The Confirmation Bias: Why People See What They Want to See

The *confirmation bias* is a cognitive bias that causes people to search for, interpret, and recall information in a way that confirms their preexisting beliefs. For example, if someone is presented with a lot of information on a

certain topic, the confirmation bias can cause them to only remember the bits of information that confirm what they already thought.

The confirmation bias influences people's judgment and decision-making in many areas of life, so it's important to understand it. As such, in the following article you will first learn more about the confirmation bias, and then see how you can reduce its influence, both in other people's thought process as well as in your own.

Contents

How the confirmation bias affects people

The confirmation bias promotes various problematic patterns of thinking:

- **Biased *search* for information**, for example by ignoring information that contradicts one's preexisting beliefs.
- **Biased *interpretation* of information,** for example by favoring explanations of events that confirm one's preexisting beliefs.

- **Biased *recall* of information,** for example by forgetting information that contradicts one's beliefs, or remembering it in a way that twists it into confirm one's beliefs.

Note: one closely related phenomenon is *cherry picking*. It involves focusing only on evidence that supports one's stance, while ignoring evidence that contradicts it. People often engage in cherry picking due to the confirmation bias, though it's possible to engage in cherry picking even if a person is fully aware of what they're doing, and is unaffected by the bias.

Examples of the confirmation bias

One example of the confirmation bias is someone who searches online to supposedly check whether a belief that they have is correct, but ignores or dismisses all the sources that state that it's wrong. Similarly, another example of the confirmation bias is someone who forms an initial impression of a person, and then interprets everything that this person does in a way that confirms this initial impression.

Furthermore, other examples of the confirmation appear in various domains. For instance, the confirmation bias can affect:

- **How people view political information.** For example, people generally prefer to spend more time looking at information that supports their political stance and less time looking at information that contradicts it.
- **How people assess pseudoscientific beliefs.** For example, people who believe in pseudoscientific theories tend to ignore information that disproves those theories.
- **How people invest money.** For example, investors give more weight to information that confirms their preexisting beliefs regarding the value of

certain stocks.

- **How scientists conduct research.** For example, scientists often display the confirmation bias when they selectively analyze and interpret data in a way that confirms their preferred hypothesis.
- **How medical professionals diagnose patients.** For example, doctors often search for new information in a selective manner that will allow them to confirm their initial diagnosis of a patient, while ignoring signs that this diagnosis could be wrong.

In addition, an example of how the confirmation bias can influence people appears in the following quote, which references the prevalent misinterpretation of evidence during witch trials in the 17th century:

> "When men wish to construct or support a theory, how they torture facts into their service!"
>
> — From "Extraordinary Popular Delusions and the Madness of Crowds"

Similarly, another example of how people display the confirmation bias is the following:

> "… If the new information is consonant with our beliefs, we think it is well founded and useful: 'Just what I always said!' But if the new information is dissonant, then we consider it biased or foolish: 'What a dumb argument!'
>
> So powerful is the need for consonance that when people are forced to look at disconfirming evidence, they will find a way to criticize, distort, or dismiss it so that they can maintain or even strengthen their existing belief."
>
> — From "Mistakes Were Made (but Not by Me): Why We Justify Foolish Beliefs, Bad Decisions, and Hurtful Acts"

Overall, examples of the confirmation bias appear in various domains. These examples illustrate the various ways in which it can affect people, and show that this bias is highly prevalent, including among trained professionals who are often assumed to assess information in a purely rational manner.

Psychology and causes of the confirmation bias

The confirmation bias can be attributed to two main cognitive mechanisms:

- ***Challenge avoidance***, which is the desire to avoid finding out that you're wrong.
- ***Reinforcement seeking***, which is the desire to find out that you're right.

These forms of motivated reasoning can be attributed to people's underlying desire to minimize their *cognitive dissonance*, which is psychological distress that occurs when people hold two or more contradictory beliefs simultaneously. Challenge avoidance can reduce dissonance by reducing engagement with information that contradicts preexisting beliefs. Conversely, reinforcement seeking can reduce dissonance by increasing engagement with information that affirms people's sense of correctness, including if they encounter contradictory information later.

Furthermore, **the confirmation bias also occurs due to flaws in how we test hypotheses.** For example, when people try to find an explanation for a certain phenomenon, they tend to focus on only one hypothesis at a time, and disregard alternative hypotheses, even in cases where they're not emotionally incentivized to confirm their initial hypothesis. This can cause people to simply try and prove that their initial hypothesis is true, instead of

trying to actually check whether it's true or not, which causes them to ignore the possibility that the information that they encounter could disprove this initial hypothesis, or support alternative hypotheses.

An example of this is a doctor who forms an initial diagnosis of a patient, and who then focuses solely on trying to prove that this diagnosis is right, instead of trying to actively determine whether alternative diagnoses could make more sense.

This explains why people can experience *unmotivated* confirmation bias in situations where they have no emotional reason to favor a specific hypothesis over others. This is contrasted with a *motivated* confirmation bias, which occurs when the person displaying the bias is motivated by some emotional consideration.

Finally, **the confirmation bias can also be attributed to a number of additional causes.** For example, in the case of the motivated confirmation bias, an additional reason why people experience the bias is that the brain sometimes suppresses neural activity in areas associated with emotional regulation and emotionally neutral reasoning. This causes people to process information based on how their emotions guide them to, rather than based on how their logic would guide them.

Overall, people experience the confirmation bias primarily because they want to minimize psychological distress, and specifically due to *challenge avoidance*, which is the desire to avoid finding out that they're wrong, and *reinforcement seeking*, which is the desire to find out that they're right. Furthermore, people can also experience the confirmation due to other causes, such as the flawed way they test hypotheses, as in the case where people fixate on confirming a single hypothesis while ignoring alternatives.

Note: Some of the behaviors that people engage in due to the confirmation bias can be viewed as a form of *selective exposure*. This involves people choosing to engage only with information that supports their preexisting beliefs and decisions, while ignoring information that contradicts them.

How to reduce the confirmation bias

Reducing other people's confirmation bias

There are various things that you can do to reduce the influence that the confirmation bias has on people. These methods generally revolve around trying to counteract the cognitive mechanisms that promote the confirmation bias in the first place.

As such, these methods generally involve trying to get people to overcome their tendency to focus on and prefer confirmatory information, or their tendency to avoid and reject challenging information, while also encouraging them to conduct a valid reasoning process.

Specifically, the following are some of the most notable techniques that you can use to reduce the confirmation bias in people:

- **Explain what the confirmation bias is, why we experience it, how it affects us, and why it can be a problem, potentially using relevant examples.** Understanding this phenomenon better can motivate people to avoid it, and can help them deal with it more effectively, by helping them recognize when and how it affects them. Note that in some cases, it may be beneficial to point out the exact way in which a person is displaying the confirmation bias.

- **Make it so that the goal is to find the right answer, rather than defend an existing belief.** For example, consider a situation where you're discussing a controversial topic with someone, and you know for certain that they're wrong. If you argue hard against them, that might cause them to get defensive and feel that they must stick by their initial stance regardless of whatever evidence you show them. Conversely, if you state that you're just trying to figure out what the right answer is, and discuss the topic with them in a friendly manner, that can make them more open to considering the challenging evidence that you present. In this case, your goal is to frame your debate as a journey that you go on together in search of the truth, rather than a battle where you fight each other to prove the other wrong. The key here is that, when it comes to a joint journey, both of you can be "winners", while in the case of a battle, only one of you can, and the other person will often experience the confirmation bias to avoid feeling that they were the "loser".
- **Minimize the unpleasantness and issues associated with finding out that they're wrong.** In general, the more unpleasant and problematic being wrong is, the more a person will use the confirmation bias to stick by their initial stance. There are various ways in which you can make the experience of being wrong less unpleasant or problematic, such as by emphasizing the value of learning new things, and by avoiding mocking people for having held incorrect beliefs.
- **Encourage people to avoid letting their emotional response dictate their actions.** Specifically, explain that while it's natural to want to avoid challenges and seek reinforcement, letting these feelings dictate how you process information and make decisions is problematic. This means, for example, that if you feel that you want to avoid a certain piece of information, because it might show that you're wrong, then you should realize this, but choose to see that information anyway.

- **Encourage people to give information sufficient consideration.** When it comes to avoiding the confirmation bias, it often helps to engage with information in a deep and meaningful way, since shallow engagement can lead people to rely on biased intuitions, rather than on proper analytical reasoning. There are various things that people can do to ensure that they give information sufficient consideration, such as spending a substantial amount of time considering it, or interacting with it in an environment that has no distractions.
- **Encourage people to avoid forming a hypothesis too early.** Once people have a specific hypothesis in mind, they often try and confirm it, instead of trying to formulate and test other possible hypotheses. As such, it can often help to encourage people to process as much information as possible before forming their initial hypothesis.
- **Ask people to explain their reasoning.** For example, you can ask them to clearly state what their stance is, and what evidence has caused them to support that stance. This can help people identify potential issues in their reasoning, such as that their stance is unsupported.
- **Ask people to think about various reasons why their preferred hypothesis might be wrong.** This can help them test their preferred hypothesis in ways that they might not otherwise, and can make them more likely to accept and internalize challenging information.
- **Ask people to think about alternative hypotheses, and why those hypotheses might be right.** Similarly to asking people to think about reasons why their preferred hypothesis might be wrong, this can encourage people to engage in a proper reasoning process, which they might not do otherwise. Note that, when doing this, it is generally better to focus on a small number of alternative hypotheses, rather than a large number of them.

Different techniques will be more effective for reducing the confirmation bias in different situations, and it is generally most effective to use a combination of techniques, while taking into account relevant situational and personal factors.

Furthermore, in addition to the above techniques, which are aimed at reducing the confirmation bias in particular, there are additional debiasing techniques that you can use to help people overcome their confirmation bias. This includes, for example, getting people to slow down their reasoning process, creating favorable conditions for optimal decision making, and standardizing the decision-making process.

Overall, to reduce the confirmation bias in others, you can use various techniques that revolve around trying to counteract the cognitive mechanisms that promote the confirmation bias in the first place. This includes, for example, making people aware of this bias, making discussions be about finding the right answer instead of defending an existing belief, minimizing the unpleasantness associated with being wrong, encouraging people to give information sufficient consideration, and asking people to think about why their preferred hypothesis might be wrong or why competing hypotheses could be right.

Reducing your own confirmation bias

To mitigate the confirmation bias in yourself, you can use similar techniques to those that you would use to mitigate it in others. Specifically, you can do the following:

- Identify when and how you're likely to experience the bias.

- Maintain awareness of the bias in relevant situations, and even actively ask yourself whether you're experiencing it.
- Figure out what kind of negative outcomes the bias can cause for you.
- Focus on trying to find the right answer, rather than on proving that your initial belief was right.
- Avoid feeling bad if you find out that you're wrong; for example, try to focus on having learned something new that you can use in the future.
- Don't let your emotions dictate how you process information, particularly when it comes to seeking confirmation or avoiding challenges to your beliefs.
- Dedicate sufficient time and mental effort when processing relevant information.
- Avoid forming a hypothesis too early, before you'd had a chance to analyze sufficient information.
- Clearly outline your reasoning, for example by identifying your stance and the evidence that you're basing it on.
- Think of reasons why your preferred hypothesis might be wrong.
- Come up with alternative hypotheses, as well as reasons why those hypotheses might be right.

An added benefit of many of these techniques is that they can help you understand opposing views better, which is important when it comes to explaining your own stance and communicating with others on the topic.

In addition, you can also use general debiasing techniques, such as standardizing your decision-making process and creating favorable conditions for assessing information.

Furthermore, keep in mind that, as is the case with reducing the confirmation bias in others, different techniques will be more effective than others, both in general and in particular circumstances. You should take this into account, and try to find the approach that works best for you in any given situation.

Finally, note that in some ways, debiasing yourself can be easier than debiasing others, since other people are often not as open to your debiasing attempts as you yourself are. At the same time, however, debiasing yourself is also more difficult in some ways, since we often struggle to notice our own blind spots, and to identify areas where we are affected by cognitive biases in general, and the confirmation bias in particular.

Overall, to reduce the confirmation bias in yourself, you can use similar techniques to those that you would use to reduce it in others. This includes, for example, maintaining awareness of this bias, focusing on trying to find the right answer rather than proving that you were right, dedicating sufficient time and effort to analyzing information, clearly outlining your reasoning, thinking of reasons why your preferred hypothesis might be wrong, and coming up with alternative hypotheses.

Additional information

Related cognitive biases

There are many cognitive biases that are closely associated with the confirmation bias, either because they involved a similar pattern or reasoning, or because they occur, at least partly, due to underlying confirmation bias.

For example, there is the *backfire effect*, which is a cognitive bias that causes people who encounter evidence that challenges their beliefs to reject that

evidence, and to strengthen their support of their original stance. This bias can, for instance, cause people to increase their support for a political candidate after they encounter negative information about that candidate, or to strengthen their belief in a scientific misconception after they encounter evidence that highlights the issues with that misconception. The backfire effect is closely associated with the confirmation bias, since it involves the rejection of challenging evidence, with the goal of confirming one's original beliefs.

Another example of a cognitive bias that is closely related to the confirmation bias is the *halo effect*, which is a cognitive bias that causes people's impression of someone or something in one domain to influence their impression of them in other domains. This bias can, for instance, cause people to assume that if someone is physically attractive, then they must also have an interesting personality, or it can cause people to give higher ratings to an essay if they believe that it was written by an attractive author. The halo effect is closely associated with the confirmation bias, since it can be attributed in some cases to people's tendency to confirm their initial impression of someone, by forming later impressions of them in a biased manner.

The origin and history of the confirmation bias

The term 'confirmation bias' was first used in a 1977 paper titled "Confirmation bias in a simulated research environment: An experimental study of scientific inference", published by Clifford R. Mynatt, Michael E. Doherty, and Ryan D. Tweney in the *Quarterly Journal of Experimental Psychology* (Volume 29, Issue 1, pp. 85-95). However, as the authors themselves note, evidence of the confirmation bias can be found earlier in the psychological literature.

Specifically, the following passage is the abstract of the paper that coined the term. It outlines the work presented in the paper, and also notes the existence of prior work on the topic:

> "Numerous authors (e.g., Popper, 1959) argue that scientists should try to *falsify* rather than *confirm* theories. However, recent empirical work (Wason and Johnson-Laird, 1972) suggests the existence of a confirmation bias, at least on abstract problems. Using a more realistic, computer controlled environment modeled after a real research setting, subjects in this study first formulated hypotheses about the laws governing events occurring in the environment. They then chose between pairs of environments in which they could: (1) make observations which would probably confirm these hypotheses, or (2) test alternative hypotheses. Strong evidence for a confirmation bias involving failure to choose environments allowing tests of alternative hypotheses was found. However, when subjects did obtain explicit falsifying information, they used this information to reject incorrect hypotheses."

In addition, a number of other past studies are discussed in the paper:

> "Examples abound of scientists clinging to pet theories and refusing to seek alternatives in the face of large amounts of contradictory data (see Kuhn, 1970). Objective evidence, however, is scant.
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> Wason (1968a) has conducted several experiments on inferential reasoning in which subjects were given conditional rules of the form 'If P then Q', where P was a statement about one side of a stimulus card and Q a statement about the other side. Four stimulus cards, corresponding to P, not-P, Q, and not-Q were provided. The subjects' task was to indicate those cards—and only those cards—which had to be turned over in order to determine if the rule was true or false. Most subjects chose only P, or P and Q. The only cards which can falsify the rule, however, are P and not-Q. Since the not-Q card is

> almost never selected, the results indicate a strong tendency to seek confirmatory rather than disconfirmatory evidence. This bias for selecting confirmatory evidence has proved remarkably difficult to eradicate (see Wason and Johnson-Laird, 1972, pp. 171-201).
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> In another set of experiments, Wason (1960, 1968b, 1971) also found evidence of failure to consider alternative hypotheses. Subjects were given the task of recovering an experimenter defined rule for generating numerical sequences. The correct rule was a very general one and, consequently, many incorrect specific rules could generate sequences which were compatible with the correct rule. Most subjects produced a few sequences based upon a single, specific rule, received positive feedback, and announced mistakenly that they had discovered the correct rule. With some notable exceptions, what subjects did not do was to generate and eliminate alternative rules in a systematic fashion. Somewhat similar results have been reported by Miller (1967).
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> Finally, Mitroff (1974), in a large-scale non-experimental study of NASA scientists, reports that a strong confirmation bias existed among many members of this group. He cites numerous examples of these scientists' verbalizations of their own and other scientists' obduracy in the face of data as evidence for this conclusion."

Summary and conclusions

- The *confirmation bias* is a cognitive bias that causes people to search for, interpret, and recall information in a way that confirms their preexisting beliefs.
- The confirmation bias affects people in every area of life; for example, it can cause people to disregard negative information about a political candidate

that they support, or to only pay attention to news articles that support what they already think.

- People experience the confirmation bias due to various reasons, including challenge avoidance (the desire to avoid finding out that they're wrong), reinforcement seeking (the desire to find out that they're right), and flawed testing of hypotheses (e.g., fixating on a single explanation from the start).
- To reduce the confirmation bias in yourself and in others, you can use various techniques that revolve around trying to counteract the cognitive mechanisms that promote the confirmation bias in the first place.
- Relevant debiasing techniques you can use include maintaining awareness of this bias, focusing on trying to find the right answer rather than being proven right, dedicating sufficient time and effort to analyzing relevant information, clearly outlining the reasoning process, thinking of reasons why a preferred hypothesis might be wrong, and coming up with alternative hypotheses and reasons why those hypotheses might be right.