



# The Effects of Misinformation



IPAA 2014  
INTERNATIONAL  
CONFERENCE  
PERTH CONVENTION  
AND EXHIBITION CENTRE  
29 & 30 OCTOBER



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THE UNIVERSITY OF  
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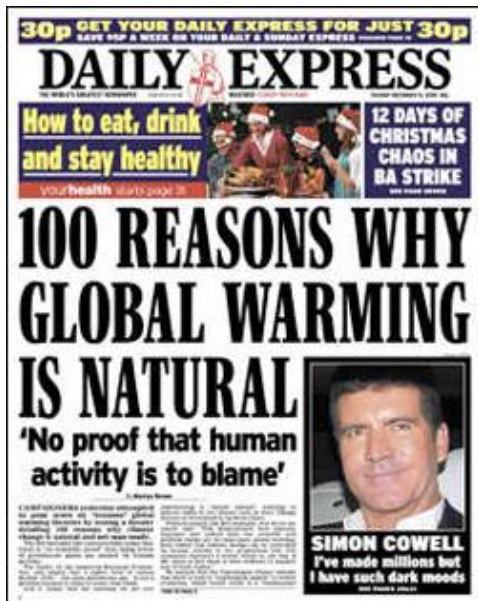


# The Continued Influence of Misinformation

- Misinformation (initially plausible/believed) will continue to influence memory, reasoning and decision making after corrections
- Even when people believe and remember the correction



# Misinformation in the media



## IPCC must accept temperature rises are small and benign

MATT RIDLEY The Wall Street Journal December 20, 2012 12:00AM



Peter Ferrara, Contributor

I cover public policy, particularly concerning economics.

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Forbes

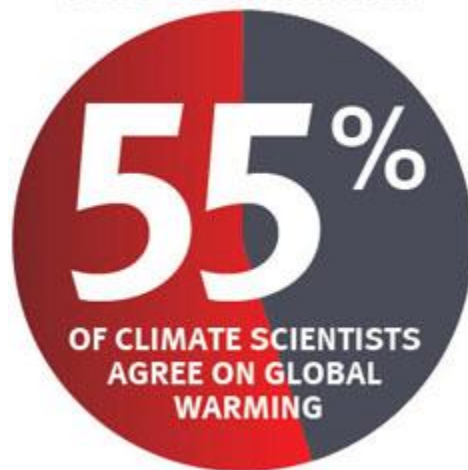
OP/ED | 5/26/2013 @ 9:44AM | 281,034 views

## To The Horror Of Global Warming Alarmists, Global Cooling Is Here



# Misinformation effects: The climate change consensus gap

THE PUBLIC THINK...



IN REALITY...



Cook et al., 2013  
Doran & Zimmerman, 2009  
Anderegg et al., 2010



# Misinformation everywhere

**Love them. Protect them.  
Never inject them.  
There are NO safe vaccines!**

Chronic Ear Infections  
ADD  
Allergies  
Asthma  
Autism  
Death  
Diabetes  
Meningitis  
Polio  
Seizures  
SBS  
and SIDS are caused by adverse reactions to vaccine poisons.

EARLY REPORT

**Early report**

**Ileal-lymphoid-nodular hyperplasia, non-specific colitis and pervasive developmental disorder in children**

A J Wakefield, S H Murch, A Anthony, J Linnell, D M Casson, M Malik, M Berelowitz, A Dilman, A Thomson, D Smith

## New evidence 'shows MMR link to autism'

by BEEZY MARSH, Daily Mail

New evidence suggesting a link between the MMR vaccine and autism emerged yesterday.

Scientists reported finding a strong association between the vaccine and an immune system reaction which is thought to play a role in autism.

**Findings** Onset of behavioural symptoms was associated, by the parents, with measles, mumps, rubella vaccination in eight of the 12 children. In addition, colitis infection in one child, and otitis media in another. Twelve children had intestinal abnormalities including ileal-lymphoid nodular hyperplasia to varying degrees. Histology showed patchy chronic inflammation of the colon in 11 children and reactive ileal-lymphoid hyperplasia in seven, but no granulomas. Biopsy of the colon showed autism (nine), disintegrating (one), and possible postviral or vaccinal encephalopathy (one). There were no focal neurological abnormalities and normal EEG tests were normal. Abnormal laboratory results included significantly raised urinary methylmalonic acid compared with age-matched controls ( $p=0.03$ ), low haemoglobin in four children, and a low albumin level in four children.

**Interpretation** We found an association of gastrointestinal disease and developmental regression in a group of previously healthy children, which is generally associated in time with measles, mumps, rubella vaccination.

Lancet 2008; 372: 826-32

**Correspondence** to: Dr A J Wakefield

**Inflammatory Bowel Disease Study Group, University Departments of Medicine (A J Wakefield, S H Murch, A Anthony, J Linnell, D M Casson, M Malik, M Berelowitz, A Dilman, A Thomson, D Smith) and the University Department of Paediatric Gastroenterology (S H Murch), St Mark's Hospital, Harlow, Essex, UK; M A Thomson, J A Walker-Smith, Child and Adolescent Psychiatry (M Berelowitz), Neurology (D Harvey), and Radiology (A Vaillant), Royal Free Hospital and School of Medicine, London NW3 2QG, UK**

Correspondence to: Dr A J Wakefield

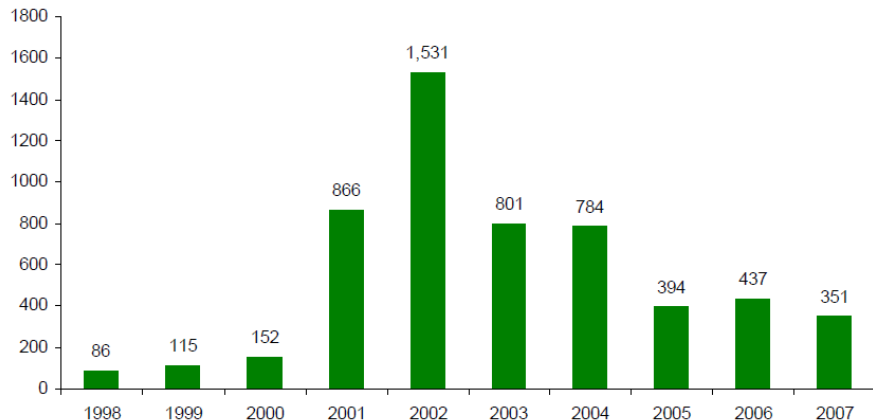
Donald J. Trump  
@realDonaldTrump

Healthy young child goes to doctor, gets pumped with massive shot of many vaccines, doesn't feel good and changes - AUTISM. Many such cases!



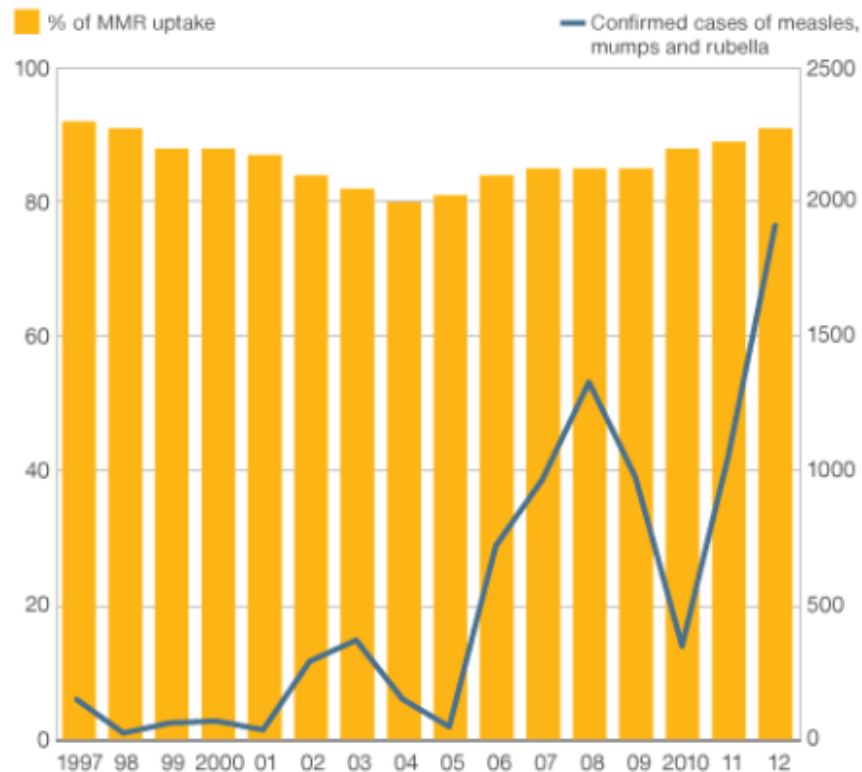
# Misinformation effects: Autism scare and MMR uptake

Chart 6: Articles mentioning MMR in UK national press, 1998-2007



Source: Factiva full article searches of 'MMR' in UK national papers for each year specified

MMR and measles in England



Source: NHS IC



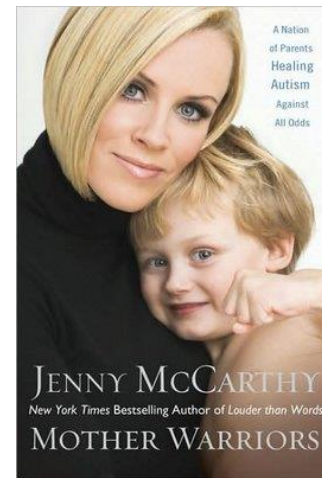
# Misinformation: How is it spread?

- Inadvertently (*in dubio pro reo*)
  - Media
    - Pressures associated with competition and 24/7 news cycle (less fact-checking)
    - Obsession with “balanced” coverage even in the absence of balanced evidence
  - Social media:
    - No fact-checking
    - Information spread based on potential to elicit an emotional reaction in the recipient (not based on veracity; Berger, 2011)
  - From fiction and rumors
    - Crichton’s ‘State of Fear’ used in US senate committee
- On purpose (*vested interests...*)



# Misinformation – Why believe it?

- People want to understand causalities, in particular in case of
  - Unusual events
  - Negative events
- Helps avoid re-occurrence
- But: Absence of good explanation opens door for misinformation
- In other words: People build mental models of the world and they prefer **complete** models



## Lost plane: Fears of 9/11 style plot





# Misinformation – Why believe it?

- Deluge of information
- Limited resources
  - Time
  - Access to highest-quality information
  - Cognitive capacity
  - Motivation
- → Impossible to thoroughly and objectively evaluate all evidence
- Heuristics
  - How does this fit with what I already (think I) know?
  - How does this fit with what I believe?
  - What do other people think about this?

...a problem if what  
you and others  
believe is wrong.



# Simple solution?

- Simple solution? Tell people it's wrong... **“Information Deficit Model”**
- Simple retractions of misinformation are **ineffective**
  - Once communicated and processed by the individual, **it is no longer possible to just “take it back”** by saying the information given was incorrect (“Mud sticks”)

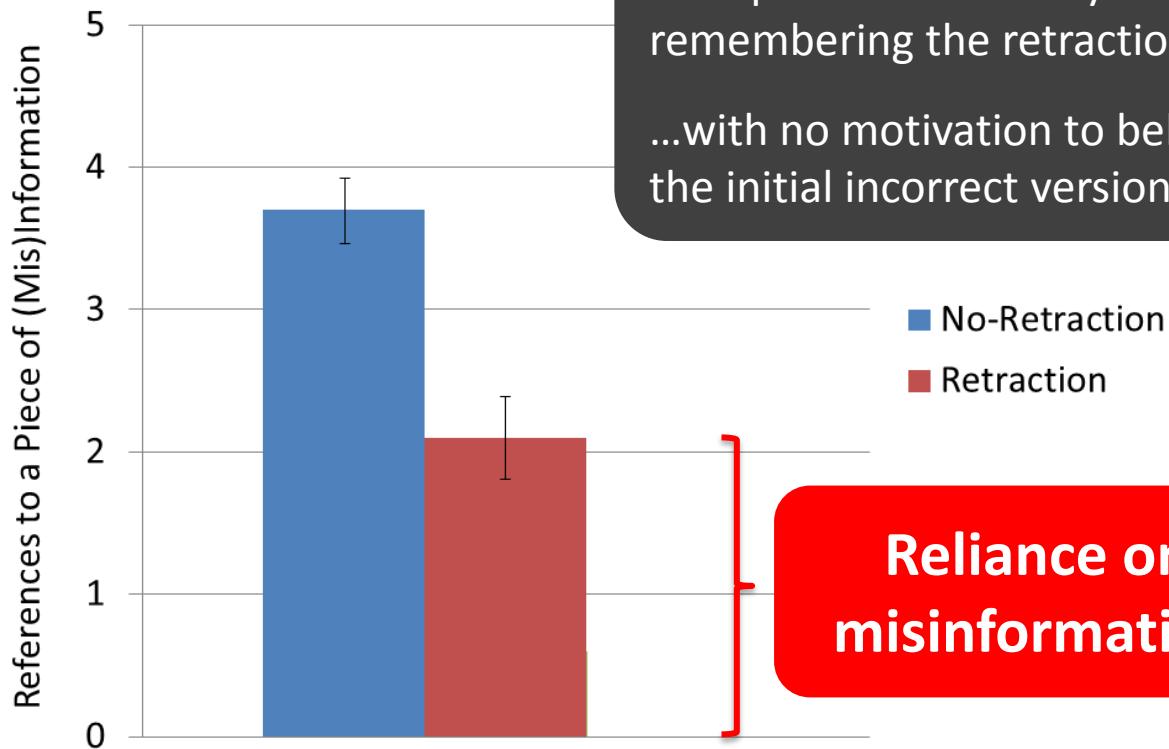


# Example lab study

- Critical information: “Spike in seizures caused by new compound vaccine.”
- Retraction: “Review finds no relation between the new vaccine and the seizures.”
- Measure: Memory, inferential reasoning, behavioural intentions



# Post-retraction reliance on misinformation



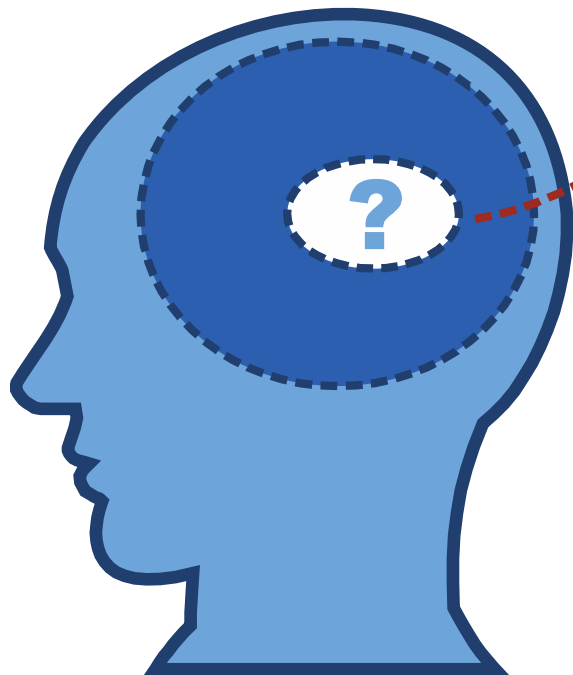
...despite demonstrably remembering the retraction

...with no motivation to believe the initial incorrect version

**Reliance on misinformation**



# Retractions create gaps



**MYTH**

**Removing  
a myth leaves  
a gap**

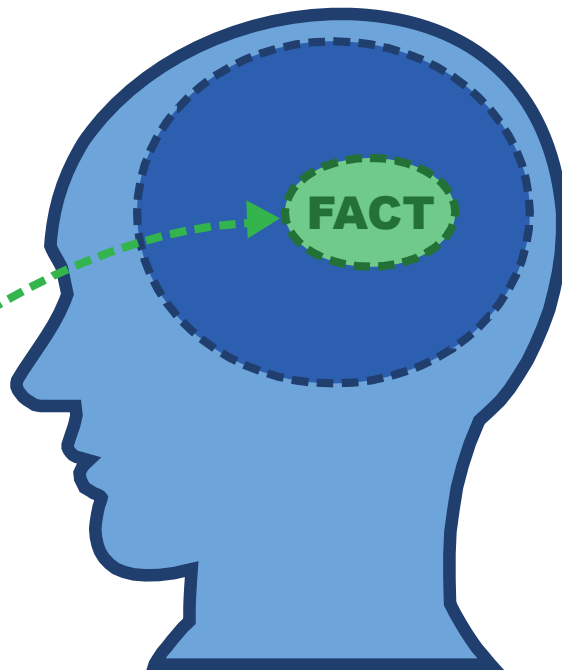
**People hate gaps!**

“Removed” misinformation is actually still in memory, and people use it even when they know it is wrong!



# Fill the gap

Replace  
with alternative  
narrative



**...Unless...**  
The gap can be filled with  
plausible alternative  
information

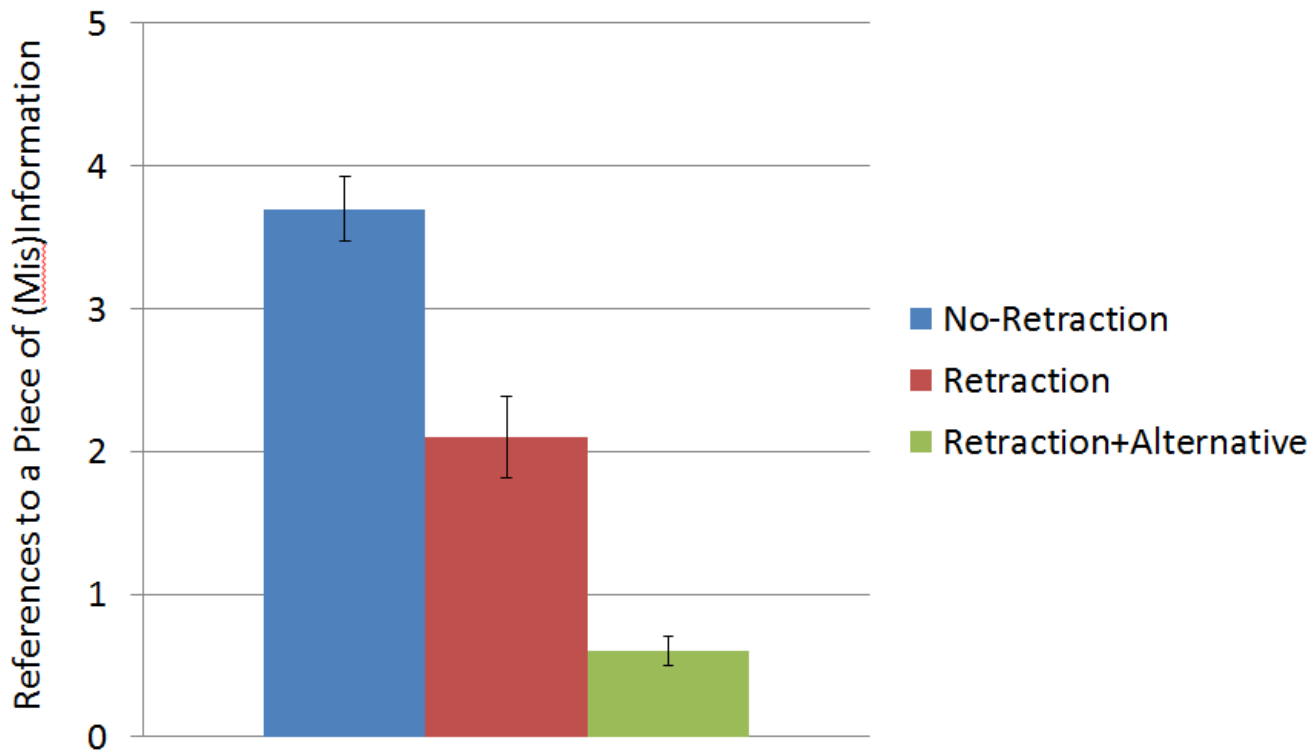


## Example

- Critical information: “Spike in seizures caused by new compound vaccine.”
- Retraction: “Review finds no relation between the new vaccine and the seizures. **Seizures were caused by a virus.**”



# Post-retraction reliance on misinformation





# Effective Debunking I

Create a gap with a  
retraction



Fill the gap with a  
factual alternative

Obvious problem when no alternative explanation  
is available, e.g. MH370



# Retractions can backfire

- The last thing you want is to make things worse!
- A few principles should guide retractions to avoid
  - The familiarity backfire effect
  - The worldview backfire effect



# Flu Vaccine

## Facts & Myths



Department of Health and Human Services  
Centers for Disease Control and Prevention

### “People can die from the flu.”

TRUE

Influenza (flu) is a highly infectious disease of the lungs, and it can lead to pneumonia. Each year about 114,000 people in the U.S. are hospitalized and about 36,000 people die because of the flu. Most who die are 65 years and older. But small children less than 2 years old are as likely as those over 65 to have to go to the hospital because of the flu.

### “Even if I get flu vaccine, I can still get a mild case of the flu.”

TRUE

The vaccine usually protects most people from the flu. Sometimes a person who receives flu vaccine can get the flu but will be far less sick than without the vaccine. Flu vaccine will not protect you from other viruses that sometimes feel like the flu.

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

FALSE

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.

### “Not everyone can take flu vaccine.”

TRUE

You might not be able to get this protection if you are allergic to eggs (used in making the vaccine), are very ill with a high fever, or have had a severe reaction to the flu vaccine in the past.

### “Only older people need flu vaccine.”

FALSE

Adults and children with conditions like asthma, diabetes, heart disease, and kidney disease need to get flu vaccine. People who are active and healthy can benefit from the protection the flu vaccine offers.

### “You must get a flu vaccine before December.”

FALSE

Flu vaccine can be given before or during the flu season. While the best time to get flu vaccine is October or November, getting immunized in December or later can still protect you against the flu.



For more information, ask your health care provider or call the CDC IMMUNIZATION HOTLINE  
English **800-232-2522** Español **800-232-0233** Website [www.cdc.gov/nip/flu](http://www.cdc.gov/nip/flu)



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THE SHAPE OF THINGS TO COME

# The Familiarity Backfire Effect

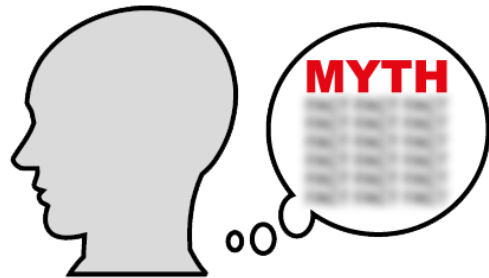
Debunking a myth can reinforce the myth in people’s minds  
(Schwarz et al., 2007)



# The Familiarity Backfire Effect

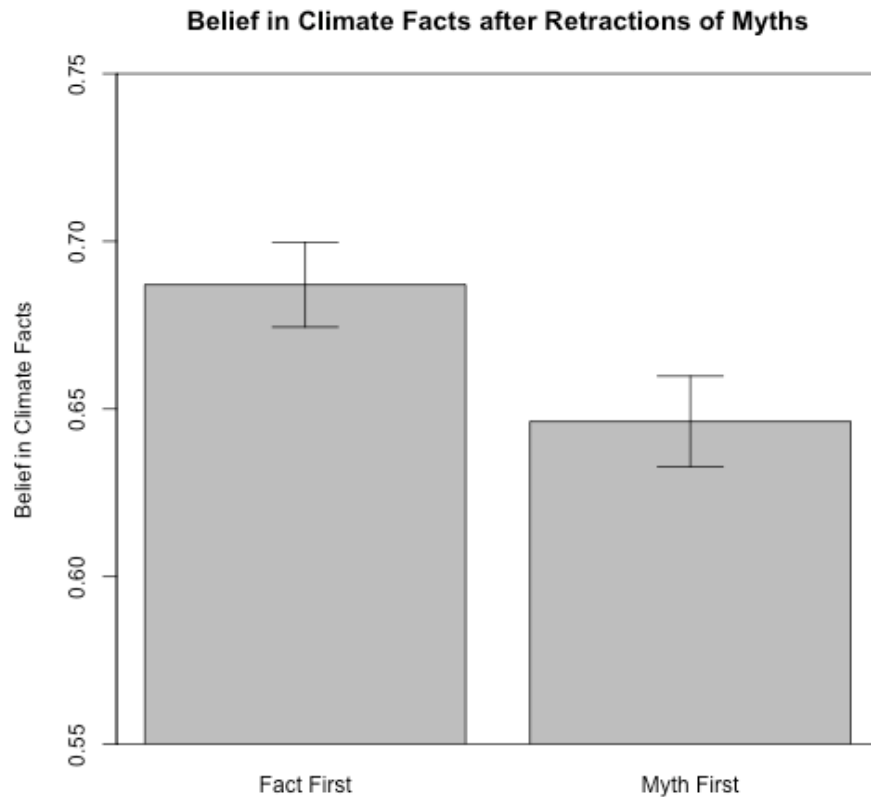
- When people read
  - *“The side effects of the flu vaccine are worse than the flu.”*
- Followed by
  - *“FALSE. The worst side effect would be a sore arm.”*
- What they may remember after a while is:
  - *“The flu vaccine has side effects.”*
- This is because repeating the myth when retracting it makes it more familiar.
- People remember and believe familiar things.

**MYTH**  
FACT FACT FACT  
FACT FACT FACT  
FACT FACT FACT  
FACT FACT FACT  
FACT FACT FACT





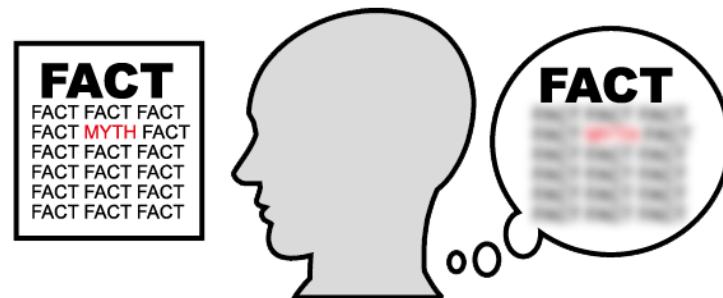
# If you correct myths, start with the facts





# The Familiarity Backfire Effect

- Start with the facts...
  - *“The vaccine is safe! The worst side effect would be a sore arm.”*
- ...then address the myth, clarifying immediately that misinformation will follow (puts people ‘on guard’).
  - *“There are myths that the side effects are worse than the flu, but they are just that: myths.”*





## Effective Debunking II

Avoid the  
Familiarity  
Backfire Effect

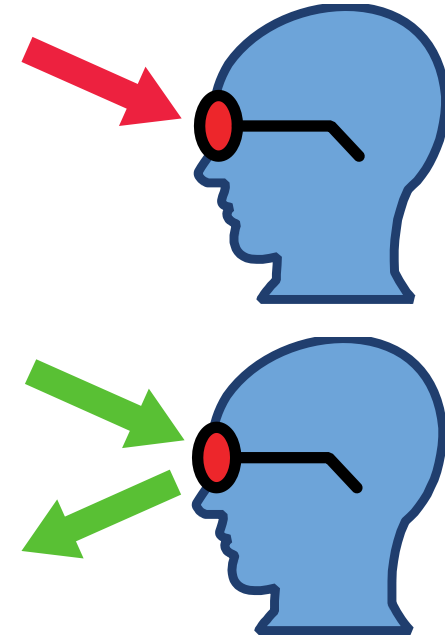


Don't (unnecessarily)  
repeat myths;  
give the facts (first)



# The Worldview Backfire Effect

- If people have strong attitudes and beliefs
  - They will accept attitude-congruent misinformation
  - They will defend their beliefs
  - Retractions can cause **stronger** misbelief





# The Worldview Backfire Effect

## Retraction attitude-congruent

e.g. You support party X.

You hear about misconduct in X.

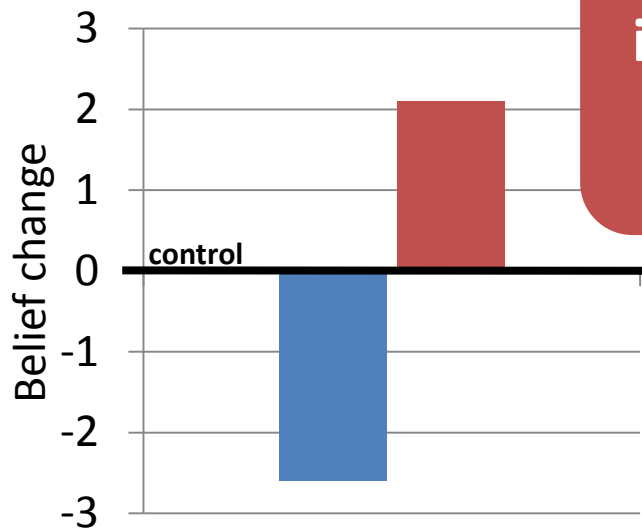
This is retracted: Belief in the  
misconduct is *reduced*.

## Retraction attitude-incongruent

e.g. You support party Y.

You hear about misconduct in X.

This is retracted: Belief in the  
misconduct *increases*.

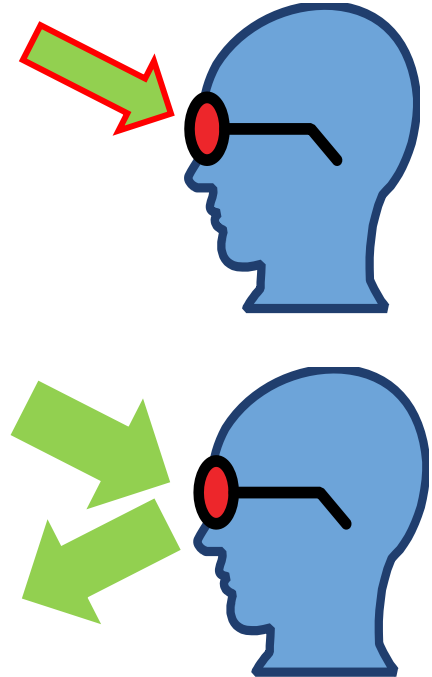


The attitude-  
incongruent  
retraction  
backfires



# The Worldview Backfire Effect

- Messages can be framed to affirm worldview
  - Conservatives are more likely to accept climate science when policy changes are framed as business opportunities (cf. Kahan, 2010)
- Strong believers are difficult to persuade even with hard evidence
  - Efforts are best targeted towards undecided majority

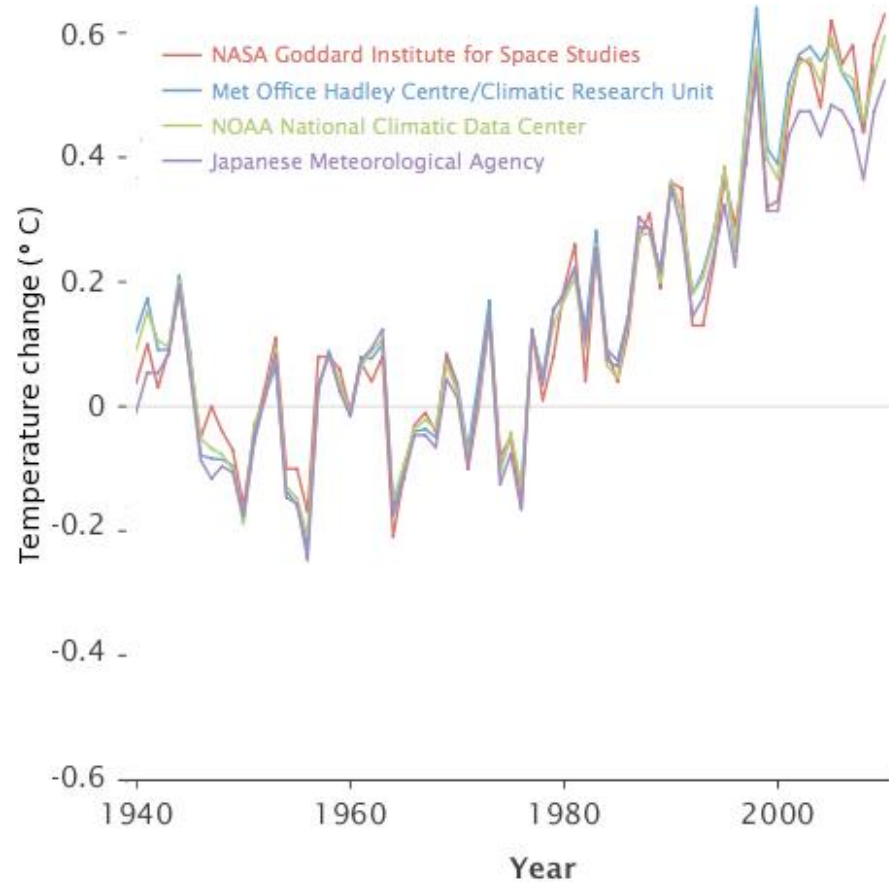




# The Use of Graphs

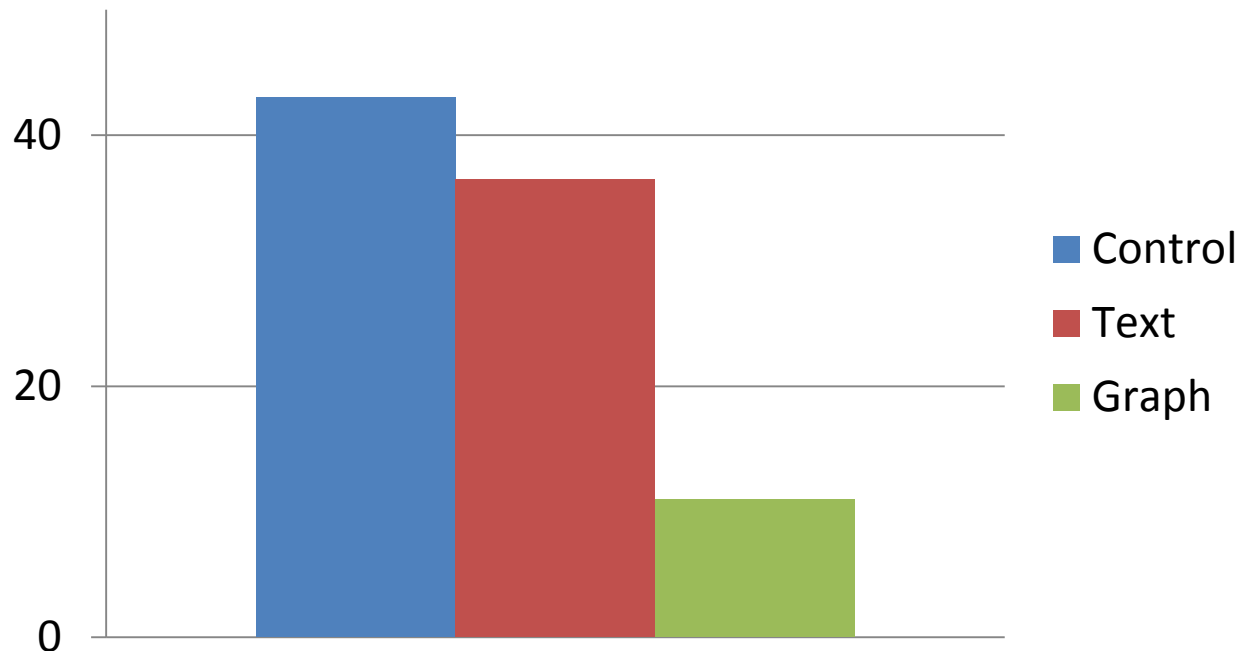
(Nyhan & Reifler, 2011)

Groups of scientists from several major institutions — NASA's Goddard Institute for Space Studies, the National Oceanic and Atmospheric Administration's National Climatic Data Center, the Japanese Meteorological Agency and the Met Office Hadley Centre in the United Kingdom — tally data collected by temperature monitoring stations spread around the world. All four records show peaks and valleys that vary in virtual sync with each other. They each show an increase in average global surface temperatures of approximately 0.5 degrees Celsius over the last three decades. Data from each source also indicate that the last decade is the warmest since 1940.



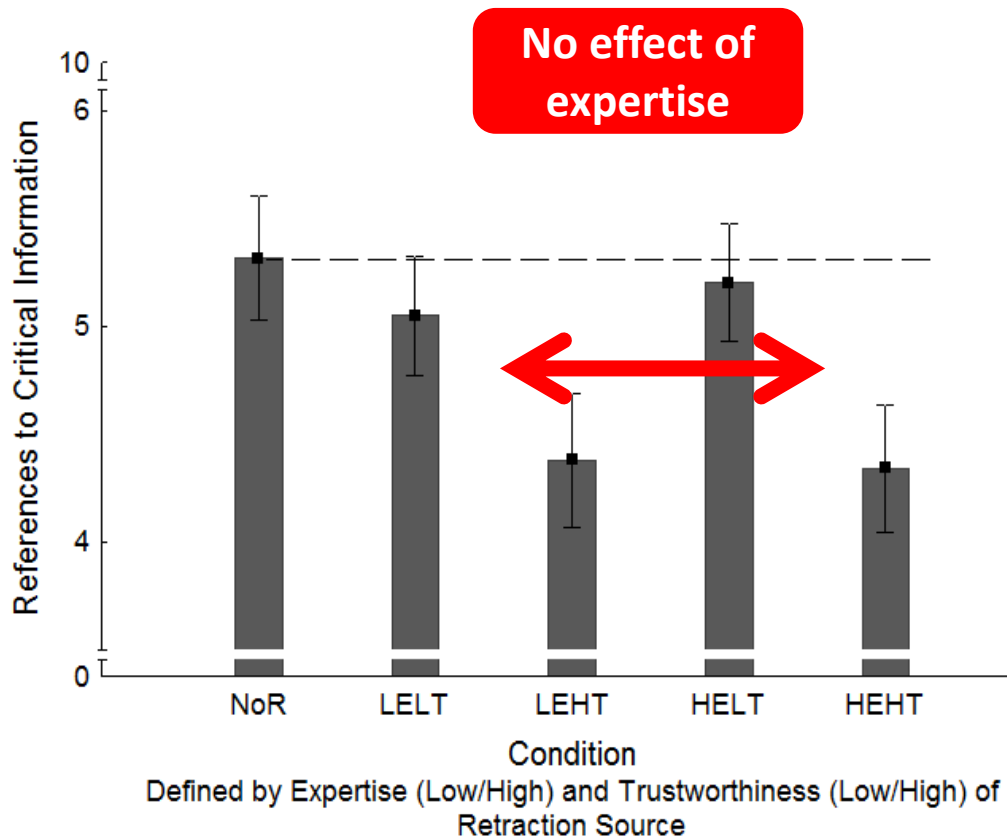


## % Agreement with Global Cooling (in Republicans; Nyhan & Reiffler, 2011)



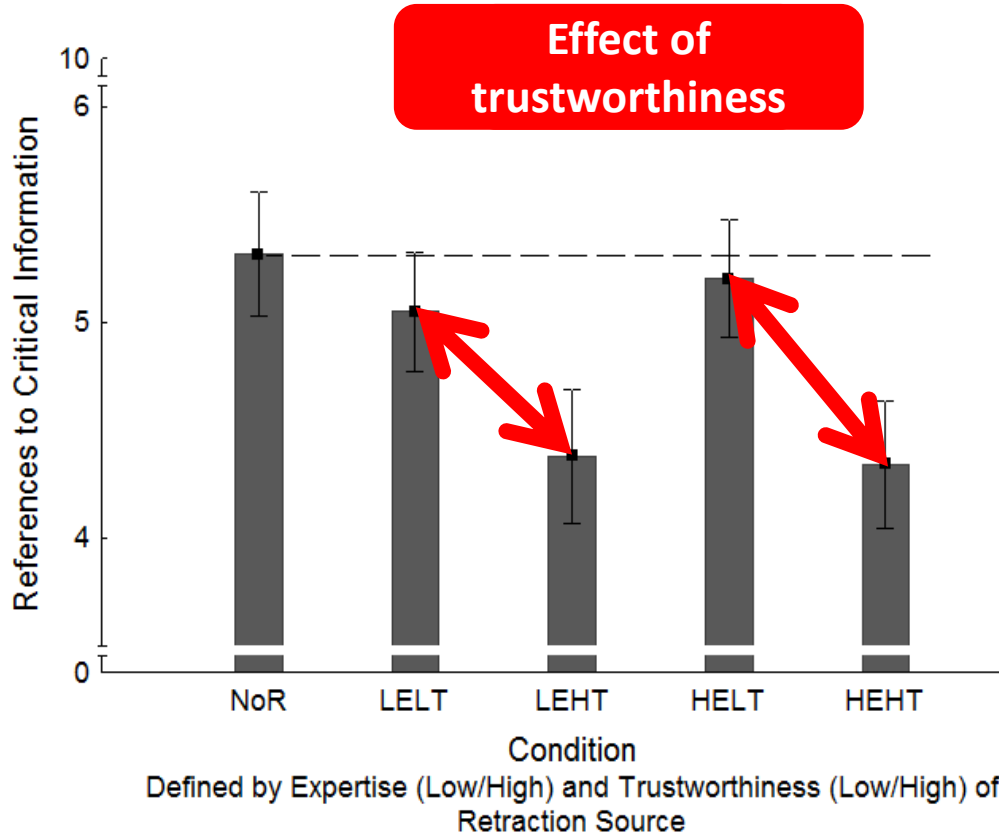


# Trustworthiness and Expertise





# Trustworthiness and Expertise





## Effective Debunking III

Avoid the  
Worldview  
Backfire Effect



Target majority;  
align correction  
to recipient



# Effective Debunking IV

Avoid  
communication  
barriers



Use graphs  
(and simple language)



# Summary of Recommendations

- Provide alternative explanation when retracting a myth
- Focus on facts
- If myth repetition is necessary, start with facts and preface misinformation with an 'Attention: Myth follows!' warning
- Use informative, well-designed graphs
- Use simple language
- Take recipients' worldview into account
- Target non-radical majority



# Thank you!



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For a review, see Lewandowsky et al. (2012) article in *Psychological Science in the Public Interest*, available at:  
<http://psi.sagepub.com/content/13/3.toc>

For a brief summary, see Cook & Lewandowsky's (2011) *Debunking Handbook*, available at:  
<http://sks.to/debunk>

For more literature & enquiries,  
please visit  
[www.cogsciwa.com](http://www.cogsciwa.com)

