



FONDATION DESCARTES



Academic article summary

HOW TO EFFECTIVELY CORRECT MISINFORMATION ?

Lewandowsky, S., Ecker, U. K., Seifert, C. M., Schwarz, N., & Cook, J. (2012); "Misinformation and its correction: Continued influence and successful debiasing."

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INTRODUCTION

In this literature review, the authors: (1) identify the different sources of misinformation; (2) attempt to explain why misinformation continues to influence individuals even when it has been clearly refuted and retracted; (3) present a series of recommendations for improving the effective correction of misinformation.

The authors use the term misinformation to refer to any information that is initially presented as valid and then retracted or corrected.

Condensed summary of solutions

Before getting to the heart of the article, we present here a summary of the main recommendations put forward in this article to maximize the effectiveness of correcting misinformation.

Solution 1: to effectively correct erroneous information, it is important to replace it with information that has the same explanatory function. To increase the effectiveness of this correction, it must be possible to repeat it without mentioning the erroneous information it replaces.

Solution 2: begin repeating the correct information prior to any exposure to misinformation. This requires anticipating the appearance of misinformation.

Solution 3: use shorter and simpler arguments than those used to justify the misinformation.

Solution 4: encourage individuals to be skeptical in order to reduce the influence of misinformation.

Solution 5: the correction should not go against the values, ideals and principles of the individual influenced by misinformation. On the contrary, the correct information must reflect the values held by the individual.¹

¹ For example, if the person values equality between individuals, the correction of the information must positively reflect this idea of equality.

I – Misinformation in society: different sources

The authors begin by recalling that the proper functioning of democracy relies on having a well-informed population. The prevalence of misinformation can therefore lead to the malfunctioning of democracy. This dysfunction is aggravated by the fact that individuals who believe in false information may become strongly committed to social and political causes which they believe to be justified by that false information. The war in Iraq is a typical example: some Americans strongly supported the military intervention in Iraq, adopting the justification given by the American government (the alleged presence of weapons of mass destruction).

However, the spread of misinformation is inevitable. Even the scientific method contributes to this: information is presented as new knowledge, and is then discussed and possibly refuted. Only the information that resists correctional attempts is incorporated into the corpus of scientific knowledge. In this sense, misinformation is an integral part of the production of scientific knowledge. There are, on the other hand, other sources of misinformation that are more harmful.

Rumors and fiction

The authors of the article do not provide a definition of "rumor". However, several studies have determined that information can circulate not only because we consider it to be true, but also because it provokes strong emotional reactions. For instance, parents are more likely to spread false information about vaccination if they believe that their children are at risk. Parents have particularly strong emotional responses to this type of subject because they are greatly preoccupied with their children's wellbeing, which will in turn lead them to spread more misinformation.

Fictitious information (derived from cultural goods) also serves to shape people's knowledge. Several studies have shown that individuals readily acknowledge that a part of their knowledge on the real world is derived from fictional sources (films, books, etc.). However, while some fictional products may indeed contain reliable information about the real world, others contain completely fictitious information that is nonetheless incorporated into our collective stock of knowledge. As an example, the authors cite Michael Crichton's book *State of Fear*, which served as a "scientific argument" in the US Senate during a discussion on the effects climate change.

Politicians and governments



Governments and politicians may intentionally or accidentally spread misinformation. This misinformation can deeply impact people's beliefs. Once again, the campaign of misinformation regarding the presence of weapons of mass destruction in Iraq had a profound impact on American society. Studies on this issue have shown that, when confronted with political information, citizens have difficulty distinguishing the true from the false. These difficulties persist even when individuals are alerted that the statement may contain misinformation. Consequently, adopting a skeptical approach is not always sufficient.

Non-governmental organizations and lobbies

The dissemination of misinformation carried out by certain industries is well documented. The tobacco and fossil fuel industries have contributed to the spread of erroneous beliefs concerning the products they sell by communicating false information to the public.

On the other hand, some non-governmental organizations have contributed to fueling fears regarding certain products (e.g. vaccines and genetically modified organisms), which has had a negative economic impact on the industries in question.

Media

The media can become a source of misinformation when covering an important event live. Information reported on the spot can be subsequently revised and corrected. It is also necessary for the media to simplify scientific results that deserve to be exposed to the general public. By simplifying these results, the media can distort the content of the scientific article and induce false beliefs in the reader.² The media can also give too much exposure to experts who express a dissenting opinion that is opposed to the scientific consensus. In this case, the media, in order to respect the balance and parity of the debate, will give the same exposure to experts representing the consensus as to those representing a small dissenting minority. Readers may then mistakenly believe that there is no consensus on the subject, since the various experts invited do not agree.

The role of the internet

The so-called "Web 2.0" has enabled every Internet user to become an informational content creator through the production of videos (YouTube), short messages (Twitter) and lengthier content (blogs in particular). While this ability to produce and disseminate

² In this exercise, we are ourselves summarizing an article that is already intended as a review of the existing literature. In a sense, we are therefore producing a "third hand" work that cannot account for all the subtleties of the research that has been carried out on misinformation. This work is, however, necessary in order to expose to the public work that would otherwise remain largely unknown.



information has had some beneficial effects on news coverage, it has also led to the greater dissemination of misinformation. Producers of information on the Internet are not bound by the editorial constraints which the media respect and which ensure, at least in theory, their reliability. This is why, for example, Internet users disseminate much more misinformation regarding public health than the media. The authors also note the occurrence of websites that intentionally disseminate misinformation. In 2012 (when the article was published), [these websites had not yet taken on the significance that they have today](#).

Lastly, the authors note that the substantial growth of information offerings in the 2000s has enabled consumers to select the information they like and to avoid information they do not like. This fragmented ecosystem has had the effect of slowing down the dissemination of misinformation corrections that circulate on various information networks.

II- Individual cognition and strategies to correct misinformation

1. How do individuals assess the validity of information?

In everyday conversations, we frequently take for granted that our interlocutor is telling the truth. For certain researchers, this premise of truthfulness is a conversational norm, since it is a precondition to understanding the meaning of the information being conveyed to us. Thus, with few exceptions, individuals are predisposed to accept the information presented to them as true. But when we attempt to determine whether this information is truthful, we usually rely on a fairly limited range of clues.³

The compatibility of information with our beliefs

We regularly judge information according to our opinions and beliefs. Thus, information that concurs with our opinion and beliefs is favored over competing information. According to Leon Festinger's famous theory, once information has been accepted because it is

³ There is much to say regarding the motivations that may lead us to suspend this premise of truthfulness. We recommend Hugo Mercier's book *Not born Yesterday* (2020).



congruent with our beliefs, it is very difficult to abandon it.⁴ For Festinger, relinquishing misinformation that we have previously incorporated would force us to question a whole range of beliefs and opinions, inducing a state of mental discomfort that we strongly look to avoid. This inclination to maintain our fundamental beliefs is, for Festinger, a fundamental mechanism of human cognition.

Generally speaking, information that "sounds true" is more readily accepted. The authors of the article have, for example, shown that a sentence whose letters are difficult to decipher will be considered less reliable than the same message written in a more legible manner. To judge whether information is true, we draw upon clues that "instinctively," and sometimes erroneously, inform us about its reliability.

The coherence of information

According to "mental model" theory, individuals, in order to coherently integrate various pieces of information, form mental representations that can be likened to a story. This story allows individuals to consolidate the different pieces of information, and to give them a sense of overall coherence. Once this has been achieved, it becomes difficult to abandon a part of the story, because this would endanger its coherence. We therefore prefer, in some cases, to introduce new information to preserve the coherence of the story rather than abandoning the story. Therefore, information that is simple, and thus consistent with our mental models, will carry more persuasive weight.

The credibility of the source

Numerous studies show that individuals preferentially rely on the reputation of the emitter rather than on the context to assess the credibility of an information source. For example, if an individual is deemed credible in one area, they will undeservedly have more credibility outside their area of expertise, simply because they have an aura of expertise.

The social consensus surrounding information

The mere fact of being repeatedly exposed to information increases its believability. The more a rumor is repeated, the more plausible it seems. In fact, according to Allport and Lepkin's (1945) landmark study, this is the main factor in determining whether or not a rumor will be perceived as credible. The more information circulates, the more individuals believe that there is a consensus. This perception of consensus has a perverse effect: it is enough

⁴ In psychology, this phenomenon is referred to as "confirmation bias". Note that this type of reasoning is not necessarily incoherent. Although we can sometimes be stubborn in the face of facts, we often have good reasons to rely on our beliefs to sort through information. But this mechanism can lead us to persist in our mistakes.



for some individuals to be preferentially exposed to information for them to mistakenly think that this information is accepted by a large number of individuals. In other words, we tend to overestimate the proportion of individuals who agree with us.

2. Correcting information is insufficient to convince others of its falsehood

Our strategies for assessing the validity of information are not always optimal. And unfortunately, information that we have classified as reliable may continue to influence our beliefs even though we have been exposed to corrections of that misinformation. Since the late 1980s, researchers in psychology have been trying to explain this phenomenon, which is influenced by the mechanisms of human psychology.

Researchers in this field have found that we very largely tend to be wrong when we are asked whether information that has previously been refuted is true or false. The typical example studied is as follows:

Participants in the experiment are presented with a story about a fire in a warehouse. The origin of the fire is first explained by the presence of flammable objects in a cupboard. However, participants are then told that the cupboard was in fact empty when the fire started. When participants were finally asked what "caused the black smoke" during the fire, they generally answered "the flammable objects in the cupboard". Thus, participants do not seem to take into account that the closet was empty when formulating their answer.

Even more troubling, however, is the fact that participants were able to remember that the cupboard was empty if the question was asked directly. In other words, participants remember that the cupboard was empty but do not take this into account when they respond that the black smoke comes from the closet. Thus, the problem is not directly related to poor memory, but rather to an inability to access the correct information in certain contexts.

However, our understanding of this phenomenon is not clear-cut, and several theories have been proposed to determine how information continues to influence us even when we are able to determine that it is wrong.

The mental model

To understand how individuals assess information, the authors of the article previously introduced the notion of the "mental model". Individuals form "mental models" based on the different elements of a story. We then assess each piece of information in the story and



reconstruct its overall coherence. The more coherent the story seems, the harder it is to give up a piece of it. Let's refer back to the story of the fire in the warehouse. In this scenario, if the participants have no alternative explanation to the start of the fire, then they will maintain the explanation of the flammable object in the closet in order to protect the coherence of the mental model they have created. If participants are provided with an alternative explanation, and this explanation fits correctly into their story, they will less frequently mention the flammable objects as being the cause of the black smoke. This tendency to establish "mental models" would therefore mean that we prefer a complete and coherent story to a correct, but incomplete one. We can therefore be led to ignore the fact that there actually was no flammable object in the closet, in order to maintain the coherence of the story and to provide an explanation.

Retrieval failure

The mechanisms of human memory could also contribute to our resistance towards informational corrections. Since individuals are able to remember the correction, the problem is not related to our ability to memorize new information but rather to our ability to access the correction when needed. When faced with a situation that requires us to retrieve a piece of information from memory, different information can compete with one another (the incorrect information and its correction). This implies that we employ certain cognitive strategies in order to access the correct information, and that these strategies may not be optimal. In the case of the fire in the warehouse, in order to provide an explanation for the origin of the fire, the participants automatically retrieve the incorrect information because it directly answers the question. Since the incorrect information is relevant to the context – it provides an explanation for the origin of the fire – we do not employ an additional strategy to access the correction of the information. In other words, memorizing the correction is not enough; one must also be able to access this information at the appropriate time in order to avoid being influenced by misinformation, which is not always guaranteed.

Familiarity

The more a piece of information is easily retrievable from memory, the more obvious it will appear. If the information is obvious, no attempt will be made to supplement it with other information. This criterion of obviousness has perverse effects. [A false information repeated several times will be easily retrievable in memory and will therefore appear to us as obvious even though we have learned that it is false.](#) Indeed, more effort is required to access information that does not seem obvious, and we are not always ready to make such an effort. Propaganda and advertising both play on this psychological effect of repetition to circumvent contradictory information and to portray the information they are communicating as evident.

3. Reducing the impact of misinformation

While correcting erroneous information is not enough to completely change our beliefs, there are nevertheless three techniques that can be used to improve the effectiveness of this correction.

1. **Warn:** if we are warned that we may be exposed to misinformation, we can develop strategies to avoid incorporating incorrect information into our mental models.
2. **Repeat:** if the correction is repeated, it becomes more effective. However, there is a great deal of research that shows that there are limits to the effectiveness of repetition. Namely, since the correction comes after the misinformation, it will systematically be at a disadvantage.
3. **Substitute:** for a correction to be truly effective, it must fit into the mental model of the corresponding story. In other words, it must be plausible and simple (which is not always possible). An overly complex correction will be more difficult to accept.

But the effectiveness of the correction also depends on certain individual characteristics. Two of these characteristics are discussed by the authors: worldview and skepticism.

Worldview

At the time of writing this article, in 2012, research on misinformation has not yet gathered the momentum that it has today. Therefore, the authors only briefly mention the role of opinions in generating belief in false information: the more compatible our worldview is with false information, the more likely we are to believe it. Our political views, for instance, would strongly influence our perception of misinformation. For example, some research has shown that Republicans in the United States (i.e. "right-wing") are more likely to believe that Iraqis possessed weapons of mass destruction (which is false) than Liberals (i.e. "left-wing" in the USA). This tendency towards confirmation bias would act as a powerful bulwark against corrections of false information.⁵ But the authors of the article point out that the link between the effectiveness of correction and previously held beliefs is not yet clearly understood.

Correcting by integrating worldviews

Basing themselves on [Kahan's theory](#), the authors believe that a correction that takes into account the individual's worldview is more likely to be accepted. The effective communication of corrections would need to rely on certain core values of the targeted

⁵ We note, however, that a series of studies we have presented here downplay the significance of this general theory of confirmation bias associated to our worldview:

<https://www.fondationdescartes.org/2020/04/comment-expliquer-croyance-fake-news/>.

individuals, in order to lead them to accept or reject certain information. Depending on the words chosen and the values emphasized, an individual may accept or reject the same information. Effective communication of corrections must also provide individuals with an opportunity for self-affirmation. In other words, correction must be empowering, not demeaning. If a correction cannot incorporate this "affirmative" dimension, then it must be presented in a way that ensures individuals will not be able to relate the correction to their own opinions. This in turn would make the correction less likely to provoke hostility. It is therefore preferable to present the correction as new and true information, without mentioning the information it corrects.

Skepticism

Skepticism has an ambiguous effect on misinformation. It can lead individuals to adopt prudent strategies, which can lead to the rejection of misinformation. But many studies show that this inclination is not always sufficient to identify or correct misinformation. Skepticism can also accentuate our propensity to reject corrections. We can therefore see that the relationship between skepticism and the effectiveness of correction is still disputed and is generally poorly understood.

CONCLUSION

Research on misinformation and its correction is still in its infancy. Moreover, this research raises certain ethical concerns. Is it desirable to use our understanding of human psychology to influence behavior by modifying beliefs, especially given that corrective techniques can also be used for misinformation⁶? The authors consider that these corrective techniques, despite the ethical concerns they raise, are certainly the best solutions available to counteract the harmful effects of misinformation campaigns orchestrated by lobbies and other profit-seeking organizations. The authors recall that a good way to protect ourselves from misinformation is to understand human psychology and its mechanisms.

⁶ This ethical debate concerns the use of "nudges," or soft inducements. For more information, here is an analytical and well-informed article on the issue:
https://www.medecinesciences.org/en/articles/medsci/full_html/2016/12/medsci20163212p1130/medsci20163212p1130.html



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