Results of the Skeptical Science experiment and impacts on (soon to be) relaunched website

EGU 2026 – EOS4.1 – EGU26-4110

Bärbel Winkler & John Cook – Skeptical Science

INTRODUCTION TO SKEPTICAL SCIENCE

- Skeptical Science (SkS) is a website and non-profit science education organization with international reach founded by John Cook in 2007.
- Main objective is to debunk misconceptions and misinformation about human-caused climate change.
- Features a database that currently has more than 250 rebuttals based on peer-reviewed literature.
- SkS has evolved from a one-person operation to a multinational team project and formal NGO.

WHY SET UP AN EXPERIMENT?

How effective are our rebuttals at reducing readers' acceptance of climate myths?

Is there a need to improve our rebuttals?

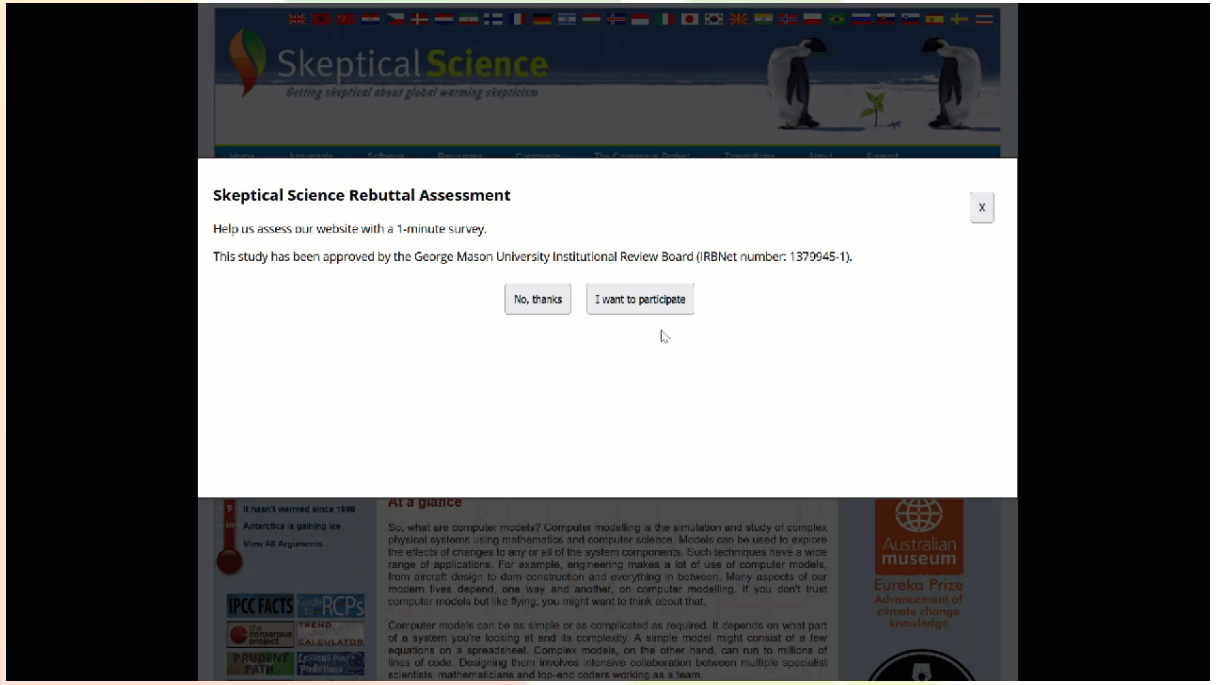
Can we identify key features of effective rebuttals?

Who is interested in reading our rebuttals?

How effective are our rebuttals at increasing readers' acceptance of climate facts?

Would it be possible to measure real-world impact?

DESIGN OF THE EXPERIMENT (1)



- The study targeted users who arrived directly at an English-language rebuttal via an organic Google search.
- Visitors were invited to participate via a pop-up modal.
- Those who provided informed consent were given a short one-question pre-rebuttal survey.
- After reading the rebuttal and reaching the end, they were shown the pop-up with the question again for the post-rebuttal part of the survey.
- The system tracked their start and end times to measure how much time they spent on the page.

DESIGN OF THE EXPERIMENT (2)

How reliable are climate models?

What the science says... Link to this page

Select a level... ● Basic ■ Intermediate

Models successfully reproduce temperatures since 1900 globally, by land, in the air and the ocean.

Climate Myth...

Models are unreliable

"[Models] are full of fudge factors that are fitted to the existing climate, so the models more or less agree with the observed data. But there is no reason to believe that the same fudge factors would give the right behaviour in a world with different chemistry, for example in a world with increased CO2 in the atmosphere." (Freeman Dyson)

Survey X

How much do you agree or disagree with the following statement?

Scientists' computer models have been successful at predicting global warming over long time periods.

STATEMENT TYPE
FACT

- (●) Strongly agree
- ( ) Moderately agree
- ( ) Slightly agree
- ( ) Slightly disagree
- ( ) Moderately disagree
- ( ) Strongly disagree

Submit

Survey X

How much do you agree or disagree with the following statement?

Scientists' computer models are too unreliable to predict future climate.

STATEMENT TYPE
MYTH

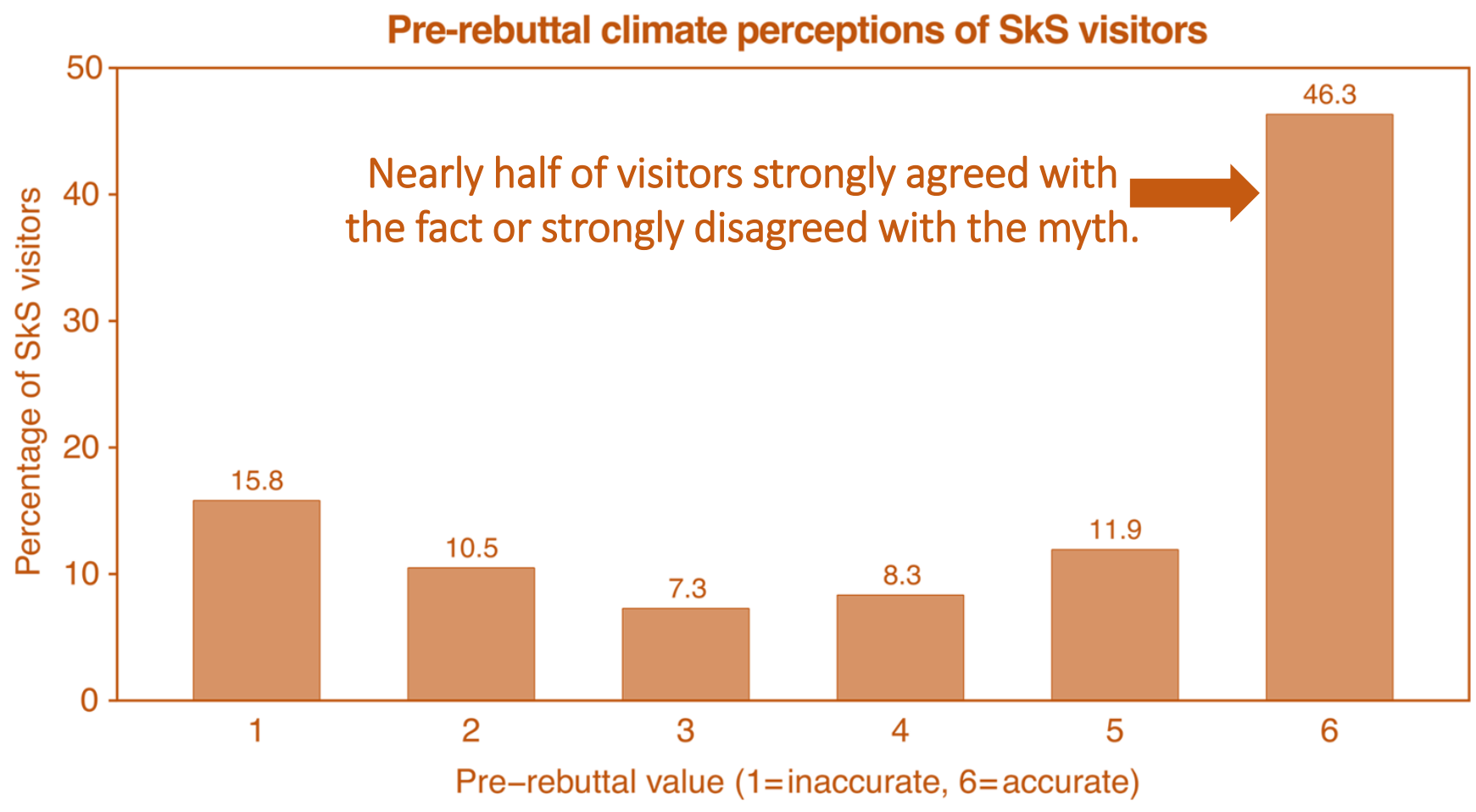
- ( ) Strongly agree
- ( ) Moderately agree
- ( ) Slightly agree
- ( ) Slightly disagree
- ( ) Moderately disagree
- (●) Strongly disagree

Submit

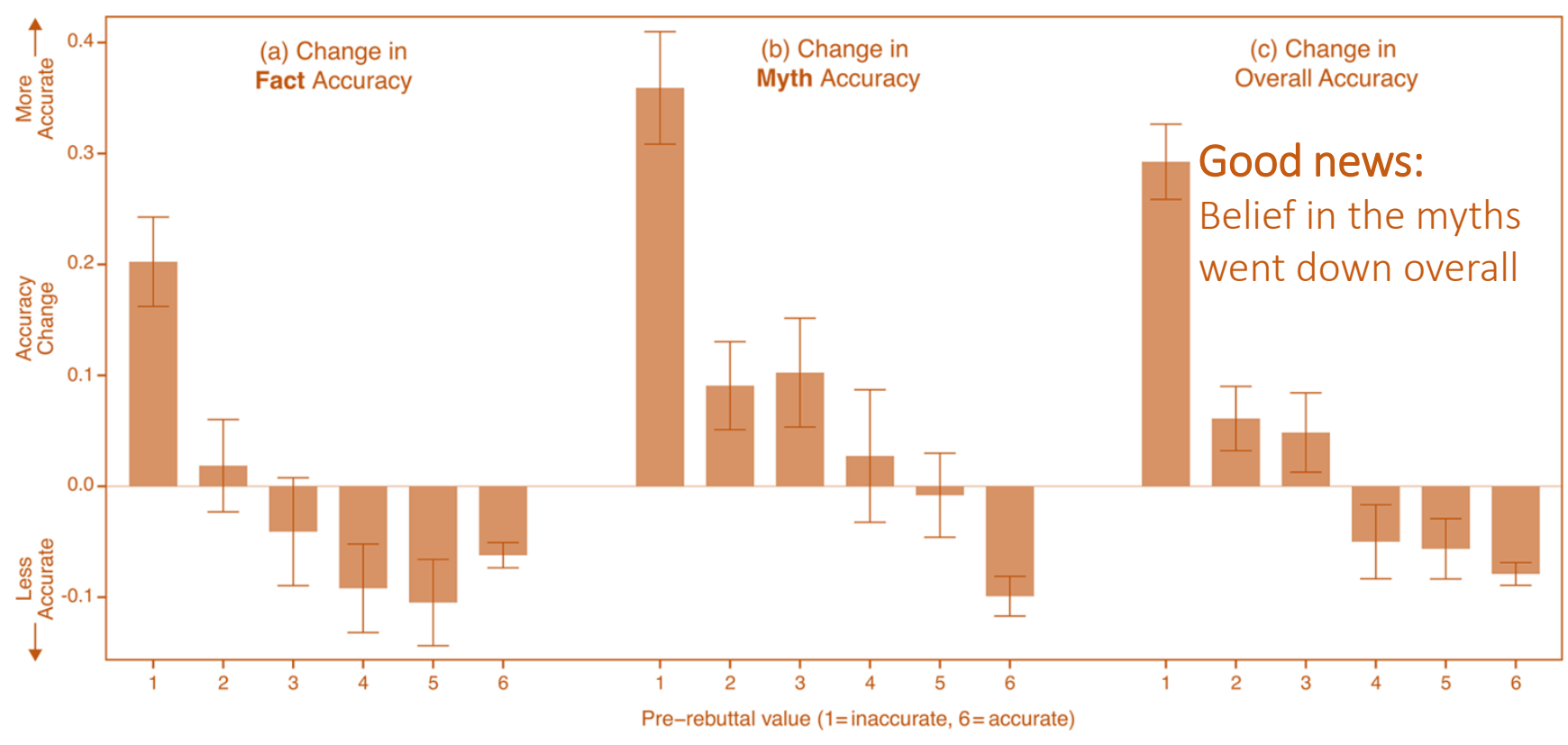
EXPERIMENT BY THE NUMBERS

- Data collection ran from November 2021 to July 2025
- 858,016 visitors were shown the initial invitation
- 13,432 visitors consented to the pre-survey
- 6,261 visitors also completed the post-rebuttal form
- 3146 participants were shown a factual statement and 3115 were shown a myth statement

RESULTS – INCOMING CLIMATE PERCEPTIONS

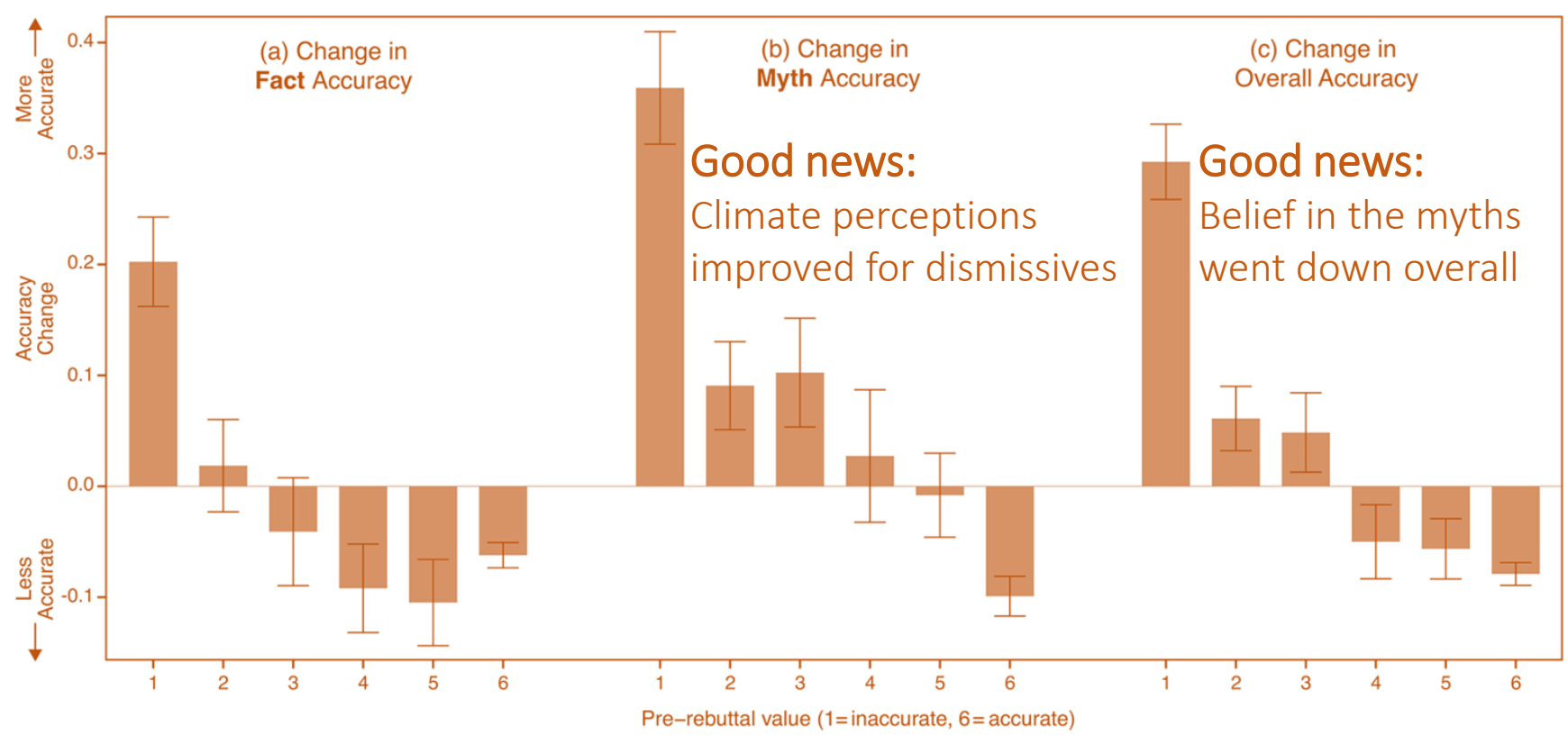


RESULTS – CHANGE IN ACCURACY



Good news:
Belief in the myths went down overall

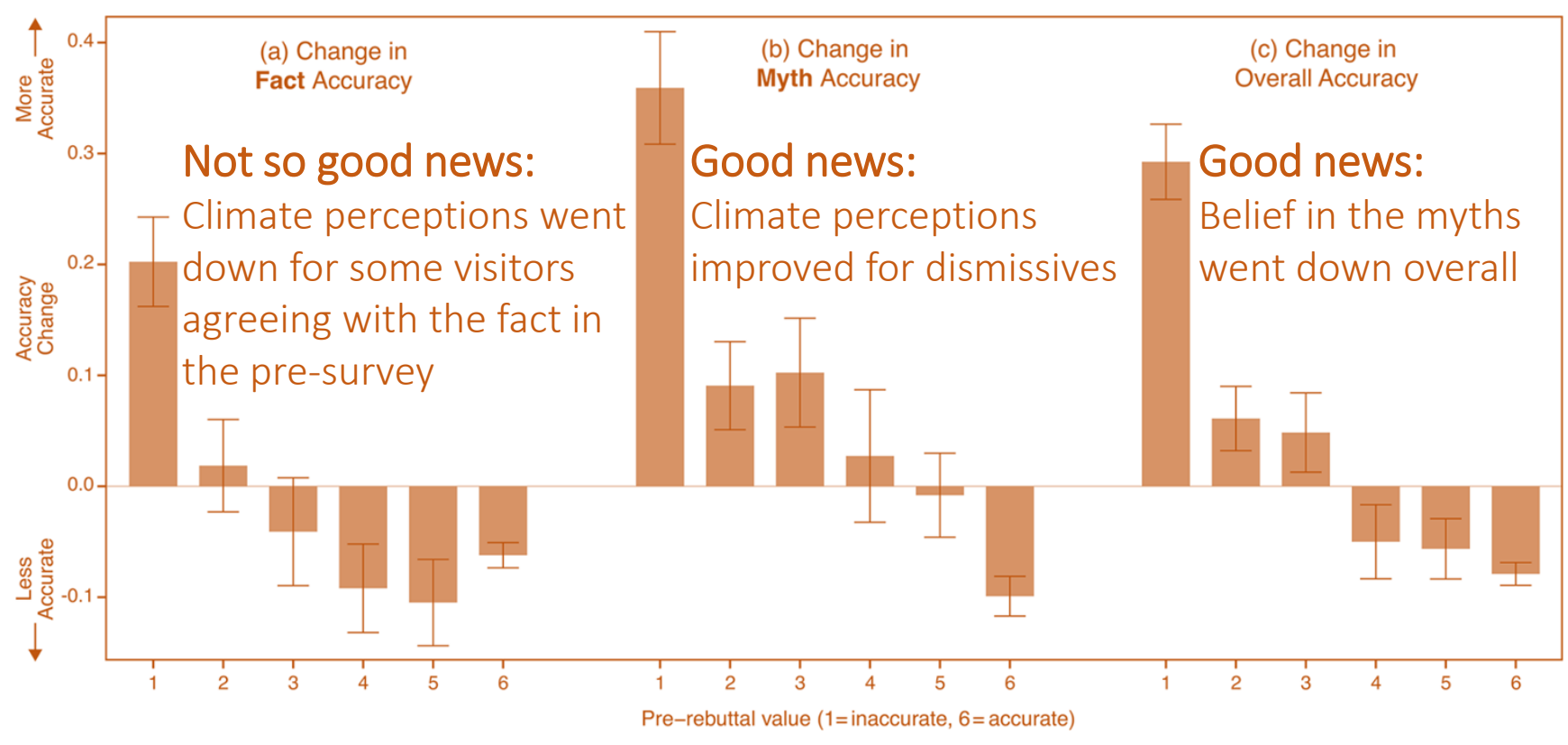
RESULTS – CHANGE IN ACCURACY



Good news:
Climate perceptions improved for dismissives

Good news:
Belief in the myths went down overall

RESULTS – CHANGE IN ACCURACY



Not so good news:
Climate perceptions went down for some visitors agreeing with the fact in the pre-survey

Good news:
Climate perceptions improved for dismissives

Good news:
Belief in the myths went down overall

Not quite what we had hoped to see!

A BIT OF A GUESSING GAME

Comparing the three best- with the three worst-performing rebuttals to fathom possible reasons

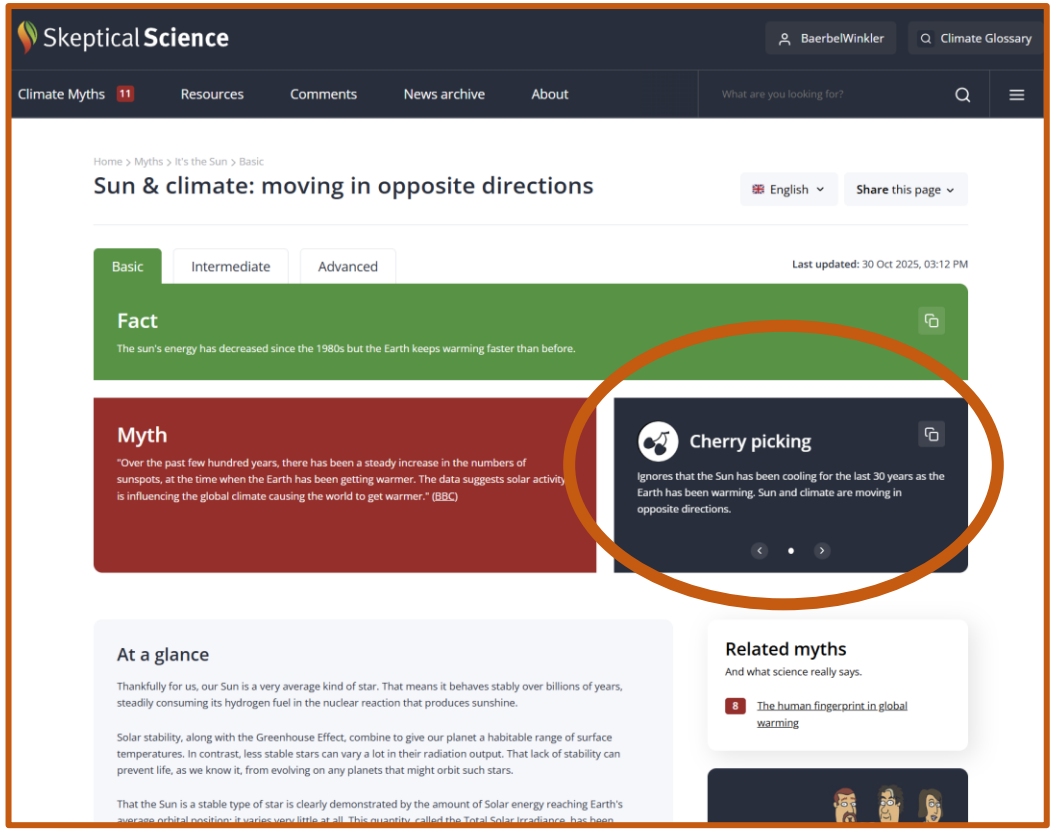
	Rebuttal Topic	Performance Shift	Replacement Fact Articulated?	Fallacy Explicitly Explained?
Top 3 Performers				
1	Climate impacts are not bad	Strong Positive	✓	
2	Caused by albedo	Positive	✓	✓
3	Greenhouse effect saturated	Positive	✓	✓
Bottom 3 Performers				
4	CO2 higher in past (Basic)	Negative	✗	✗
5	CO2 higher in past (Int)	Negative	✗	✗
6	It's cooling	Negative	✗	✓

Note: These are just best guesses as our survey-design did not include any questions about the reasons for the selection made in either the pre- or post-survey

WHAT'S NEXT?

In parallel to running our survey we have been working on a complete relaunch of the Skeptical Science website (see related EOS1.1 oral presentation). One new feature will be the inclusion of the fallacy employed by the climate myth to follow the fact-myth-fallacy structure of a successful debunking.

FACT	Lead with the fact if it's clear, pithy, and sticky—make it simple, concrete, and plausible. It must "fit" with the story.
WARN ABOUT THE MYTH	Warn beforehand that a myth is coming... mention it once only.
EXPLAIN FALLACY	Explain how the myth misleads.
FACT	Finish by reinforcing the fact—multiple times if possible. Make sure it provides an alternative causal explanation.



FUTURE PLANS

- Setup a new experiment on the new website
- Improve the survey design
- Potentially add more questions like:
  - What brought you to Skeptical Science?
  - What influenced your rating?
  - ?

THE TEAM SETTING UP THE EXPERIMENT

Backend Developer

Collin Maessen

Creator of SKS and Researcher

John Cook

Backend Developer

Timo Lubitz

Server admin and scripting

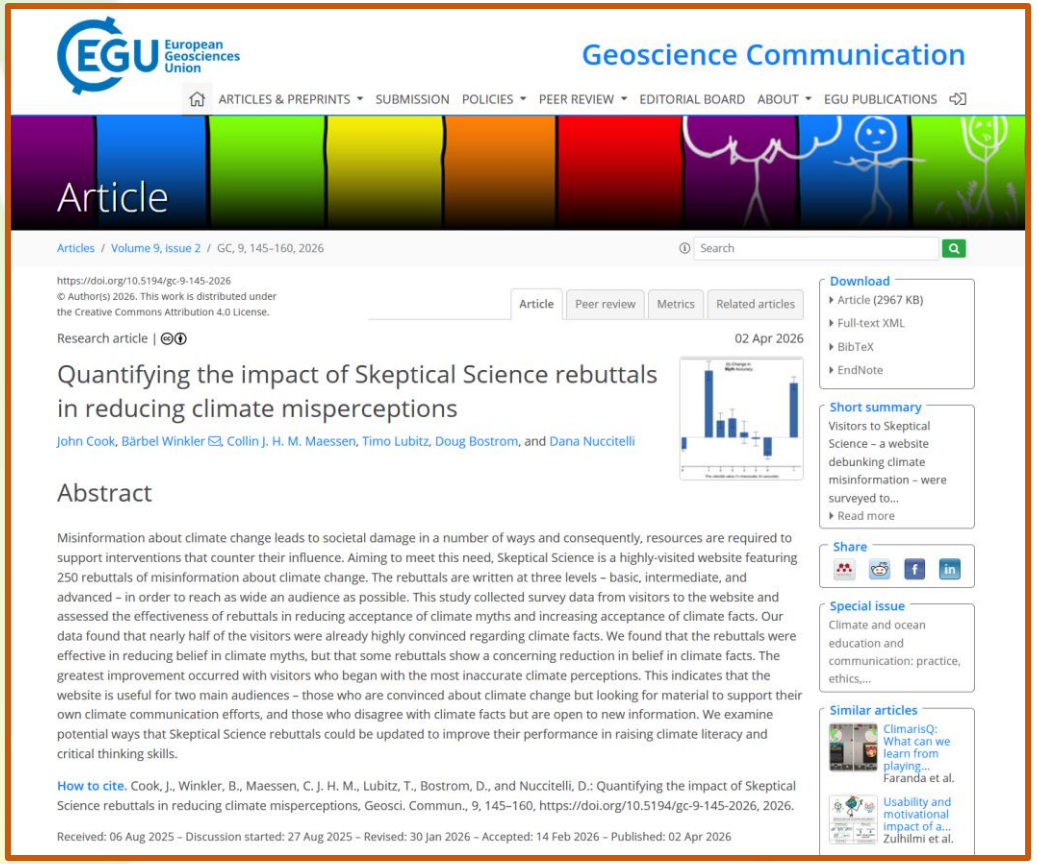
Doug Bostrom

OUR PAPER IN GEOSCIENCE COMMUNICATION

Quantifying the impact of Skeptical Science rebuttals in reducing climate misperceptions

Cook, J., Winkler, B., Maessen, C. J., Lubitz, T., Bostrom, D., & Nuccitelli, D. (2025). Quantifying the Impact of Skeptical Science Rebuttals in Reducing Climate Misperceptions. EGUsphere, 2025, 1-19.

sks.to/sksexperiment



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https://doi.org/10.5194/gc-9-145-2026
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Quantifying the impact of Skeptical Science rebuttals in reducing climate misperceptions

John Cook, Bärbel Winkler, Collin J. H. M. Maessen, Timo Lubitz, Doug Bostrom, and Dana Nuccitelli

Abstract

Misinformation about climate change leads to societal damage in a number of ways and consequently, resources are required to support interventions that counter their influence. Aiming to meet this need, Skeptical Science is a highly-visited website featuring 250 rebuttals of misinformation about climate change. The rebuttals are written at three levels – basic, intermediate, and advanced – in order to reach as wide an audience as possible. This study collected survey data from visitors to the website and assessed the effectiveness of rebuttals in reducing acceptance of climate myths and increasing acceptance of climate facts. Our data found that nearly half of the visitors were already highly convinced regarding climate facts. We found that the rebuttals were effective in reducing belief in climate myths, but that some rebuttals show a concerning reduction in belief in climate facts. The greatest improvement occurred with visitors who began with the most inaccurate climate perceptions. This indicates that the website is useful for two main audiences – those who are convinced about climate change but looking for material to support their own climate communication efforts, and those who disagree with climate facts but are open to new information. We examine potential ways that Skeptical Science rebuttals could be updated to improve their performance in raising climate literacy and critical thinking skills.

How to cite. Cook, J., Winkler, B., Maessen, C. J. H. M., Lubitz, T., Bostrom, D., and Nuccitelli, D.: Quantifying the impact of Skeptical Science rebuttals in reducing climate misperceptions, Geosci. Commun., 9, 145–160, https://doi.org/10.5194/gc-9-145-2026, 2026.

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Short summary
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Thanks!

Bärbel Winkler

Skeptical Science

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Abstract & Full presentation
https://sks.to/egu26-eos41

Companion Blog Post
https://sks.to/egu26-experiment

Skeptical Science

AUTHOR INFORMATION

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Bärbel Winkler lives and works in Germany. She has always had a lot of interest in environmental issues and has been active as a volunteer at the local zoo and a conservation group for many years. Over time and while learning more and more about it, Bärbel became increasingly aware and concerned about climate change and what it will mean for generations to come. As a means to turn her concerns regarding climate change into something productive, Bärbel joined the Skeptical Science team in 2010 and started translating selected content into German. Since 2013 she has been coordinating the translation efforts for all languages, contributes a blog-post every once in a while, helps with many projects and became co-author of several consensus-related studies the Skeptical Science team has published over the years. From 2015 to 2024 she also coordinated the moderation team for the online course “Denial101x – Making sense of climate science denial”.

https://sks.to/BaerbelW

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John Cook is a cognitive scientist, researching how to use critical thinking to counter misinformation. He obtained his PhD at the University of Western Australia, studying the cognitive psychology of climate science denial. His research focus is understanding and countering misinformation about climate change. In 2007, he founded Skeptical Science, a website which won the 2011 Australian Museum Eureka Prize for the Advancement of Climate Change Knowledge and 2016 Friend of the Planet Award from the National Center for Science Education. John authored the book Cranky Uncle vs. Climate Change, that combines climate science, critical thinking, and cartoons to explain and counter climate misinformation. He also co-authored the college textbooks Climate Change: Examining the Facts and Climate Change Science: A Modern Synthesis and the book Climate Change Denial: Heads in the Sand. In 2013, he published a paper finding 97% scientific consensus on human-caused global warming, a finding that has been highlighted by President Obama and UK Prime Minister David Cameron.

https://sks.to/JohnCook

LIST OF LINKS

INTRODUCTION

Skeptical Science – https://skepticalscience.com

Companion article – https://sks.to/EGU26-experiment

ADDITIONAL INFORMATION

Published paper – https://sks.to/sksexperiment

The Debunking Handbook 2020 – https://sks.to/debunk2020

More about our website relaunch – https://sks.to/EGU26-relaunch

EGU26-4110, updated on 13 Mar 2026
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EGU General Assembly 2026

Oral | Monday, 04 May, 17:15–17:25 (CEST) Room D3

Results of the Skeptical Science experiment and impacts on relaunched website

Bärbel Winkler and John Cook
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Skeptical Science is a highly-visited website featuring 250 rebuttals of misinformation about climate change and climate solutions. The rebuttals are written at multiple levels—basic, intermediate, and advanced—in order to reach as wide an audience as possible. Since November 2021, we have collected survey data from visitors, assessing the effectiveness of rebuttals in reducing acceptance in climate myths and increasing acceptance of climate facts. A key goal of misinformation interventions is to increase reader discernment, the difference between belief in facts and belief in myths. While there was overall an increase in discernment, with the decrease in agreement with myths greater than the decrease in agreement with facts, we also found that belief in climate facts decreased for at least some rebuttals - an unwelcome result running counter to Skeptical Science's goals. Due to the survey design and not collecting any information about why readers selected a specific option, we can only make educated guesses about what may have led to selecting a specific option. In parallel to running the experiment on our website, we have also been working on a website relaunch project which will address some of the shortcomings already identified. One new feature will be the inclusion - where applicable - of logical fallacies used in climate myths, so that rebuttals will include all three elements of a successful debunking: fact, myth and fallacy. In my presentation, I'll also highlight some of the other updated or new features this website relaunch will include.

How to cite: Winkler, B. and Cook, J.: Results of the Skeptical Science experiment and impacts on relaunched website, EGU General Assembly 2026, Vienna, Austria, 3–8 May 2026, EGU26-4110, https://doi.org/10.5194/egusphere-egu26-4110, 2026.