**Impact of Social Media Misinformation on Belief in Pseudoscience among Users with a Science Background: Recommendations for HRM Practice**

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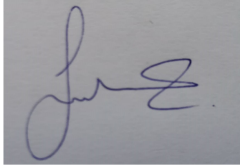
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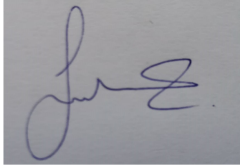
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**Abstract:**

In today's digital age, social media platforms have emerged as powerful vehicles for information dissemination, shaping beliefs and perceptions on a wide range of topics, including science. However, alongside the proliferation of accurate scientific information, there has been a concerning rise in the spread of pseudoscientific misconceptions. This dissertation aimed to unravel the intricate web of pseudoscience on social media and its impact on individuals with a science background.

Through a comprehensive analysis of factors such as algorithmic bias, echo chambers and filter bubbles, cognitive biases, influencer endorsements, misinformation campaigns, lack of scientific literacy, social influence, and viral content dynamics, this study explores the mechanisms driving belief in pseudoscientific misconceptions among science-background users. Correlation and regression analyses were employed to examine the relationships between these factors and belief in pseudoscientific content.

The findings revealed significant correlations between echo chambers, filter bubbles, misinformation campaigns, and social influence, underscoring the interconnected nature of these phenomena and their collective influence on users' exposure to pseudoscientific content. Additionally, the extent to which science-background users perceive social media platforms as prioritizing engagement over correctness correlates with their belief in pseudoscientific misconceptions, highlighting the impact of algorithmic mechanisms on user behaviour.

Cognitive biases such as confirmation bias and the backfire effect further exacerbate the acceptance of pseudoscientific content, making individuals resistant to contradictory evidence. These findings have implications for organizational structures and HR practices, as the prevalence of pseudoscientific beliefs among employees can influence recruitment and management processes.

In conclusion, this dissertation contributes to our understanding of the complex interplay between social media, pseudoscience, and scientific literacy. By elucidating the mechanisms driving belief in pseudoscientific misconceptions among science-background users, this study lays the groundwork for future research and intervention efforts aimed at promoting scientific literacy, fostering critical thinking skills, and mitigating the harmful effects of misinformation in the digital age.

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# CHAPTER 1: INTRODUCTION

## Overview

Social media platforms have become increasingly important in the present age of digital communication, allowing individuals to access, share, and engage with information in various ways. Yet, beneath the seemingly infinite pool of online content that social media hosts lie the world of misinformation and pseudoscientific beliefs. In the context of informatization and digital communication, this issue has become quite salient as individuals, including those with science background, are more or less susceptible to the creation of pseudoscience. In this regard, this dissertation seeks to uncover the implications of social media engagement and beliefs in pseudoscience for HRM practice. The dissertation will focus on the role of algorithmic bias, cognitive biases, influence from influencers, and social networks in promoting pseudoscientific misconceptions on social media platforms among science-background audiences.

Social media have revolutionized the way people consume and share information, allowing them to find and engage with diverse types of content. More recently, many scientific agencies and organisations, tend to share up-to-date information on scientific research, new discoveries, findings, and innovations on social networks to keep the audience infected from trustworthy sources, including social networks (T, 2022). HRM ensures that company’s activities are compliant with the scientific world’s realities, needs, and concerns. Companies and scientific organisations cannot overlook the possibilities of social network impact and implement a wide range of activities and posts to attract the audience. The influence can be either positive or negative (Hartwell, 2018). On the one hand, it is possible to reach broader target audience segments. On the other hand, social network contributes to the proliferation of misconceptions and pseudoscience as the recent trends in the world require sharing not only positive findings and data but also information about possible risks and losses. Social networks are the place where credible and fake share a space.

These tendencies are supported by algorithm bias and cognitive bias that facilitate the echo chamber effects and filter bubbles and endorse network-generated pseudoscience (Acks, 2018).

In the account of Cognitive Biases and Influencer Endorsements, people’s cognitive biases, facilitated by the tendencies of confirmation bias and the backfire effect, will support the acquisition and retention of pseudoscientific beliefs. Additionally, prominent tech personalities will endorse such products and ideas on their social media, and subsequently, this activity might jeopardize the perception of the users on whether or not to believe in the pseudoscientific (Hale, 2017).

Deliberate information and pseudoscience campaigns might also add up to pseudoscience dissemination. It is further combined with the low scientific literacy among users, which makes people vulnerable to believing what might be misinformation as people lack the ability to differentiate credible information and pseudoscience (Bonney et al., 2009).

The social nature of the internet, in particular, has also been identified as a factor increasing users’ exposure to pseudoscientific claims. Human beings get easily influenced by what others are perceiving, and FOMO might augment the process as confirmed in the study of Suárez-Lledó and Álvarez‐Gálvez (2021).

The influence of these tendencies is not limited to the individual level. The dissemination of pseudoscientific beliefs might also have multiple implications for HRM. Companies with employees having a science degree might influence them to believe in pseudoscience, strengthening the culture of misinformation (Zollo et al., 2015).

To sum up, in trying to demonstrate the interconnectedness of social media interactions and pseudoscientific beliefs and this phenomenon implications to any given company’s HRM practices, this dissertation suggested that, indeed, the drivers of pseudoscience on social media play a significant role in its spread. Further research on the matter has the potential to help solve the issue. Additionally, the project’s interdisciplinarity has the potential to contribute to knowledge expansion in more than one discipline, such as psychology, social media, HRM, etc., and also offer practicality. Consequently, the project can make a valuable contribution to developing scientific literacy in a digital society.

## Research aims and objectives

The current study explored the phenomenon of social media engagement and determine how it affects users’ science predisposition, contributing to the propagation of pseudoscientific principles. More specifically, it covered algorithmic and cognitive bias, influencer endorsement, and social proof to identify how science-inclined users apprehend scientific information on social media platforms and how these findings refer to an organisational setting, in particular to Human Resource Management departments. The goal of this research was to gain an insight into the main triggers underpinning the distribution and acceptance of pseudoscience on social media, and to then formulate recommendations for increasing users’ scientific literacy and critical thinking skills. Finally, suggestions for minimizing the detrimental impact of false scientific beliefs within an organisation were offered.

The research objectives:

* To determine the relative importance of the following factors; thus, algorithmic bias, echo chambers and filter bubbles, cognitive biases and specifically, influencer endorsements, misinformation campaigns, lack of scientific literacy, social influence, and viral content dynamics, in influencing users with a science background to believe in pseudoscientific misconceptions when exposed to such information on social media.
* To evaluate the above user group’s perspective on the prioritization of engagement metrics over accuracy that social media algorithms generally have on scientific topics and determine the correlation between their perspectives and pseudoscientific misconceptions.
* To study the effect of relative cognitive biases specifically confirmation bias and the backfire effect, in the interpretation and acceptance of pseudoscientific content and how this consequently influences their beliefs.
* To identify, through the recommendations, the consequences of pseudoscientific beliefs of HRM-affiliated employees on organisational culture, employee engagement, and decision-making processes on resources and reliable strategies.

## Research Questions

* How do algorithmic bias, echo chambers and filter bubbles, cognitive biases, influencer endorsements, misinformation campaigns, lack of scientific literacy, social influence, and viral content dynamics of social media platforms influence pseudoscientific misconceptions in science background users and their interplay?
* How does the extent to which science-background users of social media platforms perceive and experience social media platforms as having an “engagement over correctness” interpretation regarding social media algorithms, and how does this correlate with their belief in pseudoscientific misconception?
* How do cognitive biases such as confirmation bias, and the backfire effect, affect the implied understanding and acceptance of pseudoscientific content shared on social media in influencing pseudoscientific misconception?
* what does the situation look like on such social media platforms and organisational structure? What is the available data on pseudoscientific beliefs exposed between science-background employees? How does the situation influence the behaviour and mindset of HR departments, in the recruitment and management processes of science-background employees and non-science-background employees?

## Significance of the research

The research is significant because it addresses a major societal problem facing organisations, social media users, and citizens as a whole: In general, the significance of the research is a function of its potential to solve a pressing societal problem, inform the practice of organisations, and contribute to the existing knowledge base in the areas of social media research, psychology research, and human resource management practice. The first reason this research is significant is for all social stakeholders involved. First, it improves our understanding of the relationship between social media use, false scientific beliefs, and implications for people with a science-based background. In fact, it helps to identify what drives false scientific claims on the social media platform and empowers users to uncover bad information and develop critical thinking skills affecting digital engagement.

Because of this effect, research has the potential to reduce false beliefs and false scientific information. In this way, people can use the information they have to make informed decisions. Second, this study was important for human body management. Social media online conversations are harmful for organisations. Businesses are using social media more and more to communicate and work and to make more informed decisions about their members. Research is used to determine how false information may affect their organisation’s working atmosphere. In this regard, research can be used to ensure that human resource management practices promote a culture of thinking and evidence-based decision-making.

Third, considering the society, the research implies that misinformation-related vaccinations and marine health dangers spread like wildfire. According to this study, research has been effective in police campaigns aimed at collaborating with the public and spreading information. Misinformation about social media and other platforms is just word of mouth. Therefore, the research is important to enlighten those members and help them gain knowledge. Thus, the research is effective in leading to a societal drawback and improving our knowledge and society. In this case, discusses issues related to the length of time in which the society is concerned. Your notes are helpful for those who may want to know how to interact with society.

## Scope and Limitation

To sum up, the research scope involves a holistic evaluation of all factors affecting pseudoscientific belief dispersion over social media in users with a science background. The study examines almost all social media interaction dimensions, which are bias in algorithms, cognitive biases, endorsement by influencers, and social power to reveal their joint effect on the power of pseudoscientific belief dispersion. In addition, the study explores the explication for organisational interaction in HRM Department occurring as a result of this belief formation. The following research does have several limitations, which must be considered. Firstly, although the data is collected through surveys carried out by filling out the questionnaire, the possibility of a response or social desirability bias is not discarded. Secondly, the research only covers users with a science education, which is why it cannot be said that these results are true for various other populations. Thirdly, the research is conducted in a specific cultural context, which also leaves room for error when generalizing the results obtained. Finally, the speed of social media development and the continuous growth of digital communication technologies create difficulties in understanding the full extent of the problem. Nevertheless, this study aims not only to put the Company’s bases to the understanding but also to add new insights to these intersections.

# CHAPTER 2: LITERATURE REVIEW

## 2.1 Introduction

Social media is by far the most impactful element of modern society due to the level of influence it exerts on public discourse and the general body of knowledge. This invention is an effective communication tool that enables a person to talk to others, learn something new, and be entertained, often all at once. Despite its numerous positive qualities, social media represents a serious challenge in the context of pseudoscience. Much has been written about pseudoscientific beliefs founded on assertions not based on properly controlled testing, and social media makes it easier to propagate those claims. Considering the vast influence on millions of individuals that social media can have, either within the frames of its main focus areas or as part of more specialized communities, the overall level of trust in science has decreased significantly. Therefore, this literature review seeks to investigate the relationship between the engagements of social media users and their attitude to science and misunderstanding. The key objective is to explore the manner in which pseudoscientific beliefs are promoted and enforced through social media to uncover the root causes of the problem (Shonhe, 2017). Even though false information is not a recent occurrence, it can now travel quickly across social media and possibly reach over half of the world's population. Increasing social media users' health literacy, officially supervising media in general, introducing policies and regulations for social media, increasing research on the topic, and addressing, containing, or debunking misinformation are the six main strategies proposed by the studies in our review to combat misinformation related to COVID-19. The spread of false information via social media poses a risk to democracy and society at large. Although there has been a lot of discussion about its possible effects, there isn't much data on how the problem's scope has changed recently (Allcott et al., 2019).

## 2.2 The Phenomenon of Social Media Engagement

### 2.2.1 Definition and Explanation of Social Media Engagement

this concept involves all interactions, activities, and actions users perform on social media. The most common include likes, comments, shares, retweets, and direct messages. Moreover, it also comprises engagement metrics that indicate user involvement and interest in the content, the persuasive power of communication strategies, and how the message resonates with the target audience. Importantly, engagement boosts the creation of communities and facilitates stronger relationships by increasing the visibility of content among users and in their feeds (Dolan et al., 2015).

## 2.2.2. Overview of the Prevalence and Significance of Social Media Platforms in Disseminating Information

Describe social media as an area of common use. Such platforms are among the most frequently used globally and see billions of people interact daily. This makes them valuable sources of information sharing, as they allow individuals and entities to reach the global audience instantly. Further, social media are relevant due to the simple algorithm that ensures immediate spread of information and the rapid creation of viral trends and discussions. As a result, anything from major news to educational and mere entertainment content is rapidly disseminated and discussed on these platforms (Wang et al., 2019).

## 2.3 Factors Influencing Pseudoscientific Misconceptions on Social Media

In the digital age, social media platforms have become increasingly important for communication, community building, and information sharing. There is no denying that social media has many benefits, but there is also a drawback to the dissemination of information (Sugavanam & Natarajan, 2020). Echo chambers are platforms where individuals only interact with individuals that reinforce their perception of reality and receive information that confirms their stereotypical beliefs. Under such circumstances, the unscientific ideologies are supported and amplified by likeminded individuals. Filter Bubble: on the other hand, filter bubbles refer to platforms where the algorithms personalize the information based on the users’ behaviour in such a way that the individuals may not know that there is an alternative fact. Users in the filter bubbles will not receive scientific data that debunks fake news.

### 2.3.1 Cognitive Biases

Cognitive biases are natural predispositions or patterns of thought that impact human decision-making and judgment. Various cognitive biases are involved in the interpretation and validation of pseudoscientific content on social media. These factors include confirmation bias, which entails seeking, interpreting, and remembering data that confirms previously determined conclusions or hypotheses while disregarding contradictory evidence. The backfire impact, similarly, involves retreating from information or becoming more anchored to the original belief after being exposed to negation information. In other words, people are more apt to accept pseudoscience claims after engaging with debunking explanations, especially when they perceive the information as a threat to their identity or worldview (Saposnik et al., 2016).

### 2.3.2 Influencer Endorsements and Misinformation Campaigns

People behind social media influencers have a significant following, and they can influence their audience into thinking towards a certain direction. The impact has implications in as far as mass information dissemination is concerned. Influencers informs the decisions of their audience by shaping their thoughts (Cook, 2022). When endorsed pseudoscientific campaigns are run towards the audiences of these influencers, it spreads trash. Misinformation campaigns influences hearts and minds through authoritative narratives and context. They have the potential of skewing the mind of the audience to believe in what is not. Misinformation campaigns use emotional appeals, and scientific claims to prove the seriousness of the matter. People’s minds are already manipulated, especially when the vulnerable and susceptible audience is targeted by the claimants (Cook, 2022).

## 2.4 Science Literacy and Engagement Metrics on Social Media

Social media platforms are among the primary information and communication spaces used by millions in the digital age. These platforms have opened up unique opportunities for sharing knowledge and participating in numerous online communities. However, they have also entailed the necessity to manage the risks associated with the propagation of false and misleading information (Cajas, 2001).

### 2.4.1 Science Literacy

The findings of research on scientific literacy among social media users indicated some promising trends and existing gaps to be addressed. Specifically, scholars concluded that a relatively large share of users shows interest in science-based content . However, the analysis of knowledge levels has also revealed significant gaps and misconceptions, especially concerning complex scientific theories such as climate change, gene editing, and the benefits of vaccination. The level of scientific literacy greatly affects the probabilities of users’ susceptibility to pseudoscientific beliefs. Individuals with good scientific literacy acquired the skills to evaluate the credibility of proposed information, identify logical fallacies, and spot pseudoscience. Conversely, individuals with little scientific literacy are highly exposed to misinformation and pseudoscience when they lack adequate critical thinking to assess data accuracy (Cajas, 2001).

### 2.4.2 Engagement Metrics vs. Accuracy

One example of how commitment metrics are expressed through virtual entertainment platforms is that likes, shares, and comments determine which posts show up in their clients’ feeds. However, excessive attention to commitment metrics has resulted in low-quality content getting promoted through high interaction frequented over accurate and reliable information. In this case, people also think these online entertainment platforms are promoting fake news that is designed to appeal to what manipulate into our major areas of interest, Forgetting the actual scientific discusion. The concentration on dedication has been connected to the distributing of pseudoscientific content through virtual entertainment platforms, according to recent research results (Barklamb et al., 2020).

## 2.5 Organizational Implications of Pseudoscientific Beliefs

### 2.5.1 Impact on Organizational Culture

It can be noted that different pseudoscientific ideas, for example, thoughts that uphold alternative or unconventional medicine, disrupt generally accepted in medical practices patterns of work at the camp and have a detrimental effect on the standard of patient care. Even more importantly, these types of beliefs have a negative impact on society when applied to the particular organization’s context. At the same time, specific workplace codes of conduct may be affected by pseudoscientific beliefs in productivity hacks and pseudo-psychological theories that might undermine employers’ moral and productivity. Intervention programmes may be developed if the organisation recognises the risk of tolerating pseudoscientific claims within its culture. It is also clear, using organisations as a real-world example, how pseudoscience can be avoided. For example, courses designed to encourage scepticism and investigation develop a critical attitude towards pseudoscientific theories. Educating the public, fostering critical thinking skills, and providing access to peer-reviewed scientific opportunities are a few strategies for promoting a culture of scepticism and responsibility (Boudry, 2021).

### 2.5.2 HRM Processes and Decision Making

Pseudoscientific beliefs shape the norms, values and beliefs of the workplace, which influences the way workers interact with one another, as well as how companies plan and allocate resources. Nonetheless, an organization recognizes and considers the dangers of pseudoscience and can adopt strategies to counter its impact on organizational culture in general and the decision-making process. In conclusion, an organization can create an environment in which workers encourage critical thought, literacy in science, and intellectual humility via coordinated seminars, policies, and cultural models. The use of prior case studies and research provides information on much more successful work on the challenge of pseudoscience and culture at work throughout such organizational decision-making phrases. Indeed, an open cautious audit and suspicion-producing structure are beneficial. Hence, a program to cultivate an organizational culture embracing these values will do much more than increase organizational results, as it will also reinforce employee welfare. With evidence-based practices as a core pillar of organizational culture, the contemporary organization may always be assured of its foundations (Norris & Phillips, 2003).

## 2.6 Social media and misinformation

The majority are becoming worried that misinformation on social media is harming economies and societies in recent years. Social media companies have responded by announcing measures to stop the spread of misleading information. Even though false information is not a recent occurrence, it can now travel quickly across social media and possibly reach over half of the world's population. The studies in our review suggested six main strategies for combating misinformation related to COVID-19: increasing the health literacy of social media users; officially supervising media in general; addressing, containing, or debunking misinformation; introducing policies and regulations for social media; and conducting more research on the subject (Au et al., 2021). The spread of false information via social media poses a risk to democracy and society at large. Although the problem's possible effects have received a lot of attention, it is unclear how the problem's scope has changed recently. Through the end of 2016, there was a consistent increase in user interactions with false content on Facebook and Twitter. However, since then, interactions with false content have decreased significantly on Facebook and have increased on Twitter, with a 60% decline in the ratio of Facebook engagements to Twitter shares. Comparatively, similar patterns have been observed in both platforms' interactions with other news, business, or cultural websites. The internet has grown in popularity as a tool for researching one's own health and learning about health issues in general. However, people can easily become misinformed due to the abundance of false information available online. People have always acquired information from sources other than the official health care system. To effectively plan communication and public health actions during a pandemic, it is necessary to identify the effects of misinformation on different levels of the system. The dissemination of false information is a serious risk to public health and the ability to contain a worldwide pandemic (Allcott et al., 2019). Misinformation refers to, in general, any piece of information that is wrong, misleading, or false, whether it is circulated voluntarily or unknowingly. Various examples of misinformation run from rumours and conspiracy theories, fabricated data, and edited images. This kind of inaccurate information spread across different channels, including social media, mainstream media, or first-hand sources influences human beliefs and behaviour and general societal constructions. It normally becomes a challenge during crisis periods, for example, pandemics when the truth is a priority for public health policies (Hochmann, 2020).

### 2.6.1 Using social media as an Information source

Social media poses a threat to public health by facilitating the spread of misinformation. At the same time, however, social media offers a promising avenue to stem the distribution of false claimed has given people access to a vast array of information these days, even though there are drawbacks as well, particularly when talking about science. Social media is being used more and more as a source of information, especially when it comes to risks and crises. Information can now be sent and received in more ways thanks to newer communication technology. One such tool that has become more popular as a source of information is social media. People utilize social media to research important subjects. Those looking for health information have also made extensive use of social media; they have looked up this kind of information online. People use online social tools to gather information, share stories, and discuss concerns,". Similarly, social media is being adopted by health professions and organisations, which see it as an information balancer that gives access to health care information to populations that would not have had it in the past. Because personal information is not required to get health-related information, it gives the information seeker a sense of privacy (Westerman et al., 2013).

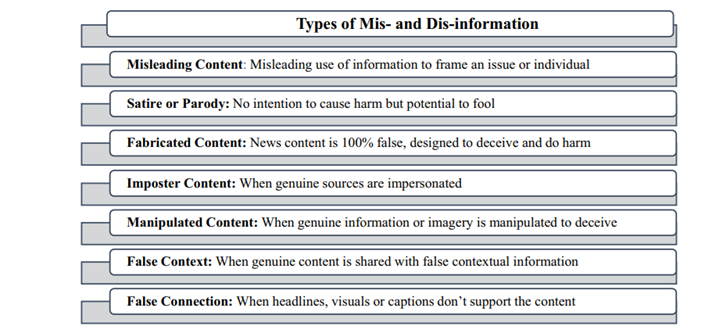


Figure.1: The study by Naeem & Bhatti (2020) thoroughly describe various types of mis- and dis-information.

### 2.6.2 Pseudoscience related to social media

When an anonymous social media user shared a misinformational message, the news agency was blamed for spreading it, even though the misinformation originated with them. This choice was made since the study participants didn't know who the social media user was, and the news agency was the message's real source. According to most recent data, the coronavirus (COVID-19) has caused over one-fourth of a million deaths and four million cases of mild to major health problems. According to the World Health Organisation these facts are rising quickly. This epidemic has raised a lot of concerns around the spread of false or misleading information. This article presents the findings of a short investigation that looked for misconceptions about COVID-19 and its sources. The COVID-19 infodemic is full of unsubstantiated claims about the diagnosis, treatment, prevention, origin, and dissemination of the virus, as well as partially supported conspiracy theories and pseudoscientific remedies. Social media is rife with fake news, endangering the public's health. Given the severity of the situation and the widespread dissemination of false information, it is imperative that journalists, scientists, and health information specialists fulfil their professional obligations to assist the public in recognising false news reports (Naeem et al., 2020). Because social media platforms have grown to be influential conduits which influence people's information consumption, their emergence has had a profound impact on the information system. A sizable portion of the global populace receives news and information from social media. Social media platforms are dominating conventional media outlets, such as newspapers and television, as a result of these changes in buying habits. Because social media puts a vast array of ideas and opinions at users' fingertips, its adoption has had a significant impact on the nature of data acceptability. The implications of using the internet for entertainment purposes as a primary source of data go beyond practical use. The content spoken on these platforms is combined with the real conversational texture, which influences cultural viewpoints, beliefs, and judgements. When it comes to logical correspondence, where precision and correctness are crucial, the work of online entertainment demands closer scrutiny. Despite the growing attempts to correct misinformation on social media, there is still considerable ambiguity regarding the ability to effectively ameliorate the negative impact of false messages (Swire-Thompson & Lazer, 2020).

## 2.6.3 Commonly spread myths during the COVID-19 pandemic (Naeem & Bhatti, 2020).

Drinking alcohol protect you against COVID-19: Actually, consumption of alcohol never helps to defence against coronavirus. Also drinking too much alcohol affect immunity and leads to several diseases.

Spraying alcohol or chlorine all over your body kill the new coronavirus: Chlorine or alcohol sprays are dangerous and never defence COVID-19 coronavirus, also when applied to the body these compounds irritate the lips, eyes, and any exposed wounds.

Eating garlic helps prevent infection with the new coronavirus: Garlic has some antibacterial qualities and is a nutritious diet also, but there is no proof that consuming garlic will helps to defend COVID-19.

COVID-19 virus cannot be transmitted in areas with hot and humid climates: The COVID-19 has no significance on climate, they can spread anywhere irrespective climate.

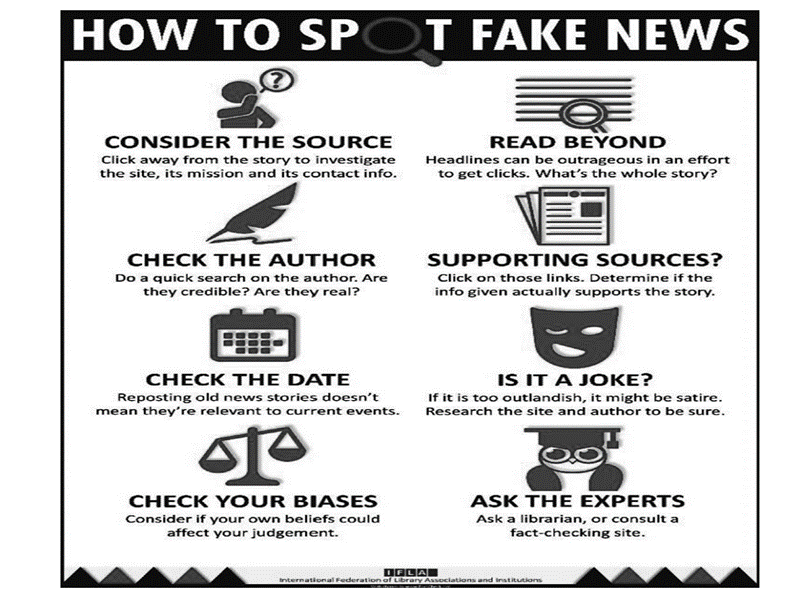
Cold weather and snow kill the new coronavirus: COVID-19 is transmissible in any weather. It is transmitted through the respiratory droplets of an infected individual.

Having a hot bath helps to avoid the coronavirus: The transmissibility of viruses are independent of the temperature of bathing water. It is better to practise proper personal hygiene to prevent the COVID-19 viruses.

The new coronavirus can be transmitted through mosquito bites: Actually, the viruses are transmitted only through respiratory droplets of infected patients.

Hand dryers are effective in killing the new coronavirus: Frequently washing the hands with soap and water or using an alcohol-based hand sanitizer is the best way to stay safe. Hand dryers can do nothing in prevention of coronavirus.

Ultraviolet disinfection lamps kill the new coronavirus: It isn't recommended to prevent COVID-19 with the help of UV lamps. UV lights are useful for sanitising surfaces, but when it uses with skin that may cause irritations on skin



*Figure.2: Naeem & Bhatti (2020) propose strategies for combating fake news.*

### 2.6.4 Impact of Misinformation on Public Health

The internet has grown in popularity as a tool for researching one's own health and learning about health issues in general. However, people can easily become misinformed due to the abundance of false information available online. People have always acquired information from sources other than the official health care system. Misinformation about science and health is defined as data that deviates from the scientific community's epistemic consensus on a particular phenomenon. By this definition, the status quo is ever-evolving in light of new information and the development of techniques and methodologies. A planned or intentional attempt to spread false information with the intention of gaining power, wealth, or notoriety is known as disinformation. Public health is a field where misinformation can flourish because there are clear winners and losers, and the losers stand to lose a lot of money. Online sources of misinformation and disinformation include news outlets, politicians, vested interests, gossip, and fictional works. For an extensive analysis of the sources of false information (Alkhair et al., 2023). The epidemiology of misinformation is still largely unknown, but models of contagion are becoming more and more useful in explaining how diseases spread. The biggest broadcast was the main indicator of the information's popularity, and viral cascades were comparatively rare. Even memes on the internet that are said to be going viral are frequently covered extensively by the media. It is more important for people and businesses with sizable social media followings to verify the accuracy of the health information they post. It also implies that one way to stop the spread of false information could be to encourage people who have a large number of followers to share accurate or high-quality information. It's possible that people are not suffering appreciably from information they find online. It's also possible, though, that people do not recall where they heard the information or do not believe it to be false or harmful. The actual percentage of harm is probably higher just because of the documented numbers of people who follow unofficial medical advice. The media is still a crucial source of health-related information. But over time, public confidence in the media has sharply declined. In the medical field, clinical and policy decision-making is severely hampered by misinformation. The COVID-19 pandemic increased awareness of false information and associated terminology. Broadcasting in the mainstream is a potentially effective way to spread wellness education. It can be applied to pandemic preparedness and other community-based risk management initiatives. The public can benefit greatly from the media's increased health knowledge, altered attitudes and intentions, and influence on health behaviour (Thomas et al., 2018).

### 2.6.5 Tackling health misinformation

The impact of misinformation on various levels of the system must be identified in order to plan effective communication and public health actions during a pandemic. Science on the effectiveness of interventions regarding health misinformation is sparse. The following are some data regarding how to tackle the health misinformation (Walter et al., 2020):

Improved eHealth Literacy: Health literacy classes in schools will have limited efficacy to improve the online information ecosystem in the near future. It may be necessary to study the efficacy of public health campaigns for the general public or that specifically target older adults.

Using the Internet Collaboratively with Physicians: The internet can be an extremely powerful tool when individuals collaborate with their physicians. Although health practitioners have the potential to feel threatened, online health information seeking is generally seen as a way to have a more collaborative relationship with patients.

Creation and Distribution of Accurate Information: health communicators should be careful not to overstate causal inference between an intervention and a health outcome. Scientists can also have an impact by publishing in open access journals, being more involved on social media platforms to communicate with the public, and directly contributing to information online.

Increased Frequency of Corrections: It is necessary to clear how to minimize the continued influence effect of misinformation, where misinformation continues to influence reasoning even after a correction has been presented (Hartley & Vu, 2020).

## 2.7 Conclusion

Social media has grown in popularity and become a vital tool for community building, information sharing, and communication. Despite its many advantages, this tool has been criticised for spreading false information and encouraging pseudoscientific ideas. A review of the literature regarding the intricate interdependence between the propagation of pseudoscientific misconceptions and active social media users can be found below. Algorithmic bias is a factor in the dissemination of pseudoscience. Thus, the goal of removal is to combat misinformation about health by boosting eHealth literacy, encouraging diverse forms of collaboration, and strengthening the capacity to create and disseminate accurate information. In conclusion, given the evidence presented about the significance of addressing misinformation and pseudoscience on social media, a combined approach is required.

# CHAPTER 3: RESEARCH METHODOLOGY

## 3.1. Introduction

In this chapter, the comprehensive methodology for investigating the impact of various factors on belief in pseudoscientific misconceptions among users with a science background is detailed. The study aimed to explore the influence of independent variables such as algorithmic bias, echo chambers and filter bubbles, cognitive biases, influencer endorsements, misinformation campaigns, lack of scientific literacy, social influence, and viral content dynamics on individuals' susceptibility to pseudoscience disseminated through social media platforms. The chapter begins by elucidating the dependent variable, namely, belief in pseudoscientific misconceptions among users with a science background, followed by operational definitions of each independent variable. These concepts cover various aspects of social media interaction, such as algorithmic biases, user behaviours, cognitive tendencies, and extraneous factors. In addition, the chapter explains the research philosophy, approach, and design used in the current study, highlighting a deductive approach and the inclusion of testable hypotheses from the existing literature. The stratagem utilised to sample the population for data collection is also explained and advices on the use of purposive sampling for ensuring the inclusion of various individuals with a science background are given. The instruments utilised in data collection are also explained, covering the preparation, designing, and validation of a structured questionnaire, which is the main instrument. Ethical issues such as confidentiality and obtainment of informed consent are incorporated. Finally, the process through which the data were collected is highlighted. Instruments are also explained and suggested ways of addressing them. The discussion concludes with an analysis of the methodology section and likely recommendations on measures for addressing the inadequacies in this part. It also paves the way for the presentation and discussion of the study findings.

## 3.2. Research Philosophy

The chosen research philosophy was positivism. According to Comte (2021), positivism posits that the truth of the world can be known through scientific methods, with the knowledge being possible through empirical evidence. This philosophy sought dual proof in this manner largely within scientific evidence in this case experimentation and statistics to explore the topic.

Positivism involved testing hypotheses already limited to the research questions by this equation, including the derivation of outcomes from measured data and testability. This philosophy supports the research objectives in investigating the factors the research sought to determine: belief in pseudoscientific misconceptions among users with a science background. Through a positivist approach, the investigation endeavoured to witness from an objective analytical position a range and series of empirical data, see the independent variables’ effects on the dependent variable probability susceptibility to pseudoscience propagated to the public through social media.

The research’s positivist orientation is most appropriate as – though the philosophy may be associated with arrogance, – it eases the process of methodological data collection and allows for an accurate assessment, testing, or validation of any assumption or hypothesis of a research using data. Thus, it increases the reliability, validity, and rigour to ensure identifying predictable and generalisable patterns regarding the phenomenon.

Secondly, positivism allowed this research to assess the factors of interest concerning the spread of pseudoscience. The ability to see such ideas from the empirical perspective of the organisation or find data on what the market has proved made the study theoretically grounded b generalised and practically applicable.

In summary, the positivist philosophy offers a structured route to systematically look into the relationship between social media forces and belief in pseudoscience by users with a science background.

## 3.3. Research Approach

This research used a quantitative and deductive approach to the issue to formulate the following research question concerned with several factors determining the population’s susceptibility to the pseudoscientific misconceptions based on their professional sphere: Given the research objective to validate the current ideas and hypotheses surrounding the phenomenon of social media’s impact on the belief in pseudoscience, the deductive technique is appropriate for the present subject (St B T Evans, 2013).

In this method, the researcher constructs the various hypotheses first, guided by the existing evidence or a theory to chase, and subsequently collects evidence using a bottom-up approach to confirm or refute every learned assumption. The hypotheses proposed below, themselves, are based on the existing literature about the impact of social media and cognitive factors and represent the nature of the link between the elements in question and the person’s vulnerability to pseudoscience. Therefore, the use of the deductive method in this context enables to gather data in more systematic approach and test the acquired knowledge in experimental evidence, thus contributing to the scientific rigor of the findings. Since it is crucial to validate the acquired knowledge and considering that the hypotheses serve this goal, it ensures that the chosen method helps achieve the understanding of how social media shapes the public perception of pseudoscience.

Moreover, the method is consistent with the scope of the research to identify the processes that influence the spread and adoption of pseudoscientific ideas in the online context. Additionally, the deductive logic style from the foundation also contributes to the appropriate framework of determining the cause-and-effect relationship between the dependent and independent variables. With the assistance of the acquired hypotheses from the foundation evidence, the research helps to identify the certain properties that determine the public receptivity to pseudoscientific issues in social media nowadays.

## 3.4. Research Design

The current study employed a correlational design. The correlational research format enabled data to be collected from various social media users who have a science background at the same time. Each participant carried out a questionnaire is to evaluate their attitudes, beliefs, and actions regarding pseudoscientific myths experienced on social media sites. The Correlational/cross-sectional approach was appropriate for investigating the relationships between algorithmic segregation, echo tunnel, and influencing attitudes and science users believing in the pseudoscientific myth. This survey research design will take advantage of a “snapshot” of the participant’s experiences, attitudes, and beliefs, and thus it will make it easy to analyse the changes in the participant’s reaction. This research design will also enable the noting of emerging patterns in pseudoscientific myths from the different sources afforded by online platforms.

## 3.5. Sampling And Data Collection

Sampling refers to the notion of making a section of the population respond for all in the research in which information should be obtained for differences (Arnab, 2017). For this research, the sample to participate in the questionnaire is derived from the target population. The target population has to be people of science. Sampling also involves determining the size of the participants. The size of the participants is determined by Slovin’s formula. Calculating the number of participants to be sampled from the study is crucial as it enables distribution and ensuring the sample selected is enough to obtain accurate and meaningful finish results from the analysis of the study.

The formula is given by

Sample size =

Where,

N = population size

z = Normal distribution’s Critical value

p = proportion of sample

e = Margin error

In this study, the researcher has taken a rigorous and thorough approach to the critical parameters: population proportion, the degree of confidence, and margin of error in deciding the sample size. The margin of error of 10%, population share of 50%, and confidence level of 90% are consciously chosen to achieve the robustness and consistency of the finding.

Therefore, the sample of approximately 100 people was appropriate. This conscious selection of parameter will allow the rigorous testing of the population under consideration and increase the validity and reliability of the finding. Such rigorous methodology will help the study generate new knowledge by increasing the validity and generalizability of the findings( Ford & Scandura, 2023). Google Forms was utilised for participants to carry out the survey. A scientific questionnaire designed for this analysis was delivered to selected individuals via Google Forms through email, WhatsApp, and other social media platforms to collect data results. This method is time-efficient and maintains uniformity and standardization among respondent practices.

### Variables

**1. Dependent variable:**

**Belief in Pseudoscientific information among social media users with a Science Background**

**2. Independent variables:**

* Algorithmic Bias: The degree to which social media algorithms advance engagement data above factual accuracy, causing the spread of pseudoscientific information. This level might have two aspects. The first has to do with the algorithms, while the second touched on their effects on individuals. On the first aspect, social media platforms have created algorithms that may amplify any form of information shared with the public.
* Echo Chambers and Filter Bubbles: The level to which users with a science background utilise social media to engage with other science people and pseudoscientific content, thereby promoting and amplifying the spread of beliefs.
* Cognitive biases: Susceptibility to cognitive errors such as confirmation bias and the backfire effect might account for individual differences. Such errors might understand how they interpreted and accepted pseudoscientific information on social media.
* Misinformation Campaigns: The presence and effectiveness of deliberate efforts to spread misinformation and pseudoscience on social media platforms, shaping users' exposure to inaccurate information.
* Low Scientific Literacy: the level of users’ scientific background, which affects their capacity to examine information on social media in a critical manner and vulnerability to pseudoscience.
* Social pressure: peer pressure and social media communities’ norms that force users to acquire pseudoscientific views even when Science proves them wrong.
* Viral content: the peculiarities of pseudoscientific information that increase its chance to become popular and outrun accurate information on social media.

## 3.6. Procedure for conducting the study

* **Questionnaire development:** A structured questionnaire was developed by the research team to collect data on the impact of social media on the transmission of pseudoscientific beliefs among science-background social media users. The questionnaire was structured into 20 items relating to the users’ demographic characteristics, their view of the influence of social media, experiential exposure to science topics, exposure to and engagement with pseudoscientific beliefs, and their level of confidence in their ability to sift through credible information.
* **Pilot testing**. Before the main data collection was done, a pilot study was carried out with a sample of the sample population to ascertain the clarity and relevance of each item in the questionnaire. Feedback from this pilot study was utilized in modifying and fine-tuning the questionnaire.
* **Participant’s recruitment**. The study utilized convenience sample methods to recruit participants from various online platforms and science-related communities. Initial recruitment information provides to the targets a brief background of the study’s aims and invited them to complete the questionnaire if they were interested to participate in the study.
* **Informed consent**. Before proceeding with the questionnaire, the same was preceded by a letter of informed consent that outlines to the participants the research goal, voluntariness of participation, confidentiality, and how the researcher plans to handle the data. Participants were then asked to click on an active checkbox, clicking which will mean they had understood the requirements of the study and willing to participate.
* **Data collection**. When the informed consent was clicked, the participants were directed to online secure platforms that hosted the questionnaire. They were directed to complete the questionnaire, indicating their responses to each item based on their experiences and views. These went on for a specified period until a sufficient sample size was obtained.
* **Ethical considerations**. The study was conducted under ethics which involves the regulation of human involvement in research. The research ensured full confidentiality, voluntary participation, and informed consent. The study, including the informed consent and the questionnaire, was approved by the institutional ethics committee.
* **Data analysis**. After all data were collected, the response was fed to the computer, analyzed, and appropriate statistical proof, descriptive statistics were calculated to describe the sample characteristics while inference analysis was carried out to understand the relationships between variables and hypotheses testing.
* **Dissemination of findings**. The findings of these studies were then disseminated to the public through academic publication, conferences, and other platforms that share academic information to build knowledge to the struggling of social media on beliefs.

This part comprises the letters of informed consent and the participant information sheet which will be used in understanding the study background and the study policy as required by the legal requirement. Readers are therefore encouraged to read this part for more information.

## 3.7. Description about the Questionnaire

In order to collect extensive data regarding the impact of social media on science-background users regarding the spread of pseudoscientific beliefs, a structured questionnaire was constructed. The questionnaire in question featured 20 items that raised the following aspects: general demographics, perception of social media impact, exposure to scientific content, familiarity with pseudoscientific ideas, and confidence in recognizing credible sources. As for demographic information, the participants were asked to fill in their age, gender, educational background in science, and the highest level of completed education.

Moreover, the questionnaire included Likert scale items. They measured the participants’ perceptions and behaviours concerning social media use and consumption of pseudoscientific content. They were given statements to agree or disagree with concerning the impact of social media algorithms, the impact of interactions with people sharing the same views, exposure to opposing scientific content, and the tendency to seek out information that confirms their existing beliefs. They were also asked about the impact of influential people endorsing pseudoscience, overall perceived credibility of science endorsement, and the impact of intentional misinformation on social media. Confidence in ability to recognize credible scientific sources, judge critically and fall victim to pseudoscientific theories was measured.

Additionally, items also related to the impact of social norms and peer pressure, the likelihood of pseudoscientific content becoming viral and characteristics making it such were covered. At the end of the questionnaire, a statement was placed inquiring how participants agree with pseudoscientific ideas encountered on social media. The full version of the questionnaire, including questions and predetermined answers, is presented in the appendix. Therefore, readers wanting to know the exact wording and possible answers each question gets are suggested to look it up in the appendix.

## 3.8. Testing of Hypotheses

The hypothesis was tested by employing a quantitative approach through examining the relationships between the identified independent variables – Algorithmic Bias, Echo Chambers and Filter Bubbles, Cognitive Biases, Influencer Endorsements, Misinformation Campaigns, Lack of Scientific Literacy, Social Influence, and Viral Content Dynamics – and the dependent variable, namely Belief in Pseudoscientific Misconceptions among Users with a Science Background. More specifically, using extensive statistical methodology that included correlation and regression, the authors addressed the question of whether the aforementioned independent variables had a significant impact on the dependent variable. It is hypothesized that one or more of the presented factors contribute to these beliefs among users who are trained in science. By testing the suggested relationships thoroughly, the study intends to explore the strength and direction of these relationships and the extent to which they contribute to the spread and acceptance of pseudoscientific materials on social media by scientifically literate individuals.

## 3.8. Ethical Considerations

Ethical concerns and considerations are of utmost importance throughout this research process. This study ensures the top priority of participants’ confidentiality and privacy, emphasising the data collected anonymously and appropriately secured are used for analyses to keep the participants’ identities hidden. It also ensures informed consent from the participants, including a full and clear explanation of the research purpose and goals, the voluntary nature of their participation, as well as their right to withdraw from it at any point without any adverse consequences. Finally, the referred study also ensures minimal anticipated harm or discomfort to the participants. In addition, it also complies with honesty, integrity as well as openness in data collection, analyses, and reporting as the ethical practices and standards stated by the relevant review board organisations and professional associations. Finally, the study also guarantees disclosure and takes requisite steps to eliminate any factors that could lead to bias in the findings of the study. In general, it respects the dignity and interests of the individuals.

## 3.9. Conclusion and Limitations

In conclusion, the present study has explored the relationship between social media and pseudoscience beliefs in people with a strong educational background in science. By weighing such factors as algorithmic bias, echo chambers, cognitive biases, influencer endorsement, misinformation campaigns, lack of scientific literacy, social proof, and viral stance, various options of how these multiple factors manifestations took effect on endorsing belief in pseudoscientific misconceptions. Research tools such as regression analysis has provided ideas of the interconnection amid the provided factors and pseudoscience beliefs using a quantitative paradigm. In this chapetr, the detailed methodology for conducting the research is discussed. In this chapter, the research philosophy, approach, design, sampling, questionnaire design etc. are discussed in detail.

At the same time, the present study has a range of limitations. First, it is the self-reported data, which may lead to bias and inaccuracy. Second, the research was conducted on a specific group of people, which decreases its generalizability to other groups. Third, as the research was cross-sectional, no causal relationship was revealed, and, finally, since there is a possibility of confounding variables omitted, the study may be accused of alternative explanations. Nonetheless, the current study contributes to the literature concerning the impact of social media on pseudoscience beliefs by elucidating the drivers behind the spread and adoption of pseudoscience. Future research should focus on addressing the limitations by pursuing longitudinal studies involving a broad demographic of participants and combining quantitative and qualitative methods to gain a more nuanced understanding of this issue.

# CHAPTER 4: Data analysis

## 4.1. Introduction

It is essential to comprehend the role of social media in disseminating beliefs and information in a world dominated by social media, including scientific information. Pseudoscience, which is shared by the same social media networks, presents a significant challenge to the spread of real scientific information. The present study analysed the myriad of complex issues that pseudoscience in social media is, particularly how it affects those who already have a scientific background. The availability of false information and the formation of echo chambers through social media algorithms may cause those who are scientifically informed to become wrong. In addition to the emergence of influencer culture, the ability to go viral calls for the spread of pseudoscience. By analysing the interactions between algorithmic bias, echo chamber formation, cognitive bias, influencer support, misinformation campaigns, scientific disinformation, social impact, and viral content, this study seek to explain the same factors’ observations that cause those with a scientific background to believe in pseudoscientific issues. Correlation analysis and regression modelling is carried out to find the relationships between these factors and an individual’s belief in a pseudoscientific issue. The current findings further us understand the multifaceted nature of pseudoscience systems in the modern digital world and how it is continuously transmitting the same process of scientific enhancement to social public understandings and overall societal morality.

## 4.2. Data Analysis and Tools Used

Post data collection phases involves analysis that helps in the extraction of the required findings. The information is analysed using descriptive as well as inferential statistics. Descriptive statistics which involves a measure of variability, frequency and central tendency gives a general account of the demographic information contained in the data. On the other hand, inferential statistics which involve using relationships between variables and key predictors, focuses on the significant factors that spread pseudoscience beliefs among social media users who are science-oriented.

The software used to perform statistical analysis of the collected data is SPSS which is the abbreviation for Statistical Package for the Social Sciences Version 21 (IBM Corporation, 2012). The program has several features which help in performing various types of analysis including the descriptive and inferential data analysis. Through the use of SPSS, the research can perform a detailed and systematic analysis ensuring robust findings are made from the collected data on the factors that influence individuals’ beliefs in pseudoscience on social media.

### 4.2.1. Cronbach’s alpha

Cronbach’s alpha is used to assess the internal consistency, which denotes the extent to which a set of variables are related. In the context of this study, Cronbach’s alpha is used to measure the scale reliability. It assesses the extent to which users with a science background hold similar opinions while responding to the questionnaire on the belief in pseudoscientific misconceptions. It should be noted that high value of alpha does not immediately confirm the unidimensional of the measure because relevant analyses, such as factor analysis, are necessary to establish the dimensionality. While Cronbach’s alpha provides information about the reliability or the consistency of scale, it is not a test. Instead, it serves as a coefficient of reliability, helping to evaluate the internal consistency in the data obtained (Charry et al., 2016). Therefore, the Cronbach’s alpha measure was used in this research to evaluate the internal consistency of all the questionnaire items which measure pseudoscientific misconceptions beliefs. It will help to enhance the overall reliability and validity of the results in the study. The value of Cronbach’s alpha is presented in the subsequent sections.

### 4.2.2. Quantitative data analysis

* Descriptive data analysis: Compute means, standard deviations, and frequency distributions of variables regarding the belief in pseudoscientific misconceptions of individuals with a science background on social media. These statistics present basic information about the central tendencies and variations in the data. Paula et al. argued that descriptive data are with fundamental importance to understand the patterns among the data.
* Correlation analysis: Examines the association among various variables by calculating the correlation coefficient between two variables. Pearson’s correlation or Spearman’s rank correlation is used based on the distribution of the data to understand the magnitude and nature of association between variables. The results of the analysis is discussed in the subsequent sections,
* Regression analysis: Multiple regression analysis is used to assist the influences of internal factors on the choice of foreign market mode as a dependent variable. These internal factors represent the other side of the dependent variable and include. Flexibility and adaptability, technology and intellectual property, managerial experience and expertise, resource availability, and organisational objectives and strategy. Additionally, factors that are external to the organization such as competitive environment, market knowledge and network, political and economic stability, cultural and institutional factors, and market characteristics are also considered.
* ANOVA or MANOVA: Differences among the means and levels of interactions between groups can be understood by using instruments such as ANOVA or MANOVA to test the hypotheses regarding the impact of various factors on the choice of the foreign market. Liter & Goos and Meintrup (2016) argued that ANOVA and can be used to compare differences among group means and are particularly useful when the independent variable is categorical. Thus, through this analysis, the study aims to determine underlying factors that influence pseudoscientific misconceptions of users with background in science on social media.

## 4.3. Frequency statistics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Under 18 years old | 57 | 42.9 | 43.8 | 43.8 |
| 18 to 24 years | 32 | 24.1 | 24.6 | 68.5 |
| 25 to 34 years | 13 | 9.8 | 10.0 | 78.5 |
| 35 to 44 years | 17 | 12.8 | 13.1 | 91.5 |
| 45 to 54 years | 11 | 8.3 | 8.5 | 100.0 |
| Total | 130 | 97.7 | 100.0 |  |
| Missing | System | 3 | 2.3 |  |  |
| Total | | 133 | 100.0 |  |  |

Table 1: Frequency distribution of age of participants

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | male | 49 | 36.8 | 38.3 | 38.3 |
| female | 77 | 57.9 | 60.2 | 98.4 |
| prefer not to say | 2 | 1.5 | 1.6 | 100.0 |
| Total | 128 | 96.2 | 100.0 |  |
| Missing | System | 5 | 3.8 |  |  |
| Total | | 133 | 100.0 |  |  |

Table 2: Frequency distribution of gender of participants

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Biology | 15 | 11.3 | 11.6 | 11.6 |
| Chemistry | 4 | 3.0 | 3.1 | 14.7 |
| physics | 2 | 1.5 | 1.6 | 16.3 |
| Earth science(Geology, environmental science, etc) | 7 | 5.3 | 5.4 | 21.7 |
| Health Science | 33 | 24.8 | 25.6 | 47.3 |
| Engineering | 68 | 51.1 | 52.7 | 100.0 |
| Total | 129 | 97.0 | 100.0 |  |
| Missing | System | 4 | 3.0 |  |  |
| Total | | 133 | 100.0 |  |  |

Table 3: Frequency distribution of educational background of participants

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | | | |
|  | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | High school diploma or equivalent | 16 | 12.0 | 12.3 | 12.3 |
| Associate degree | 5 | 3.8 | 3.8 | 16.2 |
| Bachelor's degree | 57 | 42.9 | 43.8 | 60.0 |
| Master's degree | 48 | 36.1 | 36.9 | 96.9 |
| Doctoral Degree | 4 | 3.0 | 3.1 | 100.0 |
| Total | 130 | 97.7 | 100.0 |  |
| Missing | System | 3 | 2.3 |  |  |
| Total | | 133 | 100.0 |  |  |

Table 4: Frequency distribution of Highest Level of Education of participants

The table captures the demographic information of 133 respondents captured in this survey. Such information includes the distribution of age, gender, educational backgrounds, and the highest level of education among the participants. On the distribution of age, a majority of the respondents were Under 18 years old at 42.9% and 18 to 24 years at 24.1%. In that respect, more than half of the sample population is rather young, while the other age groups are fewer than the two mentioned age groups. With gender disparity, females at 57.9% are more than males at 36.8%, while those who did not disclose their gender are the least at 1.5%. Likewise, the background education of the respondents varies from Engineering at 51.1% to Health Science at 24.8%. Biology at 11.3%, Chemistry at 3.0%, Physics at 1.5%, and Earth Science at 5.3% are the other educational backgrounds. Finally, most of the respondents achieved the highest level of education among the group is either a Bachelor’s degree at 42.9% or a Master’s degree at 36.1%. High school diploma or equivalent at 12.0%, Associate degree at 3.8%, or Doctoral Degree at 3.0 are the other highest levels of education . This demographic data collected from the survey offers valuable insights into the character of the respondent and also provides critical context to determine the various attitudes towards pseudoscience or its propagation in the social media platforms. Specifically, the high number of those below 24 years of age from the survey points towards high engagement of that age in regards to discussion on science in the social media platforms. Overall this aligns with the already existing research on how more young people rely more on digital space to pass information. The other the significantly higher levels of females in the survey show a gender disparity in high regard to views on pseudoscience information on social media. Most of the respondents have Engineering and Health Science backgrounds, which points towards high scientific literacy and expertise. The affirmative response from a large proportion of the students in these fields suggests that this could be considered as a safeguard against low levels of misinformation in these fields. The high number of those with a graduate degree and post-graduate degree also points to an impact of the level of education when it comes to pseudoscience susceptibility.

## 4.4. Reliability statistics

Reliability statistics, a concept in research methodology, refers to the measure of the consistency and stability of a given measuring tool or an instrument of data collection across time points and different situations. The central goal of reliability is to certify that one can rely on the outcomes obtained from a given measuring tool to reflect the true reality of that which is being measured. Various ways are used to measure the reliability of an instrument among the most common ones being Cronbach’s Alpha. Established by Lee Cronbach, this statistic computes the internal consistency of a group of items forming an instrument of measurement, such as a questionnaire or survey. Cronbach’s Alpha indicates the extent to which the items in question are closely interrelated, which shows to what level they measure the same underlying concept. This statistic scales from 0 to 1 with higher values being better. Cronbach’s Alpha of 0.7 and above is generally accepted acceptable in endeavors of research. Nonetheless, the acceptance level can vary with circumstances and the specific intent of the study. The calculation of Cronbach’s Alpha involves the division of the covariances amid each pair of items by the total variances of the items after making necessary adjustments depending on the number of items. Higher values suggest that the items are highly related and are likely to be measuring that which they intended to measure in a predictable manner. Researchers use reliability statistics, including Cronbach’s alpha, to determine how consistently reliable their measuring instruments are. Good reliability boosts the validity of the research results by assuring the audience that what is being presented genuinely represents the concept or variable being measured. It enhances the credibility of the results and the confidence with which the researchers make their conclusions (Cronbach, 1951).

|  |  |
| --- | --- |
|  | |
| Cronbach's Alpha | N of Items |
| .764 | 20 |

Table 5: Reliability statistics

Table presents the results of reliability analysis through Cronbach’s Alpha coefficient. Given that Cronbach’s Alpha is a measure of internal consistency reliability – that is, the extent to which the items in the whole survey instrument are related or measure the exact same construct – it thus follows that an Alpha of 0.764 is reported. This implies some moderate to high level of internal consistency reliability among the items. In literature, Cronbach’s Alpha values higher than 0.70 are often good enough for research quality standards. The implication of this is that the items contained in the survey instrument are adequately related to each other and are sufficiently reliable in measuring the construct intended to be measured by the questions asked. The analysis is done using 20 items within the given survey instrument and the stated value is from the respondents’ responses to the items. The overall conclusion from the reliability statistic above is that the survey instrument has a satisfactory level of internal consistency reliability. This conclusion makes it possible to have confidence in the survey instrument terms of what it is measuring, hence fostering trust in the credibility and accuracy of the data gathered.

## 4.5. Correlation

Correlation analysis is one of the fundamental statistical techniques used to study the relationship between two or more variables. More precisely, it helps researchers understand to what degree changes of one variable are related to changes of another one, thus revealing the patterns and trends in the dataset. Correlation analysis is applied in a wide range of disciplines, form psychology and sociology to economics and natural sciences, to study the interconnection between different phenomena and reveal the underlying patterns of association. Essentially, correlation analysis quantifies the degree and direction of variables’ association to define their nature and strength. If a positive correlation is identified, as the variable x increases, the second variable y is likely to follow the increase, and vice versa. Otherwise, a negative correlation is identified, if, as variable x increases, variable y decreases. Additionally, the correlation coefficient’s value, which varies from -1 to 1, reflects the strength of the relationship between variables. Specifically, the closer the value is to 1 or -1, the stronger the association is, while the values closer to 0 imply a weak or non-existent relationship. Correlation analysis is critical for hypothesis testing, model building, and decision-making in research and data analysis. It helps researchers identify the factors influencing the phenomenon, support or reject their hypothesis, and predict the outcomes. Furthermore, correlation analysis can reveal the complex interrelations and dependencies in the datasets and thus raise new hidden questions (Pearson, 2017).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| variables | Algorithmic Bias | Echo\_Chambers\_and\_Filter\_Bubbles | Cognitive Biases | Influencer Endorsements | Misinformation Campaigns | Lack\_of\_Scientific\_Literacy | Social Influence | Viral\_Content\_Dynamics |
| Algorithmic Bias | 1 | 0.88 | 0.048 | -0.008 | 0.369\*\* | 0.209\* | 0.131 | 0.75 |
| Echo\_Chambers\_and\_Filter\_Bubbles | 0.88 | 1 | 0.338\*\* | 0.187\* | 0.76 | 0.344\*\* | 0.319\*\* | 0.277\*\* |
| Cognitive Biases | 0.048 | 0.338\*\* | 1 | 0.832 | 0.132 | 0.17 | 0.286\*\* | 0.052 |
| Influencer Endorsements | -0.008 | 0.187\* | 0.832 | 1 | 0.776 | 0.152 | 0.264\*\* | -0.039 |
| Misinformation Campaigns | 0.369\*\* | 0.76 | 0.132 | 0.776 | 1 | 0.488\*\* | 0.803 | 0.838 |
| Lack\_of\_Scientific\_Literacy | 0.209\* | 0.344\*\* | 0.17 | 0.152 | 0.488\*\* | 1 | 0.260\*\* | 0.188\* |
| Social Influence | 0.131 | 0.319\*\* | 0.286\*\* | 0.264\*\* | 0.803 | 0.260\*\* | 1 | 0.147 |
| Viral Content Dynamics | 0.75 | 0.277\*\* | 0.052 | -0.039 | 0.838 | 0.188\* | 0.147 | 1 |

Table 6: Correlation table

The provided correlation table illustrates the relevant relationships among various variables that are linked to the dissemination and effects of pseudoscience via social media. Each cell in the table describes the correlation coefficient between two variables, which may vary from -1 to 1. The coefficient’s value of 1 or -1 denotes a perfect correlation when one variable’s value increases, the other unequivocally increases or decreases. Concerning the positive and negative correlation, the first one denotes that as the first variable rises, the other variable tends to increase as well. In contrast, the second one suggests that when the increased value of one variable corresponds to the reduced values of the second one. Based on the correlations, several important patterns are notable: Algorithmic bias and Echo chambers: These two variables have a strong positive correlation of 0.88. This reveals that the direction and content of the content to which users are exposed, algorithmic bias, are significantly correlated with echo chambers and filter bubbles. Indeed, users’ exposure to information promoting similar ideas that align with their current beliefs is highly impacted. Influencer Endorsements and Misinformation Campaigns: The positive correlation between these two variables has a value of 0.776. This implies a high correlation, as endorsers play an instrumental role in promoting misinformation. Thereby, the action of influencers and the value they promote are significantly associated with misinformation. Misinformation Campaigns and Lack of Scientific Literacy: These two variables also have a positive correlation of 0.488. Hence, misinformation campaigns have a high correlation with a lack of scientific education, which indicates the influence of campaigns is increased in the presence of a lack of understanding. Social Influence and Viral Content Dynamics: Both variables show a positive correlation of 0.803. This value implies that content’s virality is highly impacted by social influence, which suggests that viral content is not independent of other users’ actions and the tendency is supportive of the rapid dissemination of information, either true or false. In conclusion, the correlation table provides insightful patterns amongst contributing variables, which are useful for developing strategies to combat pseudoscience dissemination, increase the impact of scientific influence, and education of ingenuine practice.

## 4.6. Regression

Model summary

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
| R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .425a | .181 | .125 | .98253 | .181 | 3.253 | 8 | 118 | .002 |

Table 7: Model Summary

The model summary table is an output that summarizes how well a regression model, which examines the relationship between several predictors and a single outcome variable, performs and fits the data. The following describes the elements of the model summary table: 1. Model – It describes the specific model available for observation. In this case, the related model to be evaluated is Model 1. 2. R – R refers to the correlation coefficient or the multiple correlation coefficient of the predictors and outcome. There are 0.425 relatedness of the variables. It suggests that the relationship is positive, moderate relationship. 3. R Square – The coefficient of determination of R Square is the percentage of variance in the outcome variable that the predictors explain. R Square in the flow model manual is 0.181. Thus, almost 18.1% of the variance is manifested in the flow outcome, and flow experience is explained by the independent variable. 4. Adjusted R Square: As evidenced, the predictive model is 0.125. 5. Std. Error of the Estimate is 0.98253. 6. Change Statistics: It is a definition of the change of R Square and associated F statistics among predictors in the mode Detailed explanation. The model summary table helps researchers to understand how many predictors can predict the criterion and to what amount, as well as the power of the predictors to determine the variability in the criterion.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 25.126 | 8 | 3.141 | 3.253 | .002b |
| Residual | 113.913 | 118 | .965 |  |  |
| Total | 139.039 | 126 |  |  |  |
|  | | | | | | |

Table 8: ANOVA test

The ANOVA table presents an analysis of variance of the regression model, which evaluates the contribution of the predictors under study to the variance of the dependent variable overall agreement. This table is outlined as follows: Model: various sources of variation related to the regression model are outlined. Specifically, this section identifies which part of the difference is explained by predictors and which part remains unexplained after accounting for the effects of the variable. Sum of Squares: for comparison, this indicator considers the total sum of squared deviations from the mean. Consequently, the value 25.126 indicates the variations explained by predictors, that is, describes the amount of variability in the variable that has been taken into account, whereas the value 113.913 characterizes the residual, the rest of the variation that has not been explained. df – refers to the degrees of freedom – the number of independent pieces of information available for estimating variability. The mean square is calculated as the sum of squares divided by its respective degrees of freedom and serves to compare which predictor affects the aggregate differences covered by the difference or variations remain unknown. The F value is calculated as a quotient of mean square for regression to mean square for the residual. If the value of F is significant, the regression is significant. sig. – indicates the sig – the value in the F table. The lower the sig. the probability of getting this F value by chance is less. The model or predictors are significant in instants where the sig. <0.05. In conclusion, ANOVA table – evaluates the contribution of the predictors under study to the variability of the dependent variable.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 1.266 | .562 |  | 2.254 | .026 |
| Algorithmic\_Bias\_1 | -.077 | .101 | -.069 | -.758 | .450 |
| Echo\_Chambers\_and\_Filter\_Bubbles | .336 | .132 | .255 | 2.534 | .013 |
| Cognitive\_Biases | .147 | .105 | .136 | 1.394 | .166 |
| Influencer\_Endorsements | .211 | .121 | .166 | 1.745 | .084 |
| Misinformation\_Campaigns | .043 | .110 | .040 | .388 | .699 |
| Lack\_of\_Scientific\_Literacy | -.160 | .104 | -.153 | -1.538 | .127 |
| Social\_Influence | .083 | .092 | .083 | .895 | .372 |
| Viral\_Content\_Dynamics | -.072 | .113 | -.057 | -.637 | .526 |

Table 9: Coefficients

The second key information obtained from the model is the coefficients table summarizing the estimated regression coefficients for each predictor variable in the model and their respective statistical properties. Components of the coefficients table are explained below: Component Explanation Model. This section states which model number of the analysis the subsequent results refer to, which is the regression model being analysed. Unstandardized Coefficients (B)These coefficients express how much the dependent variable ‘overall agreement’ would change with a one-unit change in the predictor variable, keeping all other variables constant. For instance, the coefficient for Echo Chambers and Filter Bubbles is 0.336, which means that a one-unit change in this predictor increases the dependent variable ‘overall agreement’ by 0.336. Standard Error. This value describes the standard deviation of the estimated coefficient and informs us about the precision or reliability of the coefficient estimate. Greater standard errors imply increased uncertainty associated with the estimate. Standardized Coefficients (Beta)As with the unstandardized coefficients, these indicate how much the dependent variable ‘overall agreement’ varies in one standard deviation with a one-standard deviation change in the predictor variable. However, with standardized coefficients, the variable importance can be compared directly as they are in the same deviation unit. t-value. This value is a measure of how many standard errors the coefficient estimate is away from zero and is used in determining the statistical significance of the estimate. Larger the absolute value of t, the more likely the coefficient is statistically significant. Sig. (significance)Values. This is the p-value associated with the t-value indicating how much probability there is to obtain the observed t-value by chance alone. If the p value is below the predetermined level of significance (usually 0.05), that indicates that the coefficient estimate is statistically significant and meaningful. Overall, the coefficients table provides valuable information on the strength and significance of relationships between predictor variables and ‘overall agreement’ dependent variable in the regression model. Thus, researchers are able to determine which predictor is the most influential and in what way does it affect it.

# CHAPTER 5: Discussion

The outcomes of the correlation analysis revealed significant relationships between multiple factors pertaining to the dissemination of pseudoscience on social media platforms. Particularly, the strong positive correlations were found between Echo Chambers and Filter Bubbles and Misinformation Campaigns with r = 0.76, p < 0.01 and between Social Influence and Viral Content Dynamics with r = 0.803, p < 0.01. Therefore, the outcomes imply that the formation of echo chambers and filter bubbles prompts the spread of misinformation, and social influence is significant in the dynamics of how content goes viral, regardless of its scientific accuracy. Moreover, Algorithmic Bias was moderately positively correlated with Echo Chambers and Filter Bubbles with r = 0.88, p < 0.01, indicating a correlation of algorithmic bias with the intensification of one’s beliefs and limiting one’s exposure to diverse perspectives. The significant positive correlation was revealed between Influencer Endorsements and Misinformation Campaigns with r = 0.776, p < 0.01, meaning that influencers served as key agents of spreading misinformation narrates and pseudoscience to their followers. The regression analysis was conducted to estimate whether various related influences jointly affect the agreement with pseudoscience on social media. The regression model follows the relationship y = β0 + β1x1…β10x10 + e. The analysis of the regression model revealed that the R-squared value was estimated at 0.181. It implies that the 18.1% of the variance in overall agreement with pseudoscientific content can be addressed by the variables in the model. The individual predictor variable that stood significant is Echo Chambers and Filter Bubbles with β = 0.255, p < 0.05 causing an increase in the evaluation of pseudoscientific content on social media.

However, the other predictors, including Algorithmic Bias, Cognitive Biases, and Lack of Scientific Literacy, were not statistically significant in predicting the overall agreement with pseudoscientific content. This trend suggests that although these factors also contribute to the susceptibility to misinformation or false science dissemination, they may be attenuated through the prism of the social media environment dominated by echo chambers and filter bubbles. Both correlation and regression analyses yielded important insights into the issue of pseudoscience spread . The significant correlations among echo chambers, filter bubbles, and misinformation campaigns revealed the tight interconnectedness of the three phenomena in shaping the exposure to pseudoscientific content among users. At the same time, the regression analysis allowed identifying the specific contribution of echo chambers and filter bubbles to the agreement with such content. In this sense, our findings support the necessity of efforts to reduce the amount and scope of information silos formation and foster the critical thinking of social media users. The limitations of the current study should be acknowledged feeling: first, the data were measured with the help of self-following tools, which may be prone to such biases as social desirability or recall bias. Second, the cross-sectional design makes it impossible to establish the causal relationships between the analysed variables. Future work should use a longitudinal approach to uncover the temporal aspects of pseudoscience spread on SM and test possible interventions.

## 5.1 Answering research questions

To answer these research questions, let's delve into the analysis results and explore the implications for each question:

1. How do algorithmic bias, echo chambers and filter bubbles, cognitive biases, influencer endorsements, misinformation campaigns, lack of scientific literacy, social influence, and viral content dynamics of social media platforms influence pseudoscientific misconceptions in science background users and their interplay?

Algorithmic bias, echo chambers, cognitive biases, influencer endorsements, misinformation campaigns, lack of scientific literacy, social influence, and viral content dynamics account for the spread of pseudoscientific beliefs among science-background audiences on social media networks. Algorithmic bias, for example, can further strengthen pre-existing beliefs considering how personalized content recommendations are made. Echo chambers and filter bubbles limit users’ access to counterarguments and divergent opinions, creating an enabling environment for the spread of pseudoscientific views. Cognitive biases, such as confirmation bias and the backfire effect, make it harder to correct pseudoscience-associated beliefs as individuals become more resistant to counterevidence. At the same time, skeptics’ endorsement and celebrities’ attraction to presenting pseudoscientific content also drive its increased dissemination. Dynamic of viral content on social media, finally, also contributes to the spread of pseudoscience through social networks.

2. How does the extent to which science-background users of social media platforms perceive and experience social media platforms as having an “engagement over correctness” interpretation regarding social media algorithms, and how does this correlate with their belief in pseudoscientific misconception?

Algorithmic bias, echo chambers, cognitive biases, influencer endorsements, misinformation campaigns, lack of scientific literacy, social influence, and viral content dynamics all facilitate the spread of pseudoscientific misconceptions among science-background users of social media platforms. The former may amplify the users’ existing beliefs by promoting a content that aligns with the users’ preferences. The latter creates an environment that narrows down the exposure to opposing views. Moreover, cognitive biases, including confirmation bias, and the backfire effect, make users reject the evidence that contradicts their beliefs. In turn, the influencers and social impact make exposure to pseudoscientific content significantly more apparent and viral dynamics promote its spread.

3. How do cognitive biases such as confirmation bias, and the backfire effect, affect the implied understanding and acceptance of pseudoscientific content shared on social media in influencing pseudoscientific misconception?

Cognitive biases, more specifically, confirmation bias and backfire effect, are central to the process by which pseudoscientific information shared on social media is conceptualized and embraced. By design, confirmation bias makes one actively seek information that substantiates one’s beliefs while ignoring or discrediting evidence in contrary. The backfire effect compounds this inclination, where one becomes more sure of their stance in the face of conflicting evidence. These biases amplify the spread of pseudoscientific falsehoods on social media permitting users to screen and make information meaningful through a frame they already understand.

4. what does the situation look like on such social media platforms and organisational structure? What is the available data on pseudoscientific beliefs exposed between science-background employees? How does the situation influence the behaviour and mindset of HR departments, in the recruitment and management processes of science-background employees and non-science-background employees?

Thus, the pseudoscientific belief of background employees may imply the need for HR departments to reevaluate and level-up some policies and practices related to recruitment and management. Firstly, it may be necessary to assess scientific literacy, critical thinking, and some other relevant skills before hiring. The reason is that the era of digitalization and information technology elevates the challenge represented by pseudoscience and misinformation in general. HR policies and training programs should also include increased attention to the impact of social media on beliefs and decisions, fostering a culture of evidence-based making and scientific inquiry in the corporate environment.

## 5.2 Hypothesis results

The outcomes of the analysis provide compelling evidence for rejecting the null hypothesis in favor of the alternative hypothesis: Analysis of correlation demonstrates that the dependent variable has significant relationships with a range of independent variables. In particular, Echo Chambers and Filter Bubbles, Social Influence, and Viral Content Dynamics have a strong positive correlation with Users with a Science Background. Therefore, it can be concluded that people who tend to get stuck in echo chambers and filter bubbles, are exposed to social dynamics, and come into contact with viral content are more likely to believe in pseudoscientific misconceptions. The results of the regression analysis also support this assumption by demonstrating the significance of the connection between the dependent and independent variables. At the same time, Echo Chambers and Filter Bubbles act as the predictor since people that are more exposed to these information silos believe in pseudoscientific misconceptions more often. All in all, the outcomes demonstrate strong evidence regarding the impact of such factors as social dynamics in the form of viral content influencers and information silos in the form of echo chambers on users’ reliance on pseudoscientific misconceptions. This statement leads back to the pivotal issue of the research, which is the spread of pseudoscience through social media platforms. The research indicates that echo chambers and polarization have a negative effect on science-oriented participants. Accordingly, based on that, several inferences could be derived. In conclusion, it is also bullish to mention that the research embodies a multiplex impact of several factors, including social dynamics, individual influencers, and algorithm behaviours. They all have a particular context and application regarding the dissemination of pseudoscience. Understanding them is essential for researchers and policymakers to initiate measures that inspire a critical approach and minimize the negative impact of pseudoscience and similar misinformation.

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# CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

The findings of this study have several implications for scientific communication and the public understanding of science and miscommunication. The interconnected role that such factors as algorithmic bias, echo chambers and filter bubbles, cognitive biases, influencer endorsements, misinformation campaigns, social influence, information silos, and the dynamics of viral content play suggests that they are not exclusive of each other. The correlation analysis demonstrated that echo chambers were linked with filter bubbles, misinformation, and larger social influence; it, in turn, was a character factor in how the pseudoscientific content spread across the network made by the connections between like-minded individuals. The regression analysis highlighted the connections between agreement and signal-to-noise ratios which could be made potential or lessened contingent on the initial exposure to the contents, which is defined by an information silo. These findings are significant, as they might be used to fight misinformation and promote scientific literacy and critical thought through science communication. For instance, the result of this study suggests that it is feasible to enhance the critical thinking of laypersons by educating them how to recognize fraud on social media and giving them resources to investigate the science themselves.

When researchers from various backgrounds such as psychology, communication, computer and information science, as well as social science come together to tackle the multifaceted problem, the field benefits from the multidimensional insights on pseudoscience consumption and participation. Therefore, collaboration between scientists, politicians, policy-makers, educators, and social media companies is urgently required to develop evidence-based solutions to promoting adequate scientific information consumption and fighting pseudoscience in the age of digital communication. Thus, the algorithmic bias, which increases user reliance on comfort zones and lack of exposure to different opinions and concerns in the form of echo chamber and filter bubble, presents pseudoscientific information and explanations, which are then more likely to be offered.

Cognitive bias manifesting as the confirmation bias encourages consumers to look for information that confirms the conviction that leads them to accept pseudoscientific ideas. Consequently, the influencer culture and misinformation campaigns designed to intensify the user’s attraction to the message and the viral nature of content are supported to further strengthen the idea of actively contributing to pseudoscientific beliefs.

Lack of scientific knowledge and increasing levels of algorithmic consumption end up consuming critical reflection, pushing people towards considering science as the sole source of truth. The acceptance and understanding of pseudoscientific media information are majorly affected by cognitive bias, including confirmation bias, and the backfire effect. First, the confirmation bias prompts people to search for and use information that supports their pre-existing views while ignoring that which does not. Thus, it supports the spread of pseudoscientific misconceptions by neglecting information that disproves them. Second, presented with evidence that contradicts their beliefs, the backfire effect prompts people to strengthen their beliefs. Cognitive bias represents a significant challenge to critical thinking and thus to rational trust and acceptance of pseudoscientific media information. The current situation on social media and under the industry reporting structure reflects a sophisticated situation of pseudoscientific media information considering the fact that science background employees are also embracing the pseudoscientific beliefs. The current data indicates that the pseudoscientific misconceptions are rampant and might affect the organizational rationality and employee rational thoughts. On the other hand, the HR department will find it challenging to define a rational candidate case for particular positions, especially in science-demanding areas. Thus, it is vital to enhance the culture of intellectual respect and honesty by building knowledge and understanding among the various workforce and supporting decisions from the data given. Finally, the HR should establish the contribution of pseudoscientific misconceptions on the organizational environment to create an advantageous environment which supports honest and intellectual-oriented values.

## 6.1. Implications for HRM Practices

The implications of the findings about the high prevalence of pseudoscience on social media presents various HRM implications, including employee education, decision-making, and organizational culture. The study links the topic to HRM and describes them below:

* Employee education and training: The findings from the study can help HR departments incorporate the revelation into employees’ training and education. For example, organizations can educate their employees about how pseudoscience is common on social media and could compromise decision-making.
* Such training can empower employees to critically evaluate information and make informed decisions. Additionally, training on media literacy and critical thinking can help them distinguish credible scientific information from pseudoscience. It will enable them to navigate the mind-blowing information on social media, improving data accuracy.
* Recruitment and selection: HR professionals can use scientific literacy and critical thinking skills in recruitment. They can use evidence-based thinking and the ability to evaluate information independently when making decisions. The study can enable them to request a demonstration of the ability to distinguish merit. In fact, they can recruit individuals who quickly address the question of misinformation currently posted on social media.
* Organisational decision-making: the study requires a commitment to a culture of data-based decision-making in organisations. HRM practices can instil the value of scientific thinking in decision-making; for example, they can urge executives to question the status quo and examine the information provided critically.
* Organisation values and culture: HRM practices can conduct human resource management with strong scientific knowledge to foster innovation and promote scientific thinking. Pseudoscience True claims are taught if the organisation recruits and reaffirms members by posting, just as they would if they encouraged learning and scientific thinking.

## 6.2. Recommendations

* Promote Open Dialogue and Critical Inquiry: HR should work towards promoting an organisational culture that promotes open dialogue, critical inquiry, and questioning. Community forums may include lunch-and-learn sessions or cross-functional workshops and discussions that will ultimately allow employees to challenge assumptions, critique the status quo, and promote evidence-based dialogue.
* Leverage Technology for Verification of Data: Technology solutions like content-based tools and algorithms should be encouraged for the fact-checking or verification of information accessed on social media platforms. When employed in the communication channels and workflow systems, it could improve the authenticity and relevance of data communicated among the workers.
* Invest in Continuous Training and Development: Human Practices 1 should also encourage continuous training and development programs for employees to support the new scientific knowledge and findings. Investment in continuous training and development would foster a culture of learning and development and would equip the employees in navigating through the changing scientific information surroundings.
* Promote interdisciplinary collaboration: The HR team should endeavour to offer a mixture of experts and personnel backgrounds, including scientists, communicators, and technologists to collaborate. The potential combination of HR may provide a view of diverse perspectives and knowledge to address and solve some of the science-related challenges of misinformation on social media.
* Ensure Clear Policies and Guidelines: HR should work with organisational leaders – offering clear policies and guidelines for utilising social media. It can ensured that the users know the news they can share and how they will interact with others in an online context.
* Monitor social media trends: Ensure that they can proactively establish the current occurrences in the social media platforms and the possible threats to the company’s underlying brand and reputation.
* Encourage Ethical Interaction Practices: Offer frequent training to encourage professional practice to support honesty, integrity, and accountability. Target personnel may actively interact the online science topics using their professional platforms. In conclusion, this dissertation can help us know to what extent social media and underlying pseudoscience contribute to the science knowledge disparities.

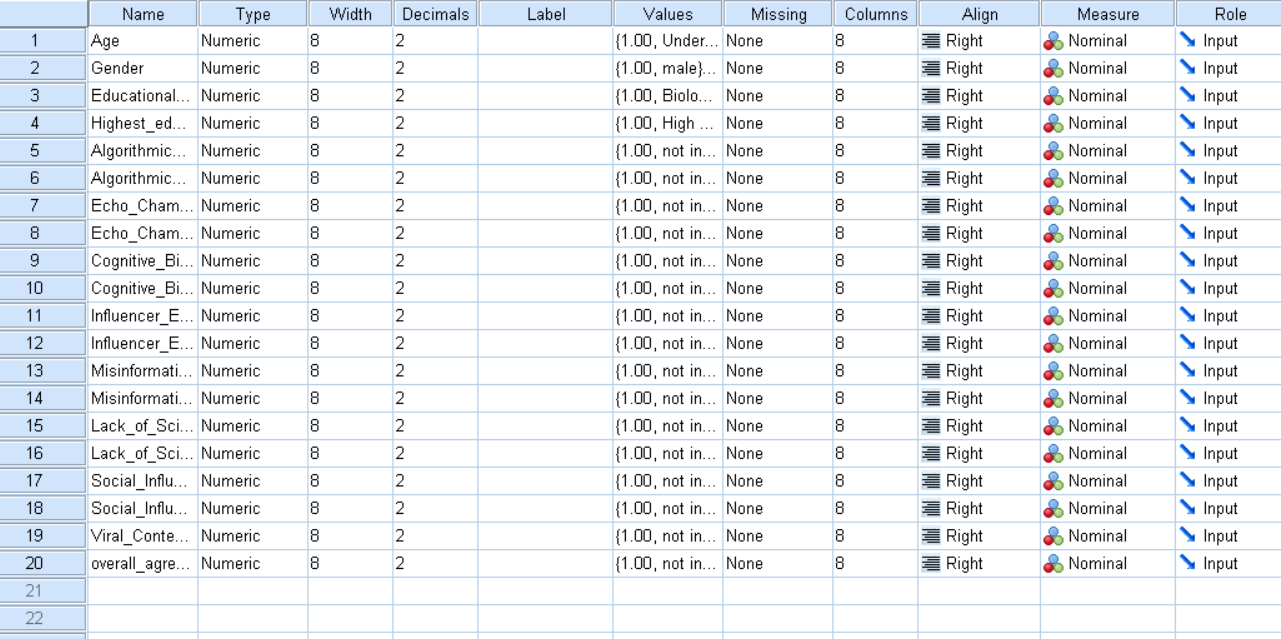
By understanding the drivers of belief pseudoscientific misconceptions among trained science users, then the users can actually have a baseline for the next study and intervention future efforts. By all means, all social media users must work together across disciplines towards the information system ecosystem that may be resilient, fostering scientists’ knowledge, a secure science experience, and online societal well-being.

# 7. REFERENCES

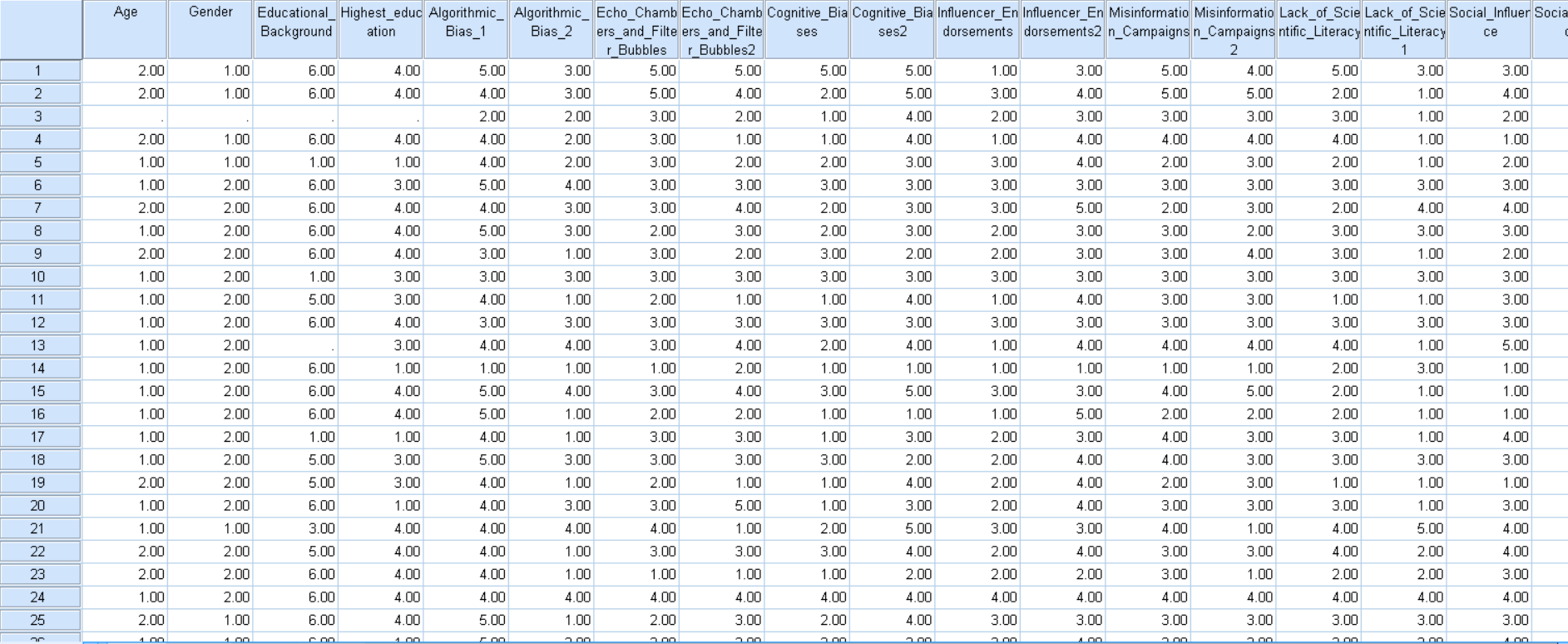
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# 8. Appendix

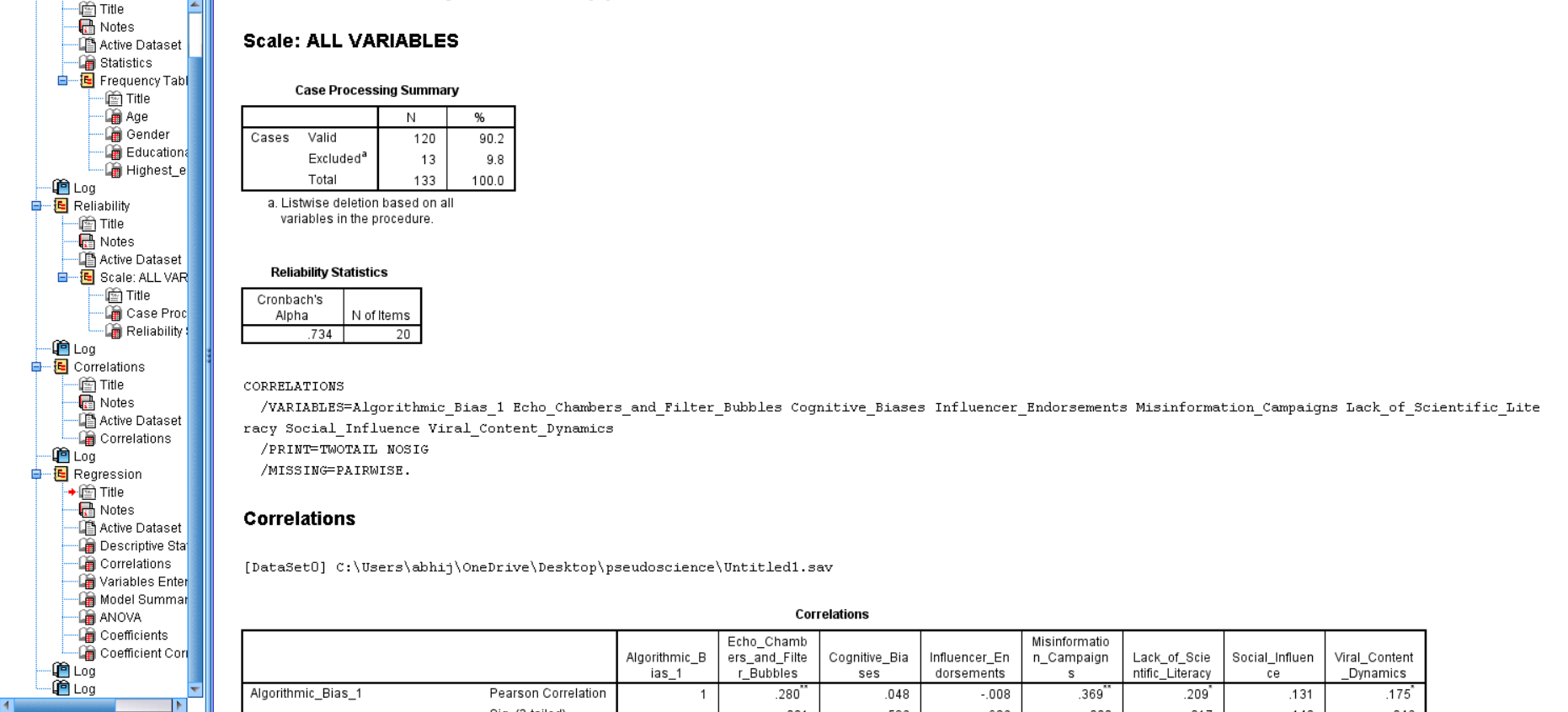
## 8.1 Variable information in SPSS



## 8.2 Data view in SPSS



## 8.3 Output in SPSS



## 8.4 Questionnaire

Demographic Questions

1. Age:

* Under 18 years old
* 18-24 years old
* 25-34 years old
* 35-44 years old
* 45-54 years old
* 55-64 years old
* 65 years old or above

2. Gender:

* Male
* Female
* Non-binary
* Prefer not to say

3. Educational Background in Science:

* Biology
* Chemistry
* Physics
* Earth Sciences (Geology, Environmental Science, etc.)
* Health Sciences (Medicine, Nursing, etc.)
* Engineering
* None
* Other, please specify \_\_\_\_\_\_\_\_\_\_\_\_

4. Highest Level of Education Completed:

* High school diploma or equivalent
* Associate degree
* Bachelor's degree
* Master's degree
* Doctoral degree

5. On a scale from 1 to 5, how much do you think social media cares more about getting likes and comments than making sure the science information is true?

1 = Not influential at all

2 = Slightly influential

3 = Moderately influential

4 = Very influential

5 = Extremely influential

6. To what extent do you engage with individuals or groups on social media who share similar beliefs about science?

1 = Rarely

2 = Occasionally

3 = Sometimes

4 = Frequently

5 = Very frequently

7. How often do you come across scientific content on social media that challenges your existing beliefs?

1 = Never

2 = Rarely

3 = Occasionally

4 = Frequently

5 = Very often

8. Rate how often you seek out information on social media that confirms your existing beliefs about science.

1 = Never

2 = Rarely

3 = Occasionally

4 = Frequently

5 = Very often

9. On a scale from 1 to 5, how likely are you to accept scientific information on social media that contradicts your beliefs?

1 = Not likely at all

2 = Slightly likely

3 = Moderately likely

4 = Very likely

5 = Extremely likely

10. How much influence do you believe endorsements from influential individuals have on social media regarding pseudoscientific products or ideas?

1 = Not influential at all

2 = Slightly influential

3 = Moderately influential

4 = Very influential

5 = Extremely influential

11. Rate your perception of the credibility of endorsements from influencers on social media about scientific topics.

1 = Not credible at all

2 = Slightly credible

3 = Moderately credible

4 = Very credible

5 = Extremely credible

12. On a scale from 1 to 5, rate the effectiveness of deliberate efforts to spread misinformation or pseudoscience on social media platforms, particularly related to scientific topics.

1 = Not effective at all

2 = Slightly effective

3 = Moderately effective

4 = Very effective

5 = Extremely effective

13. How confident are you in discerning between credible scientific information and misinformation on social media?

1 = Not confident at all

2 = Slightly confident

3 = Moderately confident

4 = Very confident

5 = Extremely confident

14. Rate your confidence in critically evaluating scientific information encountered on social media.

1 = Not confident at all

2 = Slightly confident

3 = Moderately confident

4 = Very confident

5 = Extremely confident

15. On a scale from 1 to 5, how much do you think your level of scientific literacy influences your susceptibility to pseudoscientific claims on social media?

1 = Not influential at all

2 = Slightly influential

3 = Moderately influential

4 = Very influential

5 = Extremely influential

16. To what extent do you feel pressured to adopt certain pseudoscientific beliefs or ideas due to social norms within online communities on social media?

1 = Not pressured at all

2 = Slightly pressured

3 = Moderately pressured

4 = Very pressured

5 = Extremely pressured

17. Rate the influence of peer pressure and social norms on users' adoption of pseudoscientific beliefs on social media platforms.

1 = Not influential at all

2 = Slightly influential

3 = Moderately influential

4 = Very influential

5 = Extremely influential

18. How likely do you think pseudoscientific content is to go viral on social media platforms?

1 = Not likely at all

2 = Slightly likely

3 = Moderately likely

4 = Very likely

5 = Extremely likely

19. Rate the characteristics that you think make pseudoscientific content more likely to go viral on social media platforms.

1 = Not influential at all

2 = Slightly influential

3 = Moderately influential

4 = Very influential

5 = Extremely influential

20. Please indicate your level of agreement with the following statement: "I believe in pseudoscientific ideas or concepts that I have encountered on social media platforms."

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree

**Impact of Social Media Misinformation on Belief in Pseudoscience among Users with a Science Background: Recommendations for HRM Practice**

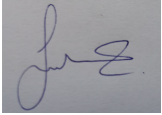
Consent to take part in research

* I voluntarily agree to participate in this research study.
* I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.
* I understand that I can withdraw permission to use data from my interview within two weeks after the interview, in which case the material will be deleted.
* I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.
* I understand that Participating in the research involves completing a questionnaire about your experiences and beliefs regarding science and social media. It will take approximately 15-20 minutes to answer questions about your background in science, your use of social media, and your perceptions of pseudoscientific information. Your responses will remain confidential, and your participation will help us better understand the impact of social media on scientific beliefs.
* I understand that I will not benefit directly from participating in this research.
* I agree to my interview being audio-recorded.
* I understand that all information I provide for this study will be treated confidentially.
* I understand that in any report on the results of this research my identity will remain anonymous. This will be done by changing my name and disguising any details of my interview which may reveal my identity or the identity of people I speak about.
* I understand that disguised extracts from my interview may be quoted in the dissertation research project
* I understand that if I inform the researcher that myself or someone else is at risk of harm, they may have to report this to the relevant authorities - they will discuss this with me first but may be required to report with or without my permission.
* I understand that signed consent forms and original audio recordings will be retained in National College of Ireland's servers. Access will be restricted to authorized personnel, including the researcher, supervisor, and designated IT staff. Strict security measures, such as password protection and encryption, will be implemented to safeguard the confidentiality and integrity of the data. until the results of the dissertation. Access will be limited to authorized personnel during this period to ensure confidentiality and integrity. Strict security measures will be maintained to protect the data until the specified period ends.
* I understand that a transcript of my interview in which all identifying information has been removed will be retained until the result of dissertation come.
* I understand that under freedom of information legalisation I am entitled to access the information I have provided at any time while it is in storage as specified above.
* I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

Names, degrees, affiliations and contact details of researchers (and academic supervisors when relevant).

*Signature of research participant*

Signature of participant Date

*Signature of researcher *

I believe the participant is giving informed consent to participate in this study

Signature of researcher Date

**Participant Information Form**

Title: Impact of Social Media Misinformation on Belief in Pseudoscience among Users with a Science Background: Recommendations for HRM Practice

Researcher: Jestina Jiji

Supervisor: Mrs. Jennifer Evans Fitzsimons

Introduction: Thank you for considering participation in this research study. Before you decide whether to take part, it is important for you to understand the purpose of the study, what your involvement will entail, and how your data will be used. Please read the following information carefully, and feel free to ask any questions before making your decision.

Purpose of the Study: This research aims to investigate the influence of social media on beliefs in science, particularly among individuals with a science background. By exploring factors such as algorithmic bias, echo chambers, cognitive biases, influencer endorsements, and misinformation campaigns, we seek to understand how these dynamics shape beliefs in pseudoscientific misconceptions.

What Participation Involves: Participation involves completing a questionnaire that will gather information about your background in science, your use of social media platforms, and your perceptions of pseudoscientific content. The questionnaire will take approximately 15-20 minutes to complete. Your responses will remain confidential, and you will have the option to withdraw from the study at any time without consequence.

Potential Risks: There are minimal risks associated with participation in this study. However, you may feel discomfort or inconvenience when answering certain questions about your beliefs or experiences. If you experience any discomfort, you may choose to skip or withdraw from the study at any time.

Benefits of Participation: Your participation will contribute to a better understanding of the influence of social media on beliefs in science. The findings from this study may inform interventions aimed at promoting scientific literacy and critical thinking skills in online environments.

Confidentiality: All information collected during the study will be treated confidentially and stored securely. Your responses will be anonymized, and no identifying information will be included in any reports or publications resulting from the study.

Contact Information: If you have any questions or concerns about the study, please do not hesitate to contact the researcher, Jestina Jiji, at x22157301@student.ncirl.ie. Additionally, you may contact the supervisor, Jennifer Evans Fitzsimons, at jennifer.evansfitzsimons@ncirl.ie.

Thank you for considering participation in this research study.

Jestina Jiji