

Confirmation Bias in Decision-making: Implications in Finance, Business, and Digital Media

Arthur Zheming Chao *

Garth Webb Secondary School, Oakville, Canada

* Corresponding Author Email: 1chaoart2@hdsb.ca

Abstract. Confirmation bias is the tendency to look for supporting evidence for an established belief. Many applications of confirmation bias occur in people's lives unconsciously, resulting in poor decision-making as they become unable to evaluate the situation objectively. It can also perpetuate false beliefs, increase group polarization, and make people more vulnerable to manipulation. Understanding and mitigating this bias is crucial for improving rational decision-making across various fields. This study examines three applications of confirmation bias in the real world by extrapolating from case studies and experiments. In finance, investors and traders are influenced by confirmation bias to make suboptimal investments and trades. In marketing, consumers are influenced by advertisements and brand loyalty to have a product fit their expectations. In digital media, confirmation bias reinforces echo chambers, promoting group polarization. Finally, the study provides policy recommendations to reduce the effect of confirmation bias, such as improving transparency in marketing and promoting partisan dialogue. It is not enough that society is aware of the problems confirmation bias poses, people should act to reduce the impact of the bias in the economy and online.

Keywords: Confirmation bias, Consumer behavior, financial markets, Digital media, Echo chambers.

1. Introduction

Confirmation bias, in the field of behavioral economics, is a bias in which individuals favor information that supports their current beliefs while overlooking evidence that contradicts them. It has significant influences on decision-making and belief formation on an individual, communal, and global scale. From historical events like the Salem Witch Trials, to discoveries in mathematics like the theorems of Pythagoras, to conflicts like the Vietnam War, confirmation bias plays a pivotal role in shaping the outcomes of many events. Understanding this bias is not only important for addressing inconsistencies in personal decisions but also for understanding its impacts in broader social contexts.

This study aims to explore the role of confirmation bias in three fields: finance, marketing, and digital media. By examining these fields, the study demonstrates the significant consequences of confirmation bias in social and economic settings. In financial markets, confirmation bias can lead to overconfidence and poor investment choices, creating major economic problems economically like financial bubbles [1]. In marketing, consumer behavior and choices can be manipulated by businesses using confirmation bias, through strategies like brand loyalty and advertisement, to confirm their present preferences. In social media, confirmation bias contributes to the formation of echo chambers and partisan sorting, where individuals are excessively exposed to information they favor while being blocked out from disagreeing evidence. This phenomenon extends social conflicts and polarization, as people unconsciously position themselves on the ends of two opposite and extreme poles.

The importance of this analysis lies in the potential to improve the decision-making process across society. Through the learning and understanding of confirmation bias, individuals and organizations can make more informed decisions by being consciously aware of the influence of the bias on their search for information. Thus, the negative impacts of confirmation bias will be reduced at both personal and societal levels. This study will examine the presence and effects of confirmation bias in the previously mentioned fields by drawing on studies and key literature to provide a comprehensive understanding. It aims to reduce the effect of bias and promote rational decision-making in society.

2. Literature Review

Confirmation bias has been studied by psychologists and behavioral economists alike due to its importance in a person's rational thinking. The formal definition of confirmation bias is:

Confirmation bias, as the term is typically used in the psychological literature, connotes the seeking or interpreting of evidence in ways that are partial to existing beliefs, expectations, or a hypothesis in hand [2].

In other words, confirmation bias is the tendency to look for support of an established belief. As a result, information that does not support the belief gets ignored or overlooked.

As people search for evidence every day to make their decisions, it is not difficult to see the results and applications of confirmation bias. First of all, a person's consumption of news is heavily impacted by this bias. As technology evolves, more diverse platforms like social media offer personalized choices in news consumption. People could customize what sources they get their news from, what topic they are interested in, what region of the world the news comes from, and many other features. These choices increase the role confirmation bias plays, as there is no single way to get news, and people have to actively choose what news they want to see. Frequently, news confirming their current views is chosen. Secondly, the purchase of products is another way confirmation bias affects people's lives. Consumer decisions are based on the established beliefs of a firm, often a result of brand loyalty and advertisement [3]. Thus, firms can easily influence and manipulate consumer decisions through understanding confirmation bias. Additionally, other aspects of life like healthy lifestyle choices and relationship-building are also influenced by confirmation bias.

If confirmation bias plays a role in every part of life, why would changing or reducing its effects benefit society? Confirmation bias can help people make decisions based on previous beliefs and experiences, but it also entails negative effects. To begin, it can perpetuate false beliefs and superstitions that people hold. As described before, the digital age and the internet allow information to be spread and received at unprecedented speed. However, some of this information might not be accurate or true, leading to misinformation. As people start to believe in this false information, confirmation bias creates a cycle in which people unconsciously reinforce false beliefs, spread them, and find more inaccurate information to support their claims. Secondly, confirmation bias is a direct cause of the group polarization phenomenon [4]. One of the major explanations for group polarization is information influence, with groups and parties forming around beliefs. These beliefs are supported through confirmation bias, and the size of the group magnifies the extremities and effects of the belief. Moreover, these beliefs are easily exploited by people using conspiracy theories and misinformation for financial and personal gains. Finally, overreliance on confirmation bias can have cognitive limitations like reducing critical and logical thinking. Consequently, it poses a threat to the process of learning information. In conclusion, understanding confirmation bias aims to reduce its negative effects.

3. Applications

3.1. Financial Markets and Investment

In making financial decisions and investments, confirmation bias can be a major factor that hinders objective analysis of the situation. As traders, investors, and financial consultants make decisions based on information, they unconsciously fall victim to confirmation bias. For instance, if an investor expects a positive return from a firm, they will believe that the company will do well financially. Then, as they look at financial reports, positive news will stand out to them, even if the company is not doing as great as they thought. The investor will become overconfident in their choices, resulting in a disproportionate increase in confidence compared to the likelihood of the belief being true [5]. Thus, confirmation bias can result in suboptimal decisions as investors seek to confirm their initial choice, instead of objectively evaluating the situation and reducing the loss.

In 2005, an experiment aimed to study trading behavior asked business students from a few universities to participate in a simulated market [1]. They were incentivized to gain the maximum profit through trading assets, valued at 50, 240, or 490. However, they do not know the value of the assets they have in their hands. The participants will receive a hint on what is not the value of the asset. This hint results in the participant making a decision and believing what their asset's value is. Then, they trade based on the perceived value of their assets. The experimenters will evaluate the different trades as well as the confidence of the participants.

The result relevant to confirmation bias is the miscalibration of the value of the assets. It represents the overconfidence in a false belief, as the participant tends to miscalibrate the value of their asset. Confirmation bias is one of the root causes of mistakes in this setting, as the participant's initial belief would have a significant impact on their transactions. If the participant were to believe that the value of the asset is 240, they would seek transactions that confirm their estimate, such as buyers or sellers around the same price. Thus, if they are wrong in their estimate, they would have a poor trading performance. The presence of confirmation bias can be extended into the field of finance as a whole. In a field of rapid decisions, investors have limited time and processing power. The presentation of information such as financial reports is crucial as misinformation will result in the formation of inaccurate beliefs. With these beliefs, the investors will seek out more information that supports them, adhering to confirmation bias. However, inaccurate information can only result in decision-making mistakes. To conclude, confirmation bias can impact major decisions in the financial sphere and bring about irrational choices.

3.2. Marketing and Consumer Behavior

A consumer's experience while using a product can be influenced through marketing, contrary to beliefs that the product itself is beyond the reach of corporate influence [3]. The reason is that confirmation bias can alter the consumer's confidence in their evaluation of the product. Through tactics like advertisement to promote brand loyalty, firms plant a seed in the minds of consumers about the expectations of their products. As consumers use the product, they will look for evidence that supports their preexisting expectations. Thus, confirmation bias is relevant for firms to use marketing effectively and for consumers to understand the outcomes of their purchasing decisions.

In a series of experiments to study consumer behavior toward brands, confirmation bias is exhibited in the decision-making of the participants [6]. Its objective was to understand the influence of experience and preexisting beliefs on a brand when compared to an objectively better brand. Before the experiment, the experimenter chose natural skin lotion brands as most participants will not have a high degree of expertise in the field and products have observable and objective attributes. First of all, participants learn about lotions and are exposed to a matrix of brands, with one brand being objectively superior to all others. The participants would choose their initial brand and would be asked to try the lotion once (limited experience) or many times (extensive experience). Then, the levels of belief and experience of participants are tested based on which lotion brand they chose and how confident they are with their decisions. This establishes a preexisting belief about the superiority of their chosen brand. Then, after a few days, they would choose again from a matrix of brands that involve their initial choice but also involve an objectively better lotion brand. Their choices and confidence in their choices were again examined.

Table 1. The Results of Experiment 1

Dependent measure	Low belief crystallization		High belief crystallization	
	Limited experience	Extensive experience	Dependent measure	Limited experience
Choice	3/22 (.14)	16/22 (.73)	Choice	3/22 (.14)
Confidence	3.95	4.68	Confidence	3.95

In the result of this experiment, it can be observed from Table 1 that participants with high confidence in their initial belief had a significantly higher chance of picking their initial brand the second time they chose. This is the case for both limited experience and extensive experience compared to low belief crystallization. Moreover, the high-belief crystallization participants' confidence in their choices is also significantly higher compared to low-belief crystallization. It demonstrates that a strong belief about a brand initially is the cause of choosing the same brand even if an objectively better brand exists. Thus, it exemplifies confirmation bias in consumer decisions, as the consumer seeks to support their initial decision and expectation of the brand by choosing the same option. The consumer exhibits a resistance towards the new brand, as they attempt to justify their choices [7]. The study's importance is to show how confirmation bias and other biases influence consumers' rationality when making decisions. It can extend into strategies for firms, as extensive exposure to positive information about a product will likely influence a consumer's objective experience. To summarize, confirmation bias plays a large role in the choices of participants, as they abandon the objectively better option, and instead choose to confirm their initial beliefs and expectations by sticking with their initial choice.

3.3. Digital Media and Echo Chambers

Digital media plays a significant role in amplifying the effects of confirmation bias. As the internet allows information to be spread rapidly, how viewers perceive this information becomes crucial in their decision-making and belief-formation process. As users engage with self-supporting content, social media algorithms limit their exposure to diverse perspectives and promote the formation of groups of people with the same beliefs [8]. Then, the beliefs of users are reinforced by what they see on social media, trapping them within sources and people who repeatedly confirm their current beliefs [8]. This phenomenon is called an echo chamber, as everything the user can perceive is a resonance of their previous beliefs. Thus, confirmation bias is very relevant to the topic of echo chambers in digital media.

To examine how confirmation bias leads to echo chambers, this study will explore two experiments and compare their findings. To begin, digital media has been hypothesized to cause intense polarization in the fields of politics, economics, and more [9]. This study uses an untraditional method, computational simulation, to create an environment in which social media interactions can be modeled. Tornberg used similar algorithms and equations to social media platforms and simulated an interaction. First of all, dots, representing individuals, are placed on a grid, representing the whole interaction, each with a preference, a randomized number between 1 and 0. Each individual also has a party affiliation, in this interaction which simulated bipartisan beliefs, being circles and crosses. As the simulation starts, random neighbors, dots beside each other, interact by sharing their preferences. If their preferences are similar, their party affiliation becomes the same. This interaction models the influence of information on social media on people.

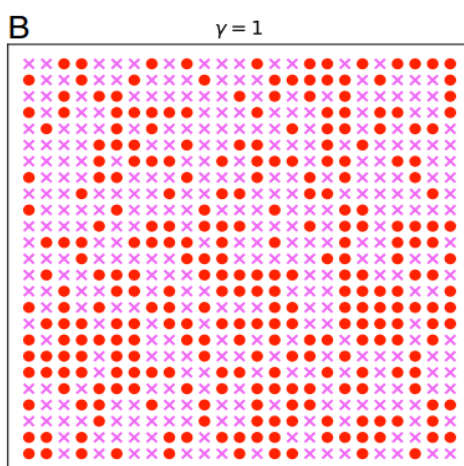


Figure 1. The Result of Tornberg's Study

Fig. 1 shows the grid divided into two parties, either circles or crosses. If observed more thoroughly, it can be seen that circles and crosses form groups in various instances. This result can be attributed to partisan sorting and echo chambers in social media [9]. Partisan sorting is from local convergence, the idea that local and similar ideas influence the region while limiting exposure to non-local views. It creates echo chambers where information tends to reinforce repeatedly established beliefs. A new finding from this study was that individuals were exposed to some non-local views in the simulation, but it strengthened their party affiliations and beliefs. Therefore, the study challenged traditional thoughts that echo chambers are a result of a lack of exposure, while emphasizing that the partisan sorting algorithm and habit of social media is the real culprit behind increasing polarization. Its importance is that it evaluates confirmation bias as a cause and tool of partisan sorting. It asks the reader and policymakers to rethink the digital policies governing social media algorithms.

The second study focuses heavily on echo chambers on major social platforms like Facebook and Reddit [8]. The literature performed a comparative analysis of more than 100 million pieces of content on controversial issues from Gab, Facebook, Reddit, and Twitter. Then, it used equations to model the individual leaning of a user, between -1 and 1. This number, i , is the average of their leanings on their produced content. These values are graphed to show the distribution of users on a scale between -1 and 1. Finally, it characterized the echo chambers using the datasets from the platforms and evaluated news consumption between Facebook and Reddit.

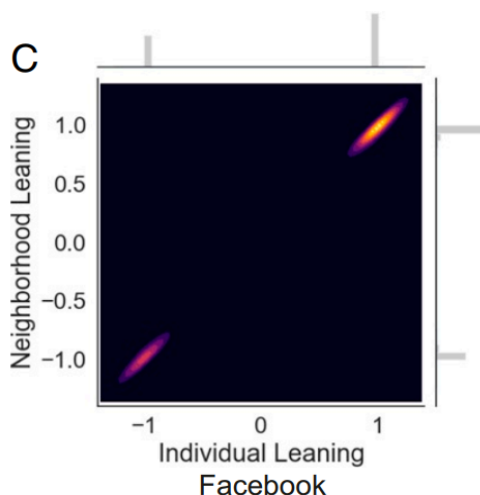


Figure 2. The Result of the Analysis on Facebook

The results from analyzing Facebook's users, Fig. 2, demonstrate two phenomena: echo chambers and group polarization. First of all, it could be observed that the dataset does not cover much of the graph, only the bottom left and upper right corner. This is evidence of an echo chamber, as there lacks a diversity of views and only two distinct views that support themselves and ignore other perspectives. Moreover, this means that users within each group are more likely to exchange information with others in their group [8], further amplifying the effect of confirmation bias. Secondly, the graph shows group polarization on the platform. The individual leaning corresponds with neighborhood leaning, meaning that the individual is part of a larger group that affirms their beliefs. In this case, the group and individual leaning are both close to -1 or 1. This group polarization effect results in two distant parties that lack understanding of one another and hold extreme views rather than diverse perspectives. In real life, people who hold strong opinions, like those on Facebook, are likely to examine objective evidence in a biased manner [10]. The significance of this study is to demonstrate the reality of echo chambers and polarization on some of the most popular social media platforms. The result is evidence of confirmation bias online, as algorithms encourage echo chambers and make people conform to either one extreme or the other. Confirmation bias also creates groups with polarized ideas as they seek other people to confirm their current beliefs.

To summarize, both studies illustrate the role confirmation bias plays in creating echo chambers online and fostering an environment of group polarization. It is not enough to be just aware of this

phenomenon but to reflect on the algorithm and policies that resulted in this amplification of confirmation bias.

4. Conclusion

Confirmation bias is detrimental to rational thinking and objective decision-making. In the fields of finance, marketing, and social media, policies could be implemented to reduce the effects of this bias. First of all, in finance, establishing an environment that encourages disclosure can reduce confirmation bias. For example, in the simulated market, the ultimate cause of miscalibration is the ambiguous hints the experimenters provided to the participants. An accurate representation of the value of the assets would have eliminated the errors in estimation. To achieve this, the government should establish policies that punish misinformation and the concealment of information during financial transactions. With more accurate and holistic information, it can help reduce false beliefs that are perpetuated by confirmation bias. Secondly, in marketing, the same principle applies to the relationship between firms and consumers. Policies should regulate false advertisements and misinformation to consumers, as these tactics can promote a false sense of superiority in the brand. Moreover, consumer education in the field of health and nutrition, amongst many others, could benefit the overall decision-making of consumers in the market. Finally, policies that limit partisan sorting in social media by changing the algorithm of applications will reduce echo chambers and polarization on social media. Similarly, policies that grant exposure to diverse views online can reduce the occurrences of echo chambers. The government should also promote digital literacy in schools, teaching children at a young age to think critically about information online and engage in dialogue across regions and party affiliations.

To conclude, confirmation bias is demonstrated in every aspect of day-to-day life. It occurs in finance, where decisions that could change the course of the economy are made under the influence of bias. The simulated study models the harm confirmation bias could have on investors. In marketing, consumers are often manipulated by brand loyalty and advertisements to make irrational decisions, all caused by confirmation bias. The lotion brand experiment shows how consumers confirm their initial belief by selecting the worst option. Finally, computational simulations and studies of social media demonstrate the intense polarization caused by echo chambers. Echo chambers are created through confirmation bias and reinforced by algorithms that promote partisan sorting. It is not enough to be aware of this bias in society, people must strive to change the system and policies to reduce the effect of irrational decisions that could be harmful to society's unity and utility. It is time for the world to see objectively without the lens of confirmation bias.

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