

Confirmation Bias in the Age of Technology

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Abstract

Technology has affected the way that humans think. In this paper we will be looking at the different ways technology has increased confirmation bias among different social platforms. It will be found that technologies such as Artificial intelligence and algorithms combined with Big Data Analytics are the leading factors that increase confirmation bias online. Along with the technologies that enable confirmation bias we will be diving into some of the psychological reasons why humans conform to confirmation bias. It will be found that confirmation bias plays a bigger role in our lives than we really suspect and that technology allows for negative implications including echo chambers for racist and hateful ideologies.

Confirmation Bias in the Age of Technology

According to Ling (2020), “Confirmation bias is the predisposition to only consume the news, or what appears to be news, that confirms our pre-existing attitudes and beliefs” (p. 596). Confirmation bias can take place within many different forms of media across many different platforms. Some examples of confirmation bias online include purposely blocking people online that don't share the same thoughts as you, posting about an issue without thinking about the other point of view, only receiving news from a news channel that shares the same beliefs as you, or arguing with someone for hours online as to why your view is correct view. I have had my own personal experiences with confirmation bias online, but in a different way. After I watch a great anime or show that I really like, I head over to YouTube to watch reactions to my favorite parts of the show, as well as watching reviews of the show. I do this because I want my views of the show to be shared among other people to confirm my own beliefs toward that show. Jonas et al. (2001) explains, “Research on selective exposure to information consistently shows that, after having made a decision, people prefer supporting over conflicting information” (p. 557). Now this makes sense, why would someone want to be met with conflicting information that goes against their own views. When I watch a negative review of a show that I really liked, I don't listen to their opinion because it differs from my own. It's in our best interest to put ourselves in situations that allow us to be in an environment where we only receive news, reviews, or tweets that we agree with. But what if I were to say that we are naturally put in those situations by the technology we use everyday.

Methods: Analyzing Big Data, AI, and Algorithms

Big Data

Big Data, artificial intelligence, and algorithms are used to alter the way the internet is brought to us. First we need to understand what big data is to understand how it ties in with algorithms. According to Schroder (2019) big data can be defined as, “data with a scale and scope that marks steps change in relation to a given object or phenomenon” (p. 182). Now this definition might be unorthodox, but Schroder (2019) further explains that data consists of the most useful units of analysis (p. 182). This last part is important because data itself is worthless, but the knowledge you gain from data is what makes it so valuable in today's world. Big data is collected by the different technologies we use today. Schroder (2019) explains, “But the vast bulk of big data used in the analysis of society comes from digital-media devices, and the vast bulk of this data collection and analysis is carried out by digital-media companies” (p.182). This shows that when we are using our devices, whether it be your smartphone, tablet, or computer, our data is being collected on our online habits and is further analyzed by digital-media companies.

Algorithms and AI

Now that we understand how Data is being collected, we need to see how this data is being used. The fact that data itself is worthless without the knowledge you receive from it was previously mentioned. Digital-media companies use different methods to make sure they get the most out of the data they collect. The amount of data they receive is too big for any person or team to analyse, that's why they implement algorithms that use artificial intelligence to automatically predict what we want to see on the different apps and websites we use. Shaffer (2019) explains:

Much of the media we engage with today is selected for us by algorithms. This is true on social platforms like Facebook, Instagram, and Twitter; on video streaming services like YouTube and Netflix; on music streaming services like Pandora and Spotify; on shopping websites like Amazon; and especially in the ads we see across the internet. It is often claimed that these algorithms are responsible for boosting one point of view while censoring another — amplifying the biases of the programmers who build these tools and influencing what we believe, what we care about, and even how we vote. (How Algorithms Amplify Our Own Biases section, para. 1)

It is true that these algorithms tend to be designed to increase our biases and influence what we believe. Shaffer (2019) explains, “algorithms learn biases from all of us — including, but absolutely not limited to, the biases of their programmers — and those algorithms sometimes do surprising things with the information we teach them” (How Algorithms Amplify Our Own Biases section, para. 2). This information that we teach algorithms, and what they learn to produce is what makes them so smart. Let's look at how these algorithms work to see how they generate the results that they do that eventually end up on our screens. Shaffer (2019) explains:

Figure 3-1 illustrates the feedback loop(s) by which human biases are amplified and propagated through unchecked algorithmic content delivery. (While this illustration emphasizes search engines, the basic concepts are similar for platforms like YouTube, Facebook, and Twitter.) When a user performs a search, the model takes their search terms and any metadata around the search (location, timing, etc.) as inputs, along with data about the user from their profile and activity history, and other information from the platform's database, like content features and the profiles and preferences of other similar

users. Based on this data, the model delivers results—filtered and ranked content, according to predictions made about what the user is most likely to engage with. (Bias Amplifier section, para. 1)

You can see how this model works in figure 3-1, which shows what Shaffer explained above.

You can see the three boxes in the middle showing our searches, profile activity, and the content database is used to filter our search results, along with what we see on different platforms of apps and websites.

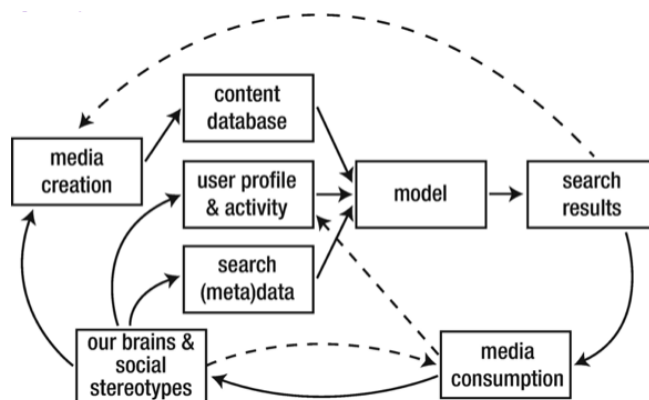


Figure 3-1: The feedback loop of human-algorithm interaction. From Shaffer, Kris. “How Algorithms Amplify Our Own Biases And Shape What We See Online.” *Talking Points Memo*, 26 Aug. 2019, talkingpointsmemo.com/cafe/algorithms-bias-internet.

Findings: Landscapes of bias created from algorithms

We know how these algorithms operate but what does this mean in the context of confirmation bias online? Now let's look at the bottom part of figure 3.1 which shows our search results translating to what media we consume, which leads to our brains and social stereotypes and bias. As a result of these algorithms, the landscape of targeted social media and news that we see are amplified to increase our bias. Shaffer (2019) explains, “sharing optimization compounds

the filter bubble effect. Because it is easier to find information that reflects my existing biases and easier to share it, my contributions to others' social feeds will reflect my biases even more than if I only shared content that I found elsewhere on the internet" (Bias Amplifier section, para. 7). This makes sense, as you see and interact with the content that is brought to you through algorithms that are designed to show you what you want to see, you are more likely to interact with people that share the same views as you. Shaffer (2019) explains this further:

This creates a feedback loop of bias amplification: I see things in accordance with my bias, I share a subset of that content that is chosen in accordance with that bias, and that feeds into the biased content the people in my network consume, from which they choose a subset in accordance with their bias to share with me, and so on. Left unchecked, this feedback loop will continue to amplify the biases already present among users, and the process will accelerate the more people find their news via social media feeds and the more targeted the algorithm becomes. (Bias Amplifier section, para. 7)

The feedback loop of bias amplification creates groups and communities that share the same views as each other. When two different groups with opposing views collide on social media, digital polarization occurs. Shaffer (2019) explains polarization as the increasing difference of viewpoints of two groups that results in animosity between opposing groups. The previously mentioned bias amplification loop causes this. Shaffer (2019) explains:

Digital polarization is in large part a result of the bias-amplification feedback loop applied to already like-minded groups. As biases get amplified within a group, it becomes more and more of a "filter bubble" or "echo chamber," where content uncritically

promotes in-group thinking and uncritically vilifies the opposition (Bias Amplifier section, para. 9).

You can see these echo chambers across different social media today. If you were on twitter at all this year, you would have seen how differently communities of people felt toward social justice issues, Covid-19, and the Presidential election. These different groups of echo chambers often collided on these tough issues that we faced this year, both with completely different viewpoints of the situation.

Humans and Confirmation Bias

Although algorithms put us in situations that tend to amplify our own biases, that can't be the only reason why we see what we see online. There has to be a human aspect to where we want to see things that we agree with and avoid things we don't agree with. Van der Meer et al. (2020) explains:

Individuals may primarily expose themselves to news and sources that reinforce existing political beliefs to exclude attitude-discrepant messages, rely on channels that are part of their habitual media diet, or self-select into information that is merely entertaining and arousing. (p. 938)

Like I mentioned in my real life example about watching good reviews on shows and movies, people want to watch and read things that reinforce one's beliefs. This makes a double edged sword when it comes to confirmation bias online. On one side we have humans exposing themselves to news and content that reinforce existing beliefs, and on the other side we have algorithms analyzing this information and then further recommending this content back to us. This seems potentially dangerous, a continuous cycle without an exit. According to Schwind et

al. (2011), “The Web is a perfect backdrop for opinion formation as a multitude of different opinions is publicly available. However, the different opinions often remain unexploited: Learners prefer preference-consistent over preference-inconsistent information, a phenomenon called confirmation bias (abstract section, para. 1). Like Schwind has stated, different opinions exist online, but we don't want to view them due to our confirmation bias. Seeing things from different perspectives can enable us to think differently and be more open minded toward other possibilities. Often peoples biased opinions tend to exclude all of the facts and sides on certain topics and issues. Schwind et al. (2011) supports this stating, “the availability of different opinions often remains unexploited: When learners inform themselves about relevant facts, arguments, or explanations on a controversial issue, they frequently fail to take dissenting information into account” (Introduction section, para. 2). This is important to understand if we want to be able to combat this. Schwind et al. (2011) describes dissenting information as, “Information which contradicts an individual’s position leads to cognitive dissonance. As dissonance is a negative and uncomfortable state, individuals try to avoid it—or at least reduce it—and therefore prefer information which supports their own position” (Introduction section, para. 2).

Breaking the cycle

Schwind et al (2011) explains, “Both educational and social psychological research findings hint at the potential that dissenting information might have to overcome confirmation bias” (Potentials of preference-inconsistent recommendations section, para. 1). How can we provide dissenting viewpoints in a system where algorithms and amplify our human nature to appeal to our own biases online? In a study conducted by Schwind et al. (2011) it was found that,

“preference-inconsistent recommendations can foster unbiased information selection and elaboration of controversial topics. The studies showed that preference-inconsistent recommendations have an effect on information selection and thus can help to overcome confirmation bias” (Conclusion and Discussion section para. 1). Preference-inconsistent recommendations can cause people to be curious about other opposing viewpoints, as opposed to their own biases that are pushed to them everyday by algorithms. Also further proving the results of this study, Schwind et al. (2011) explains:

The effect was not due to participants "blindly" accepting a recommendation. In fact, the low acceptance rates in both recommendation conditions suggest that participants did not select the recommended argument, but rather selected a different argument from the recommended perspective instead. (Conclusion and Discussion section para. 1)

This is important because it shows that when the participants were provided dissenting opinions in this study, they chose results that weren't the recommended argument, actively selecting against recommended content. To break the previously mentioned cycle of confirmation bias online, digital media companies would have to create algorithms that provide us with content and news that is both consistent and inconsistent with our preferences. This way we will be exposed to dissenting information as well as information that we agree with. This way people will have the opportunity to view opposing opinions and have the opportunity to see issues and topics from different perspectives. No one should be forced to change their views and beliefs on specific topics and issues, but simply seeing things from different perspectives can help people understand that their way of thinking isn't the only way to look at something. Unfortunately as we previously mentioned, digital media companies don't allow that possibility because catering

to one's own bias is better for them because you are more likely to use that social media platform when it feeds you what you want to hear.

Discussion: negative effects of confirmation bias

Lastly, I would like to discuss another negative impact confirmation bias on social media brings. Alsaad et al. (2018) states:

grounded in the theory of confirmation bias, a growing body of anecdotal literature suggests that social media may nurture racist, hateful behaviors by promoting bias. Thus, social media may ultimately lead to rise in racist, hateful behaviors, as these are bias-driven behaviors. (Introduction section, para 3.)

While the previously mentioned negative effects of confirmation bias online included being close minded and not being able to see issues from different perspectives, this negative effect is much more serious and concerning. Echo chambers of racist ideologies can and do exist online, creating groups that believe this sort of behavior is acceptable. Alsaad et al. (2018) explains, “In line with the notion that social media is personalized to users' concerns, users tend to consume online content that supports their racial ideologies, which in turn may stimulate and motivate them to become lone wolf extremists” (Social Media and Confirmation Bias section, para. 2). This not only happens for racists ideals, but to other negative and hateful topics. This further proves that it should be in our best interest to break the cycle of confirmation bias online and to understand and change the technology that enables this online.

Conclusion

In an age where we are online more than ever, data collection techniques and algorithms are used to recommend and put us in online environments that are suited for us. As we discussed,

our desire to see and search for opinions that we agree with combined with the technology like big data and algorithms that use Artificial intelligence to learn our habits creates an unhealthy environment to where we are recommended things that cater to our own bias. While personalization like this can have its benefits like user recommendations on Youtube and Netflix, there are negatives that further enhance our biases while we're scrolling through Facebook and Twitter, or searching for news online. These negative effects include filter bubbles and echo chambers that create communities of bias, or potentially hateful acts. While it wouldn't benefit media companies to change how their algorithms work, it would be beneficial to us. Solutions like preference-inconsistent recommendations have been proven to be effective. Hopefully in the future we can find a solution that decreases our confirmation bias online and creates an environment where people look for news and opinions that they do and don't agree with.

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