



FACT OR FABLE: YOUR GUIDE TO FIGHTING MISINFORMATION

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YOUNG REVIEWERS:



AKSHARA

AGE: 13



AYUMI

AGE: 12

Nobody wants to believe false information and share it with others. Still, at some point, almost everyone will consider some fake news reports to be true, without even realizing it. This may happen because the information matches their world view but also because news producers use clever tricks to spread misinformation. In this article, we provide you with the tools to understand what misinformation is, why you may fall for it, and how to fight it. Given the ease with which fake news spreads on social media, it is important to know what you can do to resist its power.

INTRODUCTION

Have you heard it said that the Great Wall of China is visible from space... and do you believe it? If you think this is true, how do you

MISINFORMATION

Incorrect or false information.

CONFIRMATION BIAS

The tendency to search for, interpret, and recall information that is consistent with what we already think and believe.

know? Did you learn it from a reliable source or is it something that you heard from a friend, read on social media, or just “know”? In this case, you may have fallen victim to the effects of **misinformation** because the truth is that the Great Wall is not visible from orbit.

WHY DO PEOPLE BELIEVE MISINFORMATION?

Misinformation means incorrect or false information that is spread by others. It can be shared through various sources, such as the internet, social media, or even people talking to each other [1].

Why do we believe misinformation in the first place? One explanation is because we like to judge information as true or false quickly. When we encounter familiar information, a part of the brain that is involved in memory can tell us that we have encountered the same information before. People are more likely to believe something simply because they have heard it before, regardless of whether it is true or not. In other cases, we believe misinformation because it fits with our world view—what we already think [1]. This is known as **confirmation bias**. When we choose to stick with a bias, the brain does not have to work as hard as it does when we encounter different viewpoints. Therefore, it is easier to “go along” with information that is similar to what we already think, even if the information is not true.

Finally, misinformation often has surprising or emotional content. For example, a miraculous cure for a disease that is advertised but does not exist, may lure people into thinking that it is real. Made-up stories about crimes that famous people would have committed in the past could have the same effect. The bottom-line is, when we have a strong emotional reaction, our brains are less likely to process information deeply, which explains why emotional content can contribute to a belief in misinformation.

DOES AGE PLAY A ROLE?

Age can also influence how we understand information. Studies found that both young children and older adults are more susceptible to misinformation than young adults are. In children, this may happen because the area of the brain that helps people to judge complex information accurately has not finished developing yet. Older adults, on the other hand, may have difficulty judging whether information is true because they forget the details of where the information came from. This can be an even bigger problem if they see the same misinformation multiple times, so that it seems familiar. So, older adults are vulnerable to misinformation even though they use their general knowledge well when they encounter information for the first time [2]. Overall, while age affects our susceptibility to misinformation, more research is needed to fully understand its role.

MISINFORMATION CAN LEAD TO BAD DECISIONS

Based on what you have learned so far, it is probably no surprise that misinformation can cause people to hold false beliefs, which affects their decision making. For example, parents have refused to let their children receive the rubella vaccine because they believed misinformation stating that this vaccine can cause autism. People who believed in misinformation about the COVID-19 pandemic, for example that face masks were not protective against infection, were also less likely to follow public health guidelines and use protective measures such as a face mask [1]. This is a big problem because these decisions can cause serious problems for public health, putting many people at risk of getting sick from diseases that could have been prevented.

DEBUNKING

A strategy to fight misinformation by showing that the misinformation people believe is not true, like saying, "Actually that is not right!" and then explaining why.

CONTINUED INFLUENCE EFFECT

The phenomenon that people are still influenced by misinformation even after this misinformation is corrected.

DEBUNKING—CORRECTING MISINFORMATION

What can we do about misinformation? The usual way to deal with it is to correct false information after people have already heard it and/or believe in it. This is known as **debunking**. However, debunking does not always work because misinformation might continue to influence what we think, feel, and remember—even after the incorrect information has been corrected. This phenomenon is known as the **continued influence effect**. Going back to the example of the rubella vaccine and autism, despite continuous efforts of the government, health organizations, and the media to reject this unproven link, a considerable proportion of the public still believe it [3].

Why is incorrect information so persistent? Well, memory does not work like a blackboard: you cannot erase it so easily. Think about a time when you wanted to erase the memory of an embarrassing event; no matter how hard you tried, it probably still lingered in your head, maybe even until now. Similarly, you cannot immediately wipe out misinformation and replace it with correct information. In other words, true and false information coexist and constantly compete for a place in our brains (see [Figure 1](#)).

Additionally, misinformation can stick around if the correction is not convincing enough. Simply saying something is wrong is not powerful enough to "kick out" misinformation. The corrective message is more effective if it explains *why* the misinformation is wrong and what the facts are. However, the correction must also be easy to understand. If it is too hard, people might stick with the misinformation because it is simpler [3]. Ads are often considered to be more trustworthy than statements from science. You can see that correcting misinformation is challenging!

Figure 1

When the brain receives a correction for misinformation, the misinformation is not immediately “thrown out”. In fact, the misinformation and the correct information compete with each other.

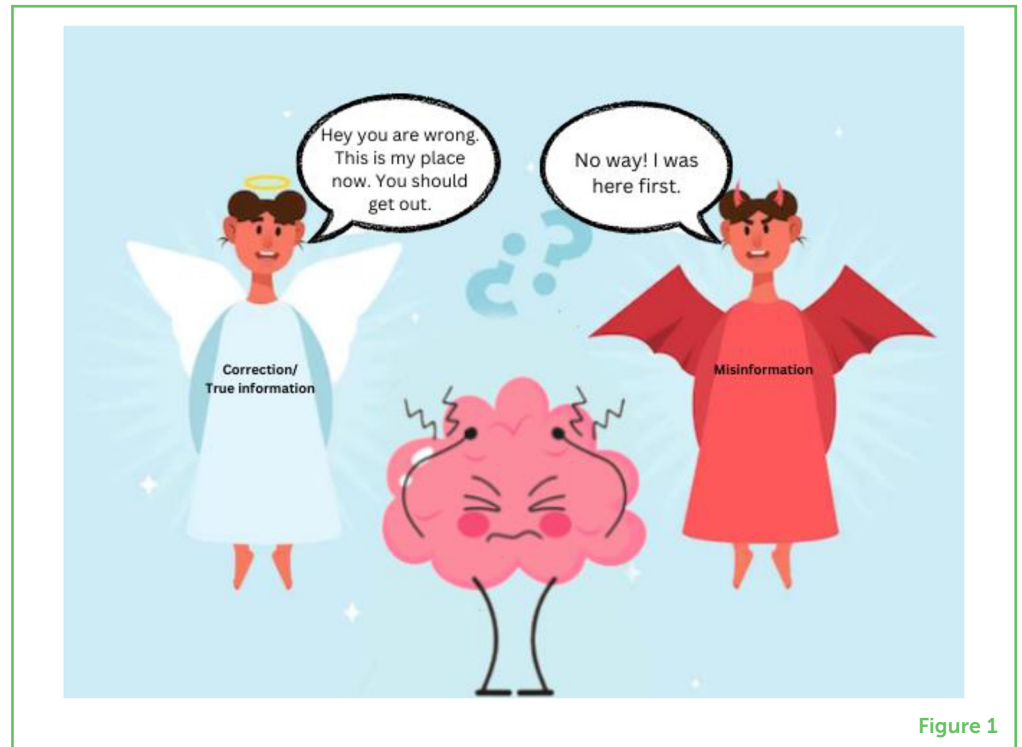


Figure 1

Misinformation not only has a lasting influence on what we think, feel, and remember, it also spreads faster and more widely than true information, just like a virus does [1]. Fake news is shared and retweeted more often than facts. It is more surprising, has more emotional content and fits with confirmation biases. When you are scrolling through your social media feed, you see posts from people you follow. Even if those posts are not true, people see them, like them, and share them with people who then share them again. It is like a game of telephone, in which players pass around a message that gets more and more distorted each time it is passed on. Imagine how difficult it can be for factual information to compete in such a viral environment! This makes debunking misinformation even more challenging.

FIGHTING MISINFORMATION WITH INOCULATION

With the overwhelming amount of news available, it is impossible to evaluate every false story out there. Even when we try to correct a story after people have read it, the correction often will not be accepted or remembered. If debunking is not always effective, is there any other way to fight misinformation? Yes, there is. It is called **inoculation**, and it helps us to protect ourselves from believing misinformation and false news before it takes hold.

In the 1960's, a researcher named William McGuire proposed an interesting idea by using the metaphor of how a vaccine works to protect people against viruses. We know that some vaccines make

INOCULATION

A strategy to fight misinformation by exposing individuals to a weakened form of misinformation, so that they can become better at recognizing misinformation later on.

us more resistant to viruses by exposing us to a weakened version of the virus. McGuire suggested that, similarly, we might be able to use weakened doses of misinformation to combat its spread, making us more resistant to future attacks—just like vaccines help us become more resistant to viruses [4]. Over the years, evidence has shown that inoculation against misinformation works!

Here is an example of inoculation (see Figure 2). Imagine that trusted authorities warn you that certain individuals might be spreading misinformation, specifically in an attempt to influence the public's opinion about whether human activities are causing global warming. The authorities give an example of misinformation you might see, called The Oregon Petition, which had supposedly collected over 31,000 signatures from scientists who disagreed with the idea that human activities are causing global warming. But wait, these "scientists" included people who just finished university, a pop star with a fake degree, and famous historical figures, such as Charles Darwin, who died a long time ago! The warning you received, in combination with this small dose of misinformation, makes you more resistant to believing similar false claims in the future. Giving people accurate information along with an explanation of how misinformation can trick our minds can stop misinformation from spreading [5].

Figure 2

Inoculation against misinformation works like a vaccine for our minds. The main purpose of the inoculation strategy is to inform people about various tricks behind misinformation. In this example, the trick is saying that the misinformation came from, or is supported by, a prestigious group of people. Something seems more reliable if it is said by a scientist rather than a random person, right? Once people understand this trick, they can see through it in the future when it is used to spread misinformation.

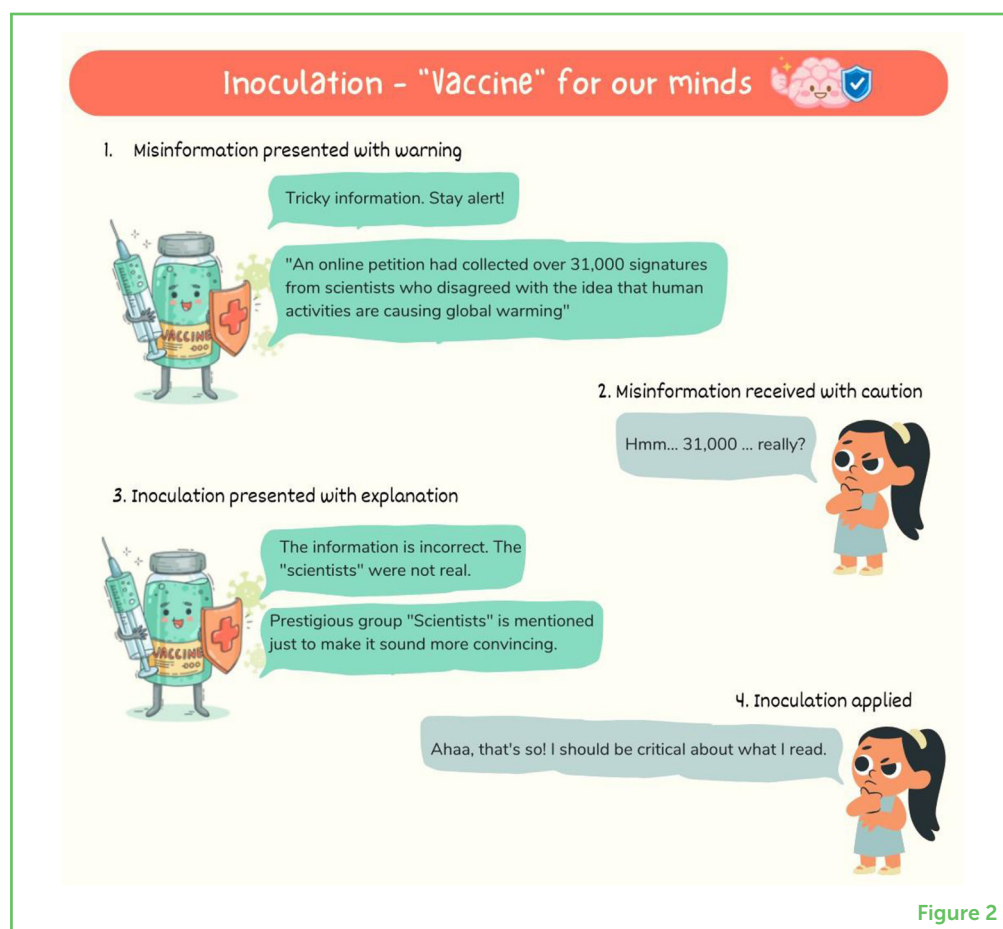


Figure 2

CONSPIRACY THEORY

A belief that a group of people is planning something bad or is hiding important information, even though this does not appear to be true in reality.

Figure 3

Certain games can be used to strengthen people's ability to spot misinformation. This is a screenshot from the Bad News Game (tiltstudio.co), in which players try to gain followers by spreading misinformation online. In this example, the player has only eight followers, and their credibility (believability) is low. To make the misinformation look real and attract more attention, the player can use the technique of impersonating people, which means pretending to be someone else. Do you think using NASA's identity could help to spread misinformation about the meteorite?

To make the inoculation strategy even more effective, researchers have explored the use of games to strengthen people's ability to spot and resist misinformation (see [Figure 3](#)). One such game is called the Bad News Game (tiltstudio.co). In this game, players try to gain followers by spreading misinformation online, while at the same time maintaining high credibility ratings among their followers. Throughout the game, players learn about various techniques used to spread misinformation, such as impersonating people (pretending to be someone else), and promoting beliefs called **conspiracy theories**, then learn to do so themselves. After 30 min of playing this game, players were shown fake news articles and asked to rate how believable they were. The same people who played the game rated the believability of news headlines significantly lower after playing the game than before. This indicates that inoculating games can be an effective tool to fight misinformation. Importantly, this effect held true for people of different age groups, political beliefs, genders, and education levels [6].

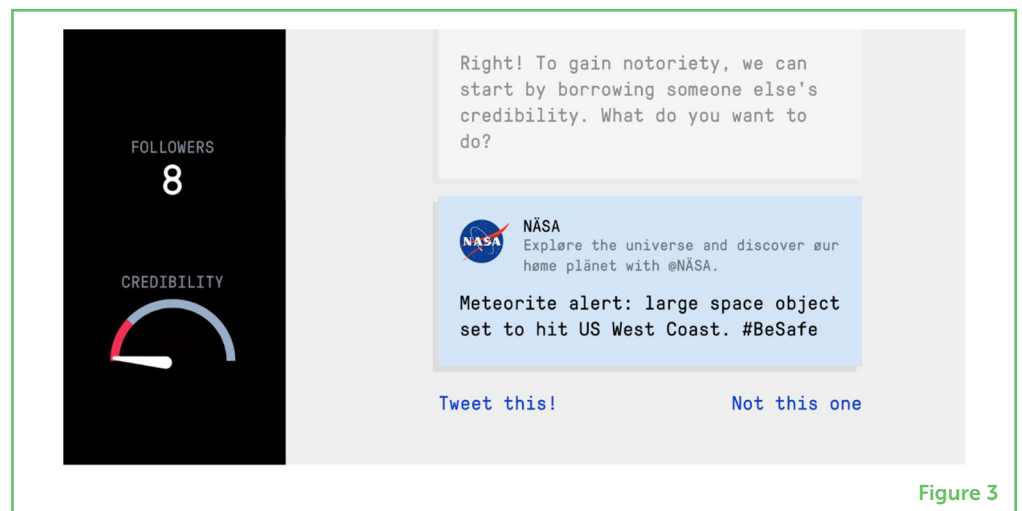


Figure 3

WHAT CAN WE DO?

We know that misinformation has a strong and persistent influence on our beliefs and the decisions we make. People are vulnerable to the persistence of misinformation because of confirmation biases, memory issues, and the rapid spread of misinformation on social media. Even though it is challenging to combat misinformation, we can address this problem by warning people about it and by playing games that reveal the tricks.

While it is critical for governments to take action against the spread of misleading and fake news, and for researchers to examine which actions may be successful, *you* can also play an important role in the fight against misinformation. From social media to daily conversations, you can learn to resist misinformation by paying attention to the information you encounter and discussing it with others when you

feel the information is false. In addition, being aware of our own confirmation biases and staying open minded to opinions that are different from our own can help us avoid the trap of misinformation. With these efforts, we can offer our own personal contributions to a well-informed society—one in which misinformation is rejected before it can spread further.

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YOUNG REVIEWERS



AKSHARA, AGE: 13

Akshara at age of 13 year, She curious about biology and world around. She believes Science is everything, from the art of brushing to the way we interact with nature. All the information we learn is gathered in our brain. Our brain is not just a heavy load on our neck, it actually helps us to have fun, dream, and live. She is eager to know more about the mechanisms of how it functions. Her aim is to understand how organisms interact with their environment to create a healthy society.



AYUMI, AGE: 12

I am in seventh grade. At school, my favorite subjects are engineering design and English. I also like to play softball with my friends, code Python, play the violin, and draw in my free time. I hope to become a computer scientist one day.

AUTHORS



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Katinka is a professor in the Brain and Cognition team at the Erasmus University Rotterdam, the Netherlands. Her research focuses on memory, misinformation, and resilience in younger and older adults. Through her research and teaching, she aims to make children and adults more aware and critical of misinformation that they encounter in social media. In her free time, she likes to travel, hike, and ride her speed bike. *k.dijkstra@essb.eur.nl



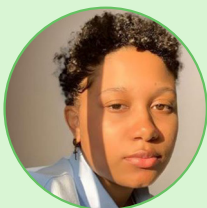
ARWEN SIENNA DIVERA MOLLENBROK

Arwen graduated from Erasmus University Rotterdam and is an enthusiastic student pursuing her master's degree at Leiden University in the Netherlands. She is studying economic and consumer psychology, which involves understanding how people make decisions. Her goal is to help people become more aware of why they behave the way they do. In her free time, she enjoys practicing yoga and reading. Through her studies and hobbies, she seeks to make a positive impact on the world around her.



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Giang is a passionate graduate from Erasmus University Rotterdam, the Netherlands, who specialized in brain and cognition. With a keen interest in individual differences in susceptibility to misinformation, she wishes to apply research to practical solutions to foster a well-informed society. Beyond academics, she enjoys traveling, cooking traditional Vietnamese food, and playing intellectually stimulating games.



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Guieane is a psychology graduate from Erasmus University Rotterdam, with a specialization in brain and cognition. She is currently pursuing a master's degree in cognitive neuropsychology at Tilburg University. In her studies, she is eager to explore the intricate relationship between the mind and behavior, delving into the cognitive processes underlying thoughts, emotions, and actions. Apart from her academic aspirations, Guieane finds joy in immersing herself in literature and channeling her creativity through crafting delightful cocktails.