTH**  
Glaciers around the world are increasing, disproving global warming.

**FALLACY**  
Picking a handful of growing glaciers ignores the vast majority of glaciers that are shrinking.



http://sks.to/340

**FACT**  
Greenland on the whole is losing ice, at a rate of over 2 Mount Everests worth of ice every year.



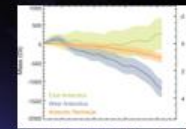
**MYTH**  
Greenland ice sheet is thickening in the middle so it must be gaining mass.

**FALLACY**  
Looking at the whole ice sheet shows it's thickening in the middle but ice loss at the edges is accelerating.



http://sks.to/340

**FACT**  
The West Antarctic ice sheet is losing hundreds of billions of tonnes of ice every year, making it a major contributor to global sea level rise.



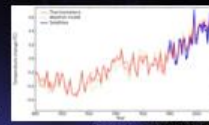
**MYTH**  
Antarctic sea ice is on the increase and casts doubt on global warming.

**FALLACY**  
A number of factors may contribute to the increase in sea ice - but in no way does it change the fact that climate change is happening.



http://sks.to/340

**FACT**  
We can measure temperature in many ways and they all say the same thing - our planet is warming.



**MYTH**  
The thermometer record is unreliable.

**FALLACY**  
Just because measurements have uncertainty doesn't mean it's unknowable. The uncertainty is smaller than measured global warming.



http://sks.to/340

**FACT**  
Slowing jet stream is causing Arctic cold air to leak down into Europe and North America, like an open fridge leaking cold air into the kitchen.



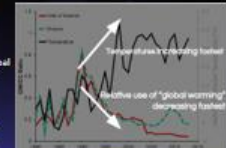
**MYTH**  
Record cold winters disprove global warming.

**FALLACY**  
A cold winter doesn't disprove global warming, you need to look at the big picture.



http://sks.to/340

**FACT**  
Climate change and global warming have both been used for decades.



**MYTH**  
They changed names from 'global warming' to 'climate change'.

**FALLACY**  
They didn't change the name (let alone in connection with temperature changes).



http://sks.to/340

**FACT**  
For thousands of years, our atmosphere has been in balance. Humans have upset the balance.



**MYTH**  
Human CO<sub>2</sub> emissions are tiny compared to natural CO<sub>2</sub> emissions so our influence is negligible.

**FALLACY**  
Considers only natural CO<sub>2</sub> emissions and ignores natural CO<sub>2</sub> sinks.



http://sks.to/340

**FACT**  
Human emissions are responsible for all of the increase in CO<sub>2</sub> in the air over the past two centuries.



**MYTH**  
Volcanoes produce more CO<sub>2</sub> than humans.

**FALLACY**  
Volcanoes do produce CO<sub>2</sub>, but over recent centuries the amounts are too small to account for the observed changes in the air.



http://sks.to/340



Thank you!

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Profile: <http://sks.to/BaerbelW>

MOOC <http://sks.to/denial101x>

# Resources & References

The Debunking Handbook: <http://sks.to/debunk>

Cook, J., Lewandowsky, S., & Ecker, U. (2017). Neutralizing misinformation through inoculation: Exposing misleading argumentation techniques reduces their influence. *PLoS ONE*, 12(5): e0175799. <https://doi.org/10.1371/journal.pone.0175799>

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