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The Debunking Handbook 2020

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Quick guide to responding to misinformation

Misinformation can do damage

Misinformation is false information that is spread either by mistake or with intent to mislead. When there is intent to mislead, it is called disinformation. Misinformation has the potential to cause substantial harm to individuals and society. It is therefore important to protect people against being misinformed, either by making them resilient against misinformation before it is encountered or by debunking it after people have been exposed.

Misinformation can be sticky!

Fact-checking can reduce people's beliefs in false information. However, misinformation often continues to influence people's thinking even after they receive and accept a correction—this is known as the "continued influence effect" [1]. Even if a factual correction seems effective—because people acknowledge it and it is clear that they have updated their beliefs—people frequently rely on the misinformation in other contexts, for example when answering questions only indirectly related to the misinformation. It is therefore important to use the most effective debunking approaches to achieve maximal impact.

Prevent misinformation from sticking if you can

Because misinformation is sticky, it's best preempted. This can be achieved by explaining misleading or manipulative argumentation strategies to people—a technique known as "inoculation" that makes people resilient to subsequent manipulation attempts. A potential drawback of inoculation is that it requires advance knowledge of misinformation techniques and is best administered before people are exposed to the misinformation.

Debunk often and properly

If you cannot preempt, you must debunk. For debunking to be effective, it is important to provide detailed refutations [2, 3]. Provide a clear explanation of (1) why it is now clear that the information is false, and (2) what is true instead. When those detailed refutations are provided, misinformation can be "unstuck." Without detailed refutations, the misinformation may continue to stick around despite correction attempts.

Misinformation can do damage

Misinformation damages society in a number of ways [4, 5]. If parents withhold vaccinations from their children based on mistaken beliefs, public health suffers [6]. If people fall for conspiracy theories surrounding COVID-19, they are less likely to comply with government guidelines to manage the pandemic [7], thereby imperiling all of us.

It's easy to be misled. Our feelings of familiarity and truth are often linked. We are more likely to believe things that we have heard many times than new information.

"Objective truth is less important than familiarity: we tend to believe falsehoods when they are repeated sufficiently often."

Definitions

Misinformation: False information that is disseminated, regardless of intent to mislead.

Disinformation: Misinformation that is deliberately disseminated to mislead.

Fake news: False information, often of a sensational nature, that mimics news media content.

Continued influence effect: The continued reliance on inaccurate information in people's memory and reasoning after a credible correction has been presented.

Illusory truth effect: Repeated information is more likely to be judged true than novel information because it has become more familiar.

This phenomenon is called the "illusory truth effect" [8, 9]. Thus, the more people encounter a piece of misinformation they do not challenge, the more the misinformation seems true, and the more it sticks. Even if a source is identified as unreliable or is blatantly false and inconsistent with people's ideology, repeated exposure to information still tilts people towards believing its claims [10, 11, 12, 13].

Misinformation is also often steeped in emotional language and designed to be attention-grabbing and have persuasive appeal. This facilitates its spread and can boost its impact [14], especially in the current online economy in which user attention has become a commodity [15].

Misinformation can also be intentionally suggested by "just asking questions"; a technique that allows provocateurs to hint at falsehoods or conspiracies while maintaining a facade of respectability [16]. For example, in one study, merely presenting questions that hinted at a conspiracy relating to the Zika virus induced significant belief in the conspiracy [16]. Likewise, if you do not read past a headline such as "Are aliens amongst us?" you might walk away with the wrong idea.

Where does misinformation come from?

Misinformation ranges from outdated news initially thought to be true and disseminated in good faith, to technically-true but misleading half-truths, to entirely fabricated disinformation spread intentionally to mislead or confuse the public. People can even acquire misconceptions from obviously fictional materials [17, 18]. Hyper-partisan news sources frequently produce misinformation [19], which is then circulated by partisan networks. Misinformation has been shown to set the political agenda [20].

Misinformation can be sticky!

"Misinformation is sticky—even when it seems to have been corrected."

A fundamental conundrum with misinformation is that even though corrections may seem to reduce people's beliefs in false information, the misinformation often continues to influence people's thinking—this is known as the "continued influence effect"[1]. The effect has been replicated many times. For example, someone might hear that a relative has fallen ill from food poisoning. Even if they later learn that the information was incorrect—and even if the person accepts and remembers this correction—they might still show a lingering reliance on the initial misinformation in different contexts (e.g., they might avoid the restaurant allegedly involved).

Fact-checking and corrections appear to "work" when you ask people directly about their beliefs. For example, people may report the correction accurately and state that they no longer believe the original misinformation. But that doesn't guarantee that the misinformation will not pop up elsewhere, for example when answering questions or making indirectly related decisions.

Even though misinformation is sticky, we have opportunities to respond. We can prevent misinformation from taking root in the first place. Or we can apply best practices to debunk misinformation successfully.

"Once experienced, even corrected misinformation can linger in memory but we can often undo its influence if we follow best practices."

Sticky myths leave other marks

There is much evidence that updates to factual beliefs, even if successful, may not translate into attitude or behaviour change. For example, in polarized societies (e.g., the U.S.) people indicate that they will continue to vote for their favored politician even if they discover that the majority of the politician's statements are false[21, 22, 23]. Fortunately, it does not have to be that way. In less polarized societies (e.g., Australia), people's voting intentions are sensitive to politicians' truthfulness[24].

Nevertheless, do not refrain from debunking because you are worried it will not change behaviour. Successful debunking can affect behaviour—for example, it can reduce people's willingness to spend money on questionable health products or their sharing of misleading content online[25, 26].

Prevent misinformation from sticking if you can

As misinformation is hard to dislodge, preventing it from taking root in the first place is one fruitful strategy. Several prevention strategies are known to be effective.

Simply warning people that they might be misinformed can reduce later reliance on misinformation [27, 78]. Even general warnings ("the media sometimes does not check facts before publishing information that turns out to be inaccurate") can make people more receptive to later corrections. Specific warnings that content may be false have been shown to reduce the likelihood that people will share the information online [28].

The process of inoculation or "prebunking" includes a forewarning as well as a preemptive refutation and follows the biomedical analogy [29]. By exposing people to a severely weakened dose of the techniques used in misinformation (and by preemptively refuting them), "cognitive antibodies" can be cultivated. For example, by explaining to people how the tobacco industry rolled out "fake experts" in the 1960s to create a chimerical scientific "debate" about the harms from smoking, people become more resistant to subsequent persuasion attempts using the same misleading argumentation in the context of climate change [30].

The effectiveness of inoculation has been shown repeatedly and across many different topics [30, 31, 32, 33, 34]. Recently, it has been shown that inoculation can be scaled up through engaging multimedia applications, such as cartoons [35] and games [36, 37].

Simple steps to greater media literacy

Simply encouraging people to critically evaluate information as they read it can reduce the likelihood of taking in inaccurate information [38] or help people become more discerning in their sharing behavior [39].

Educating readers about specific strategies to aid in this critical evaluation can help people develop important habits. Such strategies include: Taking a "buyer beware" stance towards all information on social media; slowing down and thinking about the information provided, evaluating its plausibility in light of alternatives [40, 41]; always considering information sources, including their track record, their expertise, and their motives [42]; and verifying claims (e.g., through "lateral reading" [43]) before sharing them [44]. Lateral reading means to check other sources to evaluate the credibility of a website rather than trying to analyse the site itself. Many tools and suggestions for enhancing digital literacy exist [45].

You cannot assume that people spontaneously engage in such behaviours [39]. People do not routinely track, evaluate, or use the credibility of sources in their judgments [10]. However, when they do, the impact of misinformation from less-credible sources can be reduced *(see next textbox)*.

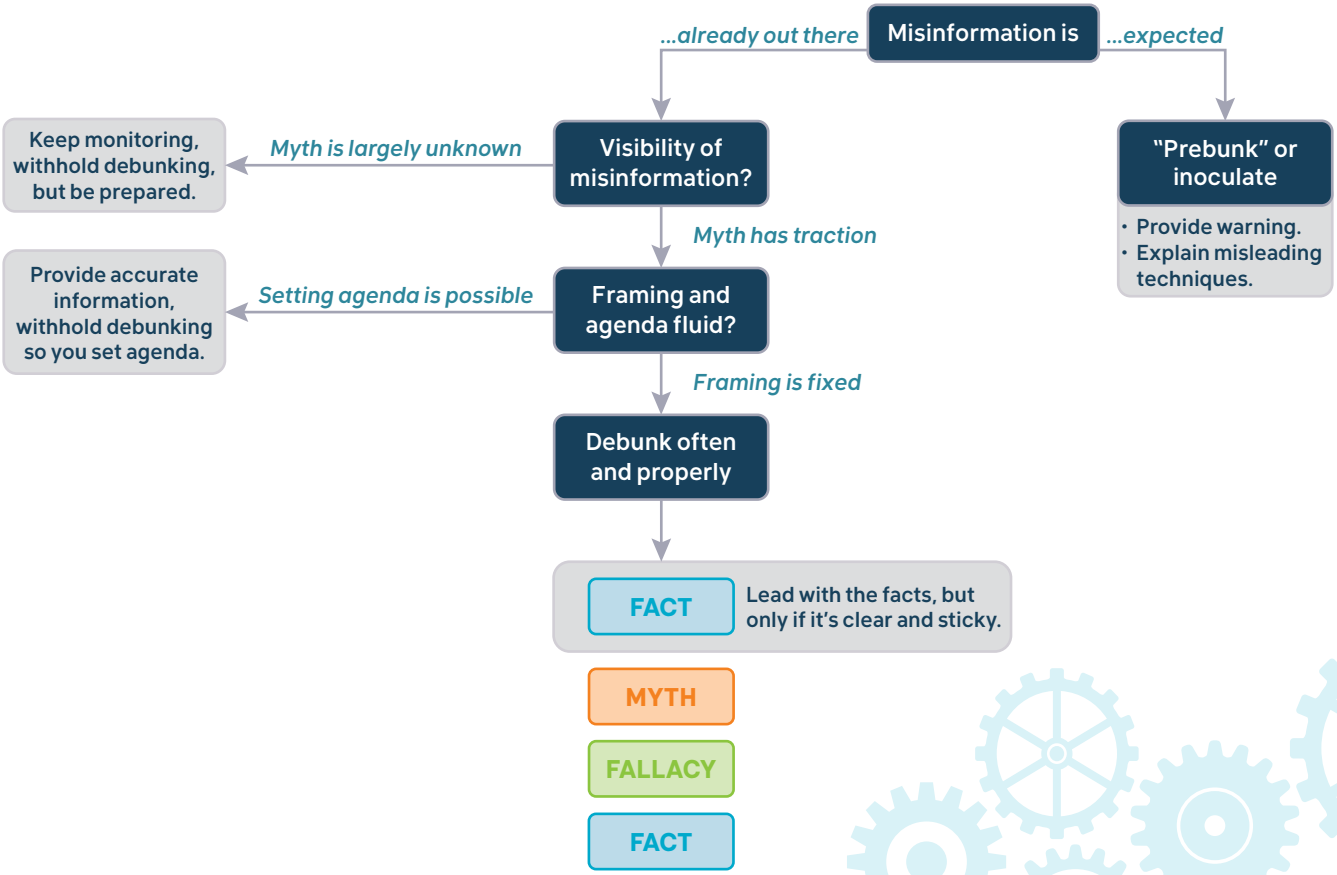
The strategic landscape of debunking

If you are unable to prevent misinformation from sticking, then you have another arrow in your quiver: Debunking! However, you should first think about a few things before you start debunking.

Everyone has limited time and resources, so you need to pick your battles. If a myth is not spreading widely, or does not have the potential to cause harm now or in the future, there may be no point in debunking it. Your efforts may be better invested elsewhere, and the less said about an unknown myth the better.

Corrections have to point to the misinformation so they necessarily raise its familiarity. However, hearing about misinformation in a correction does little damage, even if the correction introduces a myth that people have never heard of before [46]. Nonetheless, one should be mindful not to give undue exposure to fringe opinion and conspiracy claims through a correction. If no one has heard of the myth that earwax can dissolve concrete, why correct it in public?

Debunkers should also be mindful that any correction necessarily reinforces a rhetorical frame (i.e., a set of "talking points") created by someone else. You cannot correct someone else's myth without talking about it. In that sense, any correction—even if successful—can have unintended consequences, and choosing one's own frame may be more beneficial. For example, highlighting the enormous success and safety of a vaccine might create a more positive set of talking points than debunking a vaccine-related myth [47]. And they are *your* talking points, not someone else's.



Who should debunk?

Successful communication rests on the communicator's credibility.

Information from sources that are perceived to be credible typically creates stronger beliefs [48] and is more persuasive [49, 50]. By and large, this also holds for misinformation [51, 52, 53]. However, credibility may have limited effects when people pay little attention to the source [54, 55], or when the sources are news outlets rather than people [56, 57].

Source credibility also matters for corrections of misinformation, although perhaps to a lesser extent [51, 53]. When breaking down credibility into trustworthiness and expertise, perceived trustworthiness of a debunking source may matter more than its perceived expertise [58, 59]. Sources with high credibility on both dimensions (e.g., health professionals or trusted health organizations) may be ideal choices [60, 61, 62].

It is worth keeping in mind that the credibility of a source will matter more to some groups than others, depending on content and context [60, 63]. For example, people with negative attitudes toward vaccines distrust formal sources of vaccine-related information (including generally-trusted health organizations) [64].

Tailor the message to the audience and use a messenger trusted by the target group [65]. Discredit disinformation sources that have vested interests [53].

The elusive backfire effects

Ten years ago, scholars and practitioners were concerned that corrections may "backfire"; that is, ironically strengthen misconceptions rather than reduce them. Recent research has allayed those concerns: backfire effects occur only occasionally and the risk of occurrence is lower in most situations than once thought.

Do not refrain from attempting to debunk or correct misinformation out of fear that doing so will backfire or increase beliefs in false information [66, 67, 68].

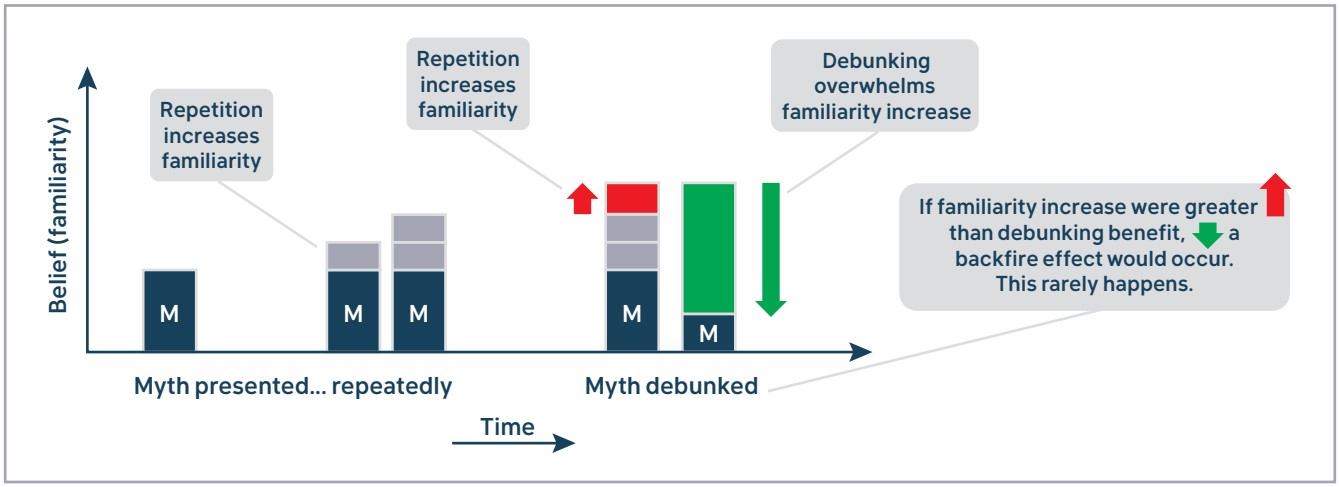
Definition

Backfire Effect: A backfire effect is where a correction inadvertently increases belief in, or reliance on, misinformation relative to a pre-correction or no-correction baseline.

"Backfire effects are not as common as we used to think. We cannot reliably predict the circumstances under which they occur."

Familiarity backfire effect

Repetition makes information more familiar, and familiar information is generally perceived to be more truthful than novel information (the aforementioned illusory-truth effect). Because a myth is necessarily repeated when it is debunked, the risk arises that debunking may backfire by making a myth more familiar *(see figure below)*. Early evidence was supportive of this idea, but more recently, exhaustive experimental attempts to induce a backfire effect through familiarity alone have come up empty[69, 70]. Thus, while repeating misinformation generally increases familiarity and truth ratings, repeating a myth while refuting it has been found to be safe in many circumstances, and can even make the correction more salient and effective[71].



"Debunking a myth makes it more familiar but the debunking usually overpowers the increase in familiarity."

Overkill backfire effect

This effect refers to the idea that providing "too many" counterarguments against a false claim might produce unintended effects or even backfire. The only study to directly examine this notion, however, found no evidence for this effect and instead concluded that a greater number of relevant counterarguments generally leads to greater reduction of misconceptions[69].

Worldview backfire effect

The worldview backfire effect is presumed to occur when a correction that challenges people's worldview increases belief in the misinformation. While there was initially some evidence for the worldview backfire effect[72], recent research indicates that it is not a pervasive and robust empirical phenomenon.

Personal experience vs. evidence

Although communicators may observe backfire effects in their everyday lives, many experiments have shown that, in fact, such behavior is unusual. Social scientists are still figuring out why some people "backfire" but not others, and why those effects occur on some occasions but not others. However, the accumulated evidence to date is clear that the worldview backfire effect is not a sufficient reason to avoid debunking and fact-checking.

Several studies have failed to obtain a backfire effect even in theoretically favourable circumstances [22, 23, 67, 73, 74]. Thus, while there are reports of worldview backfire effects emerging under specific conditions (e.g., when Republicans are presented with information concerning climate mitigation measures [75]) concern about worldview backfire has been disproportionate.

Role of worldview in belief confirmation

Even if worldview backfire effects are infrequent, there are other ways that worldview can affect debunking.

Worldview can affect what content people choose to consume [76, 77, 78]. This process of selective exposure may mean that people are more likely to be exposed to worldview-consonant false or misleading claims in the first place, and by implication, less likely to be exposed to corrective information about such claims after exposure. To illustrate, one analysis showed that 62% of visits to fake news websites came from the 20% of Americans with the most conservative information diet [77].

The efficacy of corrections depends in part on the recipient's willingness to believe the statement. Activating group identities likely induces constraints in how people think about an issue—depending on the identity and the issue, this may ameliorate or exacerbate misperceptions, and it may affect whom a person will believe. This highlights the importance of using inclusive language and avoiding the stigmatization of groups for holding inaccurate beliefs. Doing so is likely to polarize more than generate desired updating.

Recent research suggests that although (mis-)information diets may differ across the political spectrum, some of the motivated reasoning processes just described may be symmetric for liberals and conservatives [79].

"On balance, recent evidence provides no reason to avoid debunking for fear of a backfire effect. Debunking is likely to be at least partially effective, except for some limited circumstances when people's worldviews are being challenged."

Debunk often and do it properly

Simple corrections on their own are unlikely to fully unstick misinformation. Tagging something as questionable or from an untrustworthy source is not enough in the face of repeated exposures.

Debunking is more likely to be successful if you apply the following 3 or 4 components:

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.

FACT: State the truth first

If it's easy to do in a few clear words, state what is true first. This allows you to frame the message—you lead with your talking points, not someone else's.

The best corrections are as prominent (in the headlines, not buried in questions) as the misinformation.

Do not rely on a simple retraction ("this claim is not true").

Providing a factual alternative, that is an alternative that fills a causal "gap" in explaining what happened if the misinformation is corrected, is an effective method of debunking. Having a causal alternative facilitates "switching out" the inaccurate information in an individual's initial understanding and replaces it with a new version of what happened.

The alternative should not be more complex and should have the same explanatory relevance as the original misinformation [1, 80, 81].

There may, however, be circumstances in which the facts are so nuanced that they escape pithy summary. In those cases, it may be better to lead with an explanation of why the myth is false before explaining the facts.

MYTH: Point to misinformation

Repeat the misinformation, only once, directly prior to the correction. One repetition of the myth is beneficial to belief updating [27, 71, 82, 83].

But needless repetitions of the misinformation should be avoided: Although backfire effects are uncommon, we know that repetition makes information appear true [84, 85, 86].

Corrections are most successful if people are suspicious, or made to be suspicious, of the source or intent of the misinformation [87].

FALLACY: Explain why misinformation is wrong

Juxtapose the correction with the mistaken information. Ensure the rebuttal is clearly and saliently paired with the misinformation. It should be virtually impossible for the individual to ignore, overlook, or not notice the corrective element, even when skimming [27, 88, 89].

Rather than only stating that the misinformation is false, it is beneficial to provide details as to why. Explain (1) why the mistaken information was thought to be correct in the first place and (2) why it is now clear it is wrong and (3) why the alternative is correct [81, 90, 91]. It is important for people to see the inconsistency in order to resolve it [71, 83].

Such detailed corrections promote sustained belief change over time and protect against belief regression (i.e., a return to pre-correction beliefs [2, 52, 92]).

If possible, explain why the misinformation is wrong not only by providing a factual alternative but by pointing out logical or argumentative fallacies underlying the misinformation. A practical advantage of uncovering fallacies [66] is that they are not domain specific, and people can therefore benefit from the debunking in other content domains as well. Once you know that climate misinformation relies on cherry-picking [79] or incoherence [93], you may detect similar bad argumentation among anti-vaccination activists.

FACT: State the truth again

Restate the fact again, so the fact is the last thing people process.

Even with detailed refutations, the effects will wear off over time [3, 52], so be prepared to debunk repeatedly!

General guidelines:

Avoid scientific jargon or complex, technical language [94].

Well-designed graphs, videos, photos, and other semantic aids can be helpful to convey corrections involving complex or statistical information clearly and concisely [95, 96, 97].

The truth is often more complicated than some viral false claim. You must invest effort in translating complicated ideas so they are readily accessible to the target audience—so they can be easily read, easily imagined, and easily recalled [98, 99, 100].

Collective action: Debunking on social media

Accuracy nudges (e.g., "most people want to receive accurate information") and reminders increase the quality of people's sharing decisions on social media [39].

Mobilize social media users to respond quickly to misinformation by sharing facts. A platform's efforts may not be sufficient in scope or scalable to misinformation; user correction can work if people feel emboldened to engage in it [101, 102].

"Focus on interpersonal effects in online communication: 'see something, say something' " [102].

Individuals have the ability to make a difference online: Corrections from users, experts, and algorithms (e.g., recommending related articles that contain a correction) can all be effective in reducing community misperceptions when responding to misinformation [103, 104, 105].

Seeing someone else on social media being corrected (known as observational corrections) can lead to more accurate attitudes on various topics [61].

Conversely, not speaking out can lead to a "spiral of silence", both for the person being corrected and for the observer, where a mute majority cedes a narrative to a vocal but misinformed minority [106, 107, 108].

Example of a Refutation

FACT

Scientists observe human fingerprints all over our climate

The warming effect from greenhouse gases like carbon dioxide has been confirmed by many lines of evidence. Aircraft and satellites measure less heat escaping to space at the exact wavelengths that carbon dioxide absorbs energy. The upper atmosphere cools while the lower atmosphere warms—a distinct pattern of greenhouse warming.

- Lead with the fact if it's clear, pithy, and sticky—make it simple, concrete, and plausible.
- Provide a factual alternative that fills a causal "gap", explaining what happened if the misinformation is corrected.
- Do not rely on a simple retraction ("this claim is not true").

MYTH

A common climate myth is that climate has always changed naturally in the past, therefore modern climate change must be natural also.

- Warn that a myth is coming.
- Repeat the misinformation, only once, directly prior to the correction.

FALLACY

This argument commits the single cause fallacy, falsely assuming that because natural factors have caused climate change in the past, then they must always be the cause of climate change.

This logic is the same as seeing a murdered body and concluding that people have died of natural causes in the past, so the murder victim must have also died of natural causes.

- Explain how the myth misleads.
- Point out logical or argumentative fallacies underlying the misinformation.

FACT

Just as a detective finds clues in a crime scene, scientists have found many clues in climate measurements confirming humans are causing global warming. Human-caused global warming is a measured fact.

- Finish by reinforcing the fact.
- Repeat the fact multiple times if possible.

References

1 Johnson, H. M., & Seifert, C. M. (1994). Sources of the continued influence effect: When misinformation in memory affects later inferences. Journal of Experimental Psychology: Learning, Memory, and Cognition, 20(6), 1420-1436.

2 Ecker, U. K. H., O'Reilly, Z., Reid, J. S., & Chang, E. P. (2020). The effectiveness of short-format refutational fact-checks. British Journal of Psychology, 111(1), 36-54.

3 Paynter, J., Luskin-Saxby, S., Keen, D., Fordyce, K., Frost, G., Imms, C., ... & Ecker, U. K. H. (2019). Evaluation of a template for countering misinformation—Real-world autism treatment myth debunking. PLOS ONE, 14, e0210746. https://doi.org/10.1371/journal.pone.0210746.

4 Lewandowsky, S., Ecker, U. K. H., & Cook, J. (2017). Beyond misinformation: Understanding and coping with the post-truth era. Journal of Applied Research in Memory and Cognition, 6, 353-369. https://doi.org/10.1016/j.jarmac.2017.07.008.

5 Southwell, B. G., Thorson, E. A., & Sheble, L. (2018). Misinformation among mass audiences as a focus for inquiry. In B. G. Southwell, E. A. Thorson, & L. Sheble (Eds.), Misinformation and mass audiences (pp. 1–14). Austin: University of Texas Press.

6 Gangarosa, E. J., Galazka, A. M., Wolfe, C. R., Phillips, L. M., Miller, E., Chen, R. T., & Gangarosa, R. E. (1998). Impact of anti-vaccine movements on pertussis control: the untold story. The Lancet, 351(9099), 356-361.

7 Freeman, D., Waite, F., Rosebrock, L., Petit, A., Causier, C., East, A., ... & Bold, E. (2020). Coronavirus conspiracy beliefs, mistrust, and compliance with government guidelines in England. Psychological Medicine, 1-30. DOI 10.1017/s0033291720001890.

8 Hasher, L., Goldstein, D., & Toppino, T. (1977). Frequency and the conference of referential validity. Journal of Verbal Learning and Verbal Behavior, 16, 107-112.

9 Fazio, L. K., Brashier, N. M., Payne, B. K., & Marsh, E. J. (2015). Knowledge does not protect against illusory truth. Journal of Experimental Psychology: General, 144(5), 993.

10 Henkel, L. A., & Mattson, M. E. (2011). Reading is believing: The truth effect and source credibility. Consciousness and Cognition, 20(4), 1705-1721.

11 Pennycook, G., Cannon, T. D., & Rand, D. G. (2018). Prior exposure increases perceived accuracy of fake news. Journal of Experimental Psychology: General, 147, 1865-1880. DOI 10.1037/xge0000465.

12 Stanley, M. L., Yang, B. W., & Marsh, E. J. (2019). When the unlikely becomes likely: Qualifying language does not influence later truth judgments. Journal of Applied Research in Memory and Cognition, 8(1), 118-129.

13 Unkelbach, C., & Greifeneder, R. (2018). Experiential fluency and declarative advice jointly inform judgments of truth. Journal of Experimental Social Psychology, 79, 78-86.

14 Brady, W., Gantman, A., & Van Bavel, J. (2020). Attentional capture helps explain why moral and emotional content go viral. Journal of Experimental Psychology, 149, 746-756. https://doi.org/10.1037/xge0000673

15 Lorenz-Spreen, P., Lewandowsky, S., Sunstein, C. R., & Hertwig, R. (2020). How behavioural sciences can promote truth and, autonomy and democratic discourse online. Nature Human Behaviour. DOI: 10.1038/s41562-020-0889-7.

16 Lyons, B., Merola, V., & Reifler, J. (2019). Not Just Asking Questions: Effects of Implicit and Explicit Conspiracy Information About Vaccines and Genetic Modification. Health Communication, 34, 1741-1750.

17 Marsh, E. J., & Fazio, L. K. (2006). Learning errors from fiction: Difficulties in reducing reliance on fictional stories. Memory & Cognition, 34, 1140-1149.

18 Rapp, D. N., Hinze, S. R., Slaten, D. G., & Horton, W. S. (2014a) Amazing stories: Acquiring and avoiding inaccurate information from fiction. Discourse Processes, 51, 50-74. doi:10.1080/0163853X.2013.855048.

19 Benkler, Y., Faris, R., Roberts, H., & Zuckerman, E. (2017). Study: Breitbart-led right-wing media ecosystem altered broader media agenda. Columbia Journalism Review, 3, 2017.

20 Vargo, C. J., Guo, L., & Amazeen, M. A. (2018). The agenda-setting power of fake news: A big data analysis of the online media landscape from 2014 to 2016. New Media & Society, 20, 2028-2049.

21 Swire, B., Berinsky, A. J., Lewandowsky, S., & Ecker, U. K. H. (2017). Processing political misinformation: comprehending the Trump phenomenon. Royal Society Open Science, 4(3), 160802.

22 Swire-Thompson, B., Ecker, U. K., Lewandowsky, S., & Berinsky, A. J. (2020). They might be a liar but they're my liar: Source evaluation and the prevalence of misinformation. Political Psychology, 41, 21-34.

23 Nyhan, B., Porter, E., Reifler, J., & Wood, T. J. (2020). Taking fact-checks literally but not seriously? The effects of journalistic fact-checking on factual beliefs and candidate favorability. Political Behavior, 42, 939–960.

24 Aird, M. J., Ecker, U. K., Swire, B., Berinsky, A. J., & Lewandowsky, S. (2018). Does truth matter to voters? The effects of correcting political misinformation in an Australian sample. Royal Society open science, 5(12), 180593.

25 Hamby, A. M., Ecker, U. K. H., & Brinberg, D. (2019). How stories in memory perpetuate the continued influence of false information. Journal of Consumer Psychology, 30, 240-259. https://doi.org/10.1002/jcpy.1135.

26 MacFarlane, D., Tay, L. Q., Hurlstone, M. J., & Ecker, U. K. H. (2020). Refuting spurious COVID-19 treatment claims reduces demand and misinformation sharing. https://doi.org/10.31234/osf.io/q3mkd.

27 Ecker, U. K. H., Lewandowsky, S., Swire, B., & Chang, D. (2011). Correcting false information in memory: Manipulating the strength of misinformation encoding and its retraction. Psychonomic Bulletin & Review, 18(3), 570-578.

28 Mena, P. (2020). Cleaning up social media: The effect of warning labels on likelihood of sharing false news on Facebook. Policy & Internet, 12(2), 165-183.

29 McGuire, W. J., & Papageorgis, D. (1962). Effectiveness of forewarning in developing resistance to persuasion. Public Opinion Quarterly, 26, 24-34.

30 Cook, J., Lewandowsky, S., & Ecker, U. K. H. (2017). Neutralizing misinformation through inoculation: Exposing misleading argumentation techniques reduces their influence. PLOS ONE, 12(5): e0175799.

31 Amazeen, M.A. (2020). Resisting covert persuasion in digital news: Comparing inoculation and reactance in the processing of native advertising disclosures and article engagement intentions. Journalism & Mass Communication Quarterly. DOI 10.1177/1077699020952131.

32 Banas, J. A., & Rains, S. A. (2010). A meta-analysis of research on inoculation theory. Communication Monographs, 77, 281-311.

33 Compton, J. (2013). Inoculation theory. In J. Dillard & L. Shen (Eds.), The SAGE handbook of persuasion: Developments in theory and practice (pp. 220-236). Thousand Oaks, CA: Sage Publications.

34 van der Linden, S., Leiserowitz, A., Rosenthal, S., & Maibach, E. (2017). Inoculating the public against misinformation about climate change. Global Challenges, 1(2), 1600008.

35 Cook, J. (2020). Cranky uncle vs. climate change. New York: Citadel Press.

36 Roozenbeek, J., & van der Linden, S. (2019). Fake news game confers psychological resistance against online misinformation. Palgrave Communications, 5(1), 12.

37 Maertens, R., Roozenbeek, J., Basol, M., & van der Linden, S. (2020). Long-term effectiveness of inoculation against misinformation: Three longitudinal experiments. Journal of Experimental Psychology: Applied. http://dx.doi.org/10.1037/xap0000315.

38 Rapp, D.N., Hinze, S.R., Kohlhepp, K., & Ryskin, R.A. (2014b). Reducing reliance on inaccurate information. Memory & Cognition, 42, 11-26.

39 Pennycook, G., McPhetres, J., Zhang, Y., Lu, J. G., & Rand, D. G. (2020). Fighting COVID-19 misinformation on social media: Experimental evidence for a scalable accuracy-nudge intervention. Psychological Science, 31, 770-780.

40 Hinze, S.R., Slaten, D.G., Horton, W.S., Jenkins, R., & Rapp, D.N. (2014). Pilgrims sailing the Titanic: Plausibility effects on memory for facts and errors. Memory & Cognition, 42, 305-324.

41 Sinatra, G. M., & Lombardi, D. (2020). Evaluating sources of scientific evidence and claims in the post-truth era may require reappraising plausibility judgments. Educational Psychologist, 55, 120-131. DOI: 10.1080/00461520.2020.1730181.

42 Wineburg, S., McGrew, S., Breakstone, J., & Ortega, T. (2016). Evaluating information: The cornerstone of civic online reasoning. Stanford Digital Repository. Retrieved January, 8, 2018.

43 Wineburg, S., & McGrew, S. (2019). Lateral reading and the nature of expertise: Reading less and learning more when evaluating digital information. Teachers College Record 121(11).

44 Donovan, A.M., & Rapp, D.N. (2020). Look it up: Online search reduces the problematic effects of exposures to inaccuracies. Memory & Cognition, 48, 1128-1145.

45 Kozyreva, A., Lewandowsky, S., & Hertwig, R. (in press). Citizens Versus the Internet: Confronting Digital Challenges With Cognitive Tools. Psychological Science in the Public Interest.

46 Ecker, U. K. H., Lewandowsky, S., & Chadwick. M. (2020). Can corrections spread misinformation to new audiences? Testing for the elusive familiarity backfire effect. Cognitive Research: Principles and Implications, 5, 41. https://doi.org/10.1186/s41235-020-00241-6.

47 Lakoff, G. (2010). Moral politics: How liberals and conservatives think. University of Chicago Press.

48 Kumkale, G. T., Albarracín, D., & Seignourel, P. J. (2010). The effects of source credibility in the presence or absence of prior attitudes: Implications for the design of persuasive communication campaigns. Journal of Applied Social Psychology, 40(6), 1325-1356.

49 Cone, J., Flaharty, K., & Ferguson, M. J. (2019). Believability of evidence matters for correcting social impressions. Proceedings of the National Academy of Sciences, 116, 9802-9807. doi:10.1073/pnas.1903222116.

50 Pornpitakpan, C. (2004). The persuasiveness of source credibility: A critical review of five decades' evidence. Journal of Applied Social Psychology, 34(2), 243-281.

51 Amazeen, M. A., & Krishna, A. (2020). Correcting vaccine misinformation: Recognition and effects of source type on misinformation via perceived motivations and credibility. https://ssrn.com/abstract=3698102.

52 Swire, B., Ecker, U. K. H., & Lewandowsky, S. (2017). The role of familiarity in correcting inaccurate information. Journal of Experimental Psychology: Learning, Memory, and Cognition, 43(12), 1948.

53 Walter, N., & Tukachinsky, R. (2020). A meta-analytic examination of the continued influence of misinformation in the face of correction: how powerful is it, why does it happen, and how to stop it?. Communication Research, 47(2), 155-177.

54 Sparks, J. R., & Rapp, D. N. (2011). Readers' reliance on source credibility in the service of comprehension. Journal of Experimental Psychology: Learning, Memory, and Cognition, 37(1), 230.

55 Albarracín, D., Kumkale, G. T., & Poyner-Del Vento, P. (2017). How people can become persuaded by weak messages presented by credible communicators: Not all sleeper effects are created equal. Journal of Experimental Social Psychology, 68, 171-180. doi:10.1016/j.jesp.2016.06.009.

56 Dias, N., Pennycook, G., & Rand, D. G. (2020). Emphasizing publishers does not effectively reduce susceptibility to misinformation on social media. The Harvard Kennedy School (HKS) Misinformation Review, 1. doi:10.37016/mr-2020-001.

57 Pennycook, G., & Rand, D. G. (2020). Who falls for fake news? The roles of bullshit receptivity, overclaiming, familiarity, and analytic thinking. Journal of personality, 88(2), 185-200.

58 Ecker, U. K. H., & Antonio, L. (2020). Can you believe it? An investigation into the impact of retraction source credibility on the continued influence effect. https://doi.org/10.31234/osf.io/qt4w8.

59 Guillory, J. J., & Geraci, L. (2013). Correcting erroneous inferences in memory: The role of source credibility. Journal of Applied Research in Memory and Cognition, 2(4), 201-209.

60 Durantini, M. R., Albarracín, D., Mitchell, A. L., Earl, A. N., & Gillette, J. C. (2006). Conceptualizing the influence of social agents of behavior change: A meta-analysis of the effectiveness of HIV-prevention interventionists for different groups. Psychological Bulletin, 132, 212-248. doi:10.1037/0033-2909.132.2.212.

61 Vraga, E. K., & Bode, L. (2017). Using expert sources to correct health misinformation in social media. Science Communication, 39(5), 621-645.

62 van der Meer, T. G., & Jin, Y. (2020). Seeking formula for misinformation treatment in public health crises: The effects of corrective information type and source. Health Communication, 35(5), 560-575.

63 Cook, J., & Lewandowsky, S. (2016). Rational irrationality: Modeling climate change belief polarization using Bayesian networks. Topics in Cognitive Science, 8, 160-179. doi:10.1111/tops.12186.

64 Krishna, A. (2018). Poison or prevention? Understanding the linkages between vaccine-negative individuals' knowledge deficiency, motivations, and active communication behaviors. Health Communication, 33, 1088-1096.

65 Scheufele, D. A., & Krause, N. M. (2019). Science audiences, misinformation, and fake news. Proceedings of the National Academy of Sciences, 116(16), 7662-7669.

66 Schmid, P., & Betsch, C. (2019). Effective strategies for rebutting science denialism in public discussions. Nature Human Behaviour, 3(9), 931-939.

67 Wood, T., & Porter, E. (2019). The elusive backfire effect: Mass attitudes' steadfast factual adherence. Political Behavior, 41(1), 135-163.

68 Porter, E., & Wood, T. J. (2019). False Alarm: The Truth About Political Mistruths in the Trump Era. Cambridge University Press.

69 Ecker, U. K. H., Lewandowsky, S., Jayawardana, K., & Mladenovic, A. (2019). Refutations of equivocal claims: No evidence for an ironic effect of counterargument number. Journal of Applied Research in Memory and Cognition, 8, 98-107.

70 Swire-Thompson, B., DeGutis, J., & Lazer, D. (2020). Searching for the backfire effect: Measurement and design considerations. Journal of Applied Research in Memory and Cognition. DOI 10.1016/j.jarmac.2020.06.006.

71 Ecker, U. K. H., Hogan, J. L., & Lewandowsky, S. (2017). Reminders and repetition of misinformation: Helping or hindering its retraction? Journal of Applied Research in Memory and Cognition, 6(2), 185-192.

72 Nyhan, B., & Reifler, J. (2010). When corrections fail: The persistence of political misperceptions. Political Behavior, 32(2), 303-330.

73 Ecker, U., Sze, B., & Andreotta, M. (2020). No effect of partisan worldview on corrections of political misinformation. https://doi.org/10.31234/osf.io/bszm4.

74 Haglin, K. (2017). The limitations of the backfire effect. Research & Politics, 4(3), 2053168017716547.

75 Hart, P. S., & Nisbet, E. C. (2012). Boomerang effects in science communication: How motivated reasoning and identity cues amplify opinion polarization about climate mitigation policies. Communication research, 39, 701-723.

76 Grinberg, N., Joseph, K., Friedland, L., Swire-Thompson, B., & Lazer, D. (2019). Fake news on Twitter during the 2016 US presidential election. Science, 363(6425), 374-378.

77 Guess, A. M., Nyhan, B., & Reifler, J. (2020). Exposure to untrustworthy websites in the 2016 US election. Nature human behaviour, 4(5), 472-480.

78 Hart, W., Albarracín, D., Eagly, A. H., Brechan, I., Lindberg, M. J., & Merrill, L. (2009). Feeling validated versus being correct: a meta-analysis of selective exposure to information. Psychological Bulletin, 135, 555-588.

79 Lewandowsky, S., & Oberauer, K. (2016). Motivated rejection of science. Current Directions in Psychological Science, 25, 217-222.

80 Ecker, U. K. H., Lewandowsky, S., & Tang, D. T. (2010). Explicit warnings reduce but do not eliminate the continued influence of misinformation. Memory & Cognition, 38(8), 1087-1100.

81 Seifert, C. M. (2002) The continued influence of misinformation in memory: What makes a correction effective? Psychology of Learning and Motivation, 44, 265–292.

82 Guzzetti, B. J. (2000). Learning counter-intuitive science concepts: What have we learned from over a decade of research? Reading & Writing Quarterly, 16, 89-98.

83 Kendeou, P., & O'Brien, E. J. (2014). The Knowledge Revision Components (KReC) framework: Processes and mechanisms. In D. Rapp, & J. Braasch (Eds.), Processing Inaccurate Information: Theoretical and Applied Perspectives from Cognitive Science and the Educational Sciences, Cambridge: MIT.

84 Begg, I. M., Anas, A., & Farinacci, S. (1992). Dissociation of processes in belief: Source recollection, statement familiarity, and the illusion of truth. Journal of Experimental Psychology: General, 121(4), 446.

85 Brashier, N. M., Eliseev, E. D., & Marsh, E. J. (2020). An initial accuracy focus prevents illusory truth. Cognition, 194, 1040.

86 Fazio, L. K., Brashier, N. M., Payne, B. K., & Marsh, E. J. (2015). Knowledge does not protect against illusory truth. Journal of Experimental Psychology: General, 144(5), 993.

87 Fein, S., McCloskey, A. L., & Tomlinson, T. M. (1997). Can the jury disregard that information? The use of suspicion to reduce the prejudicial effects of pretrial publicity and inadmissible testimony. Personality and Social Psychology Bulletin, 23(11), 1215-1226.

88 Elsey, J. W., & Kindt, M. (2017). Tackling maladaptive memories through reconsolidation: From neural to clinical science. Neurobiology of Learning and Memory, 142, 108-117.

89 Kendeou, P., Butterfuss, R., Kim, J., & Van Boekel, M. (2019). Knowledge Revision Through the Lenses of the Three-Pronged Approach. Memory & Cognition, 47, 33-46.

90 Chan, M. P. S., Jones, C. R., Hall Jamieson, K., & Albarracin, D. (2017). Debunking: A meta-analysis of the psychological efficacy of messages countering misinformation. Psychological Science, 28(11), 1531-1546.

91 Kendeou, P., Smith, E. R., & O'Brien, E.J. (2013). Updating during reading comprehension: Why causality matters. Journal of Experimental Psychology: Learning, Memory, and Cognition, 39, 854–865.

92 Rich, P. R., & Zaragoza, M.S. (2020). Correcting Misinformation in News Stories: An Investigation of Correction Timing and Correction Durability. Journal of Applied Research in Memory and Cognition, https://doi.org/10.1016/j.jarmac.2020.04.001.

93 Lewandowsky, S., Cook, J., & Lloyd, E. (2018). The 'Alice in Wonderland' mechanics of the rejection of (climate) science: simulating coherence by conspiracism. Synthese, 195, 175-196.

94 Oppenheimer, D. M. (2006). Consequences of erudite vernacular utilized irrespective of necessity: Problems with using long words needlessly. Applied Cognitive Psychology, 20, 139-156.

95 Fenn, E., Ramsay, N., Kantner, J., Pezdek, K., & Abed, E. (2019). Nonprobative photos increase truth, like, and share judgments in a simulated social media environment. Journal of Applied Research in Memory and Cognition, 8(2), 131-138.

96 Newman, E. J., Garry, M., Bernstein, D. M., Kantner, J., & Lindsay, D. S. (2012). Nonprobative photographs (or words) inflate truthiness. Psychonomic Bulletin & Review, 19(5), 969-974.

97 Newman, E. J., Garry, M., Unkelbach, C., Bernstein, D. M., Lindsay, D. S., & Nash, R. A. (2015). Truthiness and falsiness of trivia claims depend on judgmental contexts. Journal of Experimental Psychology: Learning, Memory, and Cognition, 41(5), 1337.

98 Alter, A. L., & Oppenheimer, D. M. (2009). Uniting the tribes of fluency to form a metacognitive nation. Personality and Social Psychology Review, 13, 219–235. doi: 10.1177/1088868309341564.

99 Reber, R., & Schwarz, N. (1999). Effects of perceptual fluency on judgments of truth. Consciousness and Cognition, 8(3), 338-342.

100 Schwarz, N., Newman, E., & Leach, W. (2016). Making the truth stick and the myths fade: Lessons from cognitive psychology. Behavioral Science & Policy, 2(1), 85–95.

101 Becker, J., Porter, E., & Centola, D. (2019). The wisdom of partisan crowds. Proceedings of the National Academy of Sciences, 116, 10717-10722.

102 Bode, L., & Vraga, E. K. (2018). See something, say something: Correction of global health misinformation on social media. Health Communication, 33(9), 1131-1140.

103 Bode, L., & Vraga, E. K. (2015). In related news, that was wrong: The correction of misinformation through related stories functionality in social media. Journal of Communication, 65(4), 619-638.

104 Clayton, K., Blair, S., Busam, J. A., Forstner, S., Glance, J., Green, G., ... & Sandhu, M. (2019). Real solutions for fake news? Measuring the effectiveness of general warnings and fact-check tags in reducing belief in false stories on social media. Political Behavior, 1-23.

105 Vraga, E. K., Kim, S. C., Cook, J., & Bode, L. (2020). Testing the Effectiveness of Correction Placement and Type on Instagram. The International Journal of Press/Politics, 1940161220919082.

106 McKeever, B.W., McKeever, R., Holton, A.E., & Li, J.Y. (2016). Silent majority: Childhood vaccinations and antecedents to communicative action. Mass Communication and Society, 19(4), 476-498. DOI: 10.1080/15205436.2016.1148172.

107 Noelle-Neumann, E. (1974). The spiral of silence: A theory of public opinion. Journal of Communication, 24(2), 43–51.

108 Van Duyn, E. (2018). Hidden democracy: political dissent in rural America. Journal of Communication, 68, 965-987.