

## Exploring Demographic Factors and Algorithmic Influence on Fact-Checking Behaviors: A Qualitative Study Soohyon (Sean) Kim

### Abstract

Misinformation on social media networks, driven by echo chambers and the reinforcing effects of confirmation bias, poses concerns about skewing public perception. Misinformation can potentially cause harm by spreading false information that may be believed and acted upon, leading to poor outcomes in areas of health, politics, and public safety. Despite existing strategies to counter misinformation, gaps remain in understanding how demographic and psychological factors influence users' willingness to verify the information they encounter online. To address these gaps, the present study conducted a qualitative survey of 214 social media users in the State of Oregon, analyzing their fact-checking behaviors in relation to age, education, and social media usage. The study explored five proposed hypotheses, investigating the impact of demographic factors, educational background, social media habits, and algorithmic influences on fact-checking behaviors. Findings suggested that younger adults are more likely to fact-check compared to older adults, while educated users are not necessarily more critical towards opposing information sources, as they often disregard inconsistent information. Contrary to expectations, increased social media usage among participants was not found to reduce the likelihood of fact-checking; however, exposure to fact-check labels and content warnings did boost information verification behaviors. The study also confirmed that social media algorithms encourage confirmation bias by consistently showing users content aligned with their existing beliefs. The present study concludes with recommendations for increasing fact-checking behaviors among users through behavioral economics solutions, such as nudges, and proposes further research into the psychological processes shaping information verification behaviors across diverse demographic contexts.

**Keywords:** *social media, misinformation, echo chambers, confirmation bias, fact-checking behaviors, behavioral economics, nudges*

### Introduction

As a result of the widespread availability of technology today, regulating misinformation on social media has become an increasingly urgent concern. Misinformation, defined as inaccurate information that may be spread with a malicious intent [1], has concerning impacts, such as altering public perception and influencing harmful outcomes in areas of public health, politics, and disaster response [2]. As misinformation can have manipulative effects on public opinion, it is important to develop strategies to address its negative effects on users.

### ***Echo Chambers and Confirmation Bias on Social Media***

Echo chambers and confirmation bias are two interconnected concepts that promote misinformation on social media. Studies reveal the prevalence of online echo chambers, where people primarily encounter material that aligns with their preferences on a given subject [3]. Echo chambers are closed information systems where dissenting views are often excluded, leading to a homogeneous set of beliefs and perspectives surrounding a particular topic that is continually reinforced and perpetuates misinformation. This cyclical reinforcement, thus, extends

false narratives and misinformation to a larger audience since people continue sharing and reaffirming wrong information in their self-selected communities.

Confirmation bias, the tendency of people to focus only on the information that, in their opinion, supports a preconceived idea [4], worsens this issue. Both echo chambers and confirmation bias lead to the spread of misinformation by creating environments where false beliefs are reinforced. In this closed-loop system, misinformation is rarely challenged and frequently validated, continuing the spread of false information.

Research by Arguedas et al. [5] adds complexity to this general understanding, suggesting that online echo chambers are not as significant and that algorithmic ranking can sometimes contribute towards a more diverse consumption of the news. In fact, one in ten people have been shown to be affected by echo chambers within the realm of social media. While this finding does not diminish the overall concern regarding the prevalence and negative impact of misinformation, existing research has yet to fully capture the complex impact of echo chambers across digital platforms and user demographics.

### ***Verifying Information: Fact-Checking Behaviors***

Addressing the spread of misinformation requires an understanding of fact-checking behaviors among individuals. Past studies by Lewandowsky et al. [6] and Nickerson [4] paint a broad picture of the effects of misinformation and how they influence changes in attitude, political viewpoints, and resistance to the facts about science among users. Enhancing the readers' awareness of fact-checking has been another neglected area despite the vast literature on the dissemination of fake news. Some theories proposed in behavioral economics may have better remedies; for instance, the notion proposed by Thaler and Sunstein [7] of "nudges," defined as subtle prompts or interventions designed to encourage users to verify information. An example of a nudge could be when the social media site would preemptively give a pop-up message asking the users if they would like to verify the source of a link before sharing the said link.

Despite these discoveries, there exists a gap in understanding people's willingness to fact-check the information they receive. Various researchers have focused on the overall impact of echo chambers and confirmation bias, yet very little of them have addressed the synergy of these factors on fact-checking and information verification behaviors. A deeper understanding of the psychological effects of these phenomena are required to develop effective strategies for encouraging accurate information verification, thus reducing misinformation.

### ***Current Solutions to Address Misinformation***

Several strategies have been used to address the spread of misinformation. Research suggests that economic incentives, for example, may curb the spread of such fake news. A study found that removing ad revenue from accounts that share false information eliminates the financial motivation for spreading misinformation [8]. These policies are also challenging to enforce, as they are weakened by alternative sources of revenue.

Public awareness campaigns are another approach to combating misinformation, sensitizing users on the dangers of false information and the importance of fact-checking online. Existing research on public awareness campaigns indicates that such campaigns can motivate individuals to engage in fact-checking [9]. Although the precise effectiveness of these campaigns can be difficult to evaluate, they are necessary to contribute to an informed and resilient general public.

Media literacy education is also critical in equipping individuals with the means for critical thinking and resisting misinformation. Research demonstrates that media literacy programs nurture critical thought and insight, thus reducing the susceptibility of a person to being misled by information [10]. While investing in media literacy education is important for creating a vigilant, informed society, there are issues in implementation, teacher development and curriculum integration [10].

While these strategies for addressing the spread of misinformation exist, there remains a gap in understanding the psychological impact of echo chambers and confirmation bias on individuals' readiness to fact-check information. Despite extensive research on echo chambers, confirmation bias, and misinformation, current literature furthermore still lacks insights into how these phenomena affect individuals' fact-checking behaviors. Previous works have concentrated on the combined effect of echo chambers, confirmation bias, and misinformation without addressing how these factors interrelate in the context of information verification. For example, while the vast literature on disseminating fake news has explored various aspects of misinformation, it has neglected the crucial area of examining users' knowledge of the process of fact-checking [11]. This gap underlines the urgent need for strategies that not only prevent misinformation, but also actively promote the critical evaluation of information.

Moreover, existing research has yet to fully capture the complex impact of echo chambers and confirmation bias across various digital platforms and diverse user demographics. Studies have highlighted the prevalence of echo chambers in relatively homogeneous demographic groups, but they have not adequately explored these effects across diverse ages, educational backgrounds, and social statuses [12]. This issue presents a significant gap in existing research, as understanding the nuanced effects of echo chambers and confirmation bias across demographic contexts is crucial for developing effective countermeasures to the negative consequences of misinformation.

### **The Present Study**

The present study aimed to address these gaps by examining the effects of echo chambers and confirmation bias on users' fact-checking behaviors within social networks, enhancing a deeper understanding of the psychosocial processes that shape the perception of online information. The study aimed to gain insights into the roles of demographic factors, educational background, social media habits, and algorithmic influences in individuals' fact-checking behaviors and susceptibility to misinformation. By focusing on the State of Oregon, the present study furthermore provided a localized view of a global issue, examining how echo chambers and confirmation bias affect a diverse population with varying levels of media consumption and education.

The study had two primary objectives: first, to identify the psychological aspects involved in fact-checking behaviors when encountering echo chambers and misinformation on social media; and second, to investigate the use of behavioral economics solutions, such as nudges, in improving the information verification behaviors of users.

In response to these research objectives, the present study posed five hypotheses:

1. Older individuals are more likely to verify the accuracy of news stories on social media compared to younger individuals.
2. Individuals with higher levels of education are more likely to engage critically with posts that challenge their beliefs, such as analyzing the validity of the post or engaging in respectful discussions.



3. Higher daily usage of social media correlates with a decreased likelihood of checking the credibility of news stories, leading to a higher risk of spreading misinformation.
4. People who often notice content warnings or fact-check labels on social media are likelier to report posts they believe to be misinformation.
5. Users who find that social media algorithms frequently recommend content that reinforces their existing beliefs are less likely to engage with differing opinions and more likely to experience confirmation bias.

By exploring these hypotheses, the present study aimed to shed light on potential approaches for enhancing fact-checking behaviors among users. This research aimed to produce implications for promoting critical thinking within the general population and advancing the understanding of strategies to counter misinformation in the digital environment.

### ***Methodology***

An anonymous self-completion questionnaire was administered to a random sample of 214 individuals residing in the State of Oregon. The questionnaire was primarily promoted through social media platforms, including Facebook, Twitter, and Instagram. By leveraging social media for promotion, the survey reached a diverse group of adult participants who are active social media users, providing a relevant sample for examining the impact of echo chambers and confirmation bias on fact-checking behaviors.

The sample consisted of 44% male ( $n = 94$ ), 55% female ( $n = 119$ ), and 1% non-binary individuals ( $n = 1$ ). The age distribution was as follows: 5% ( $n = 10$ ) of individuals were 18-24 years, 20% ( $n = 42$ ) were 25-34 years, 18% ( $n = 38$ ) were 35-44 years, 19% ( $n = 40$ ) were 45-54 years, 18% ( $n = 39$ ) were 55-64 years, and 21% ( $n = 45$ ) were 65 years and older.

### ***Survey Design***

Aiming to establish the extent to which people encounter supporting and refuting information and their subsequent information verification behaviors, the questionnaire consisted of questions regarding the participants' demographics, social media engagement, sources of information, and the frequency of fact-checking behaviors during social media usage.

In the final section of the survey, participants were invited to participate in hypothetical scenarios that presented news on topics such as health and wellness, environmental issues, technological advancements, and economic trends. These scenarios aimed to observe participants' willingness to verify information through fact-checking when presented with content that either aligned with, or challenged their belief systems. The scenarios evaluated the impact of factors such as behavioral economics solutions, such as content warnings or fact-check labels operating as nudges, on information verification behaviors.

### ***Data Analysis***

Qualitative data collected from the surveys and the hypothetical scenarios were then analyzed thematically using Google Sheets. Key themes were identified related to age, education level, social media usage, and information verification behaviors. This analysis focused on understanding the rationale behind participants' behaviors and the social and psychological factors influencing their likelihood to engage fact-checking. The present study then used Google Sheets to develop visualizations of the study results for each proposed hypothesis.

## Results

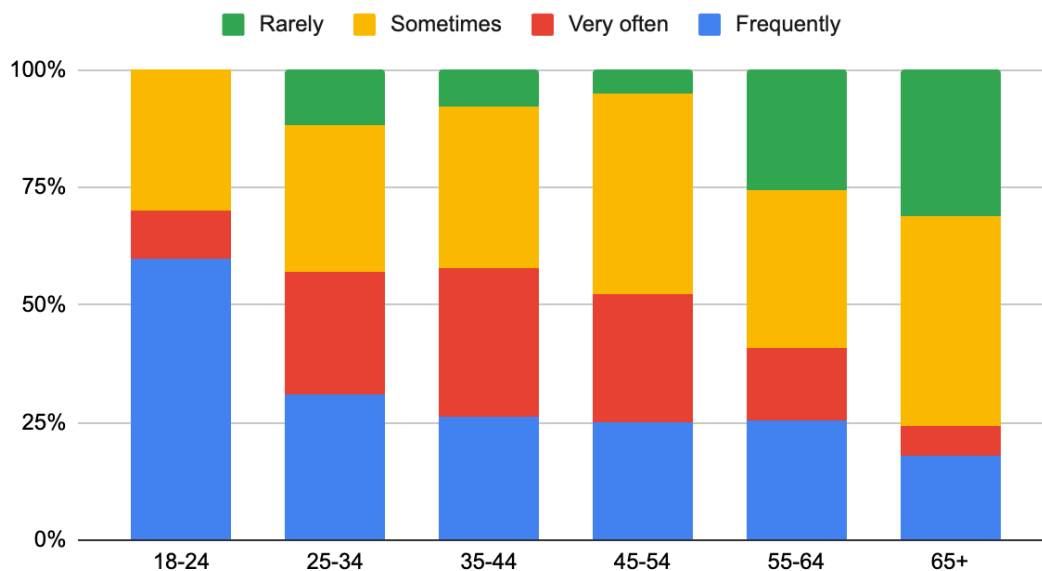
### ***Hypothesis 1: Age and Information Verification***

The first hypothesis predicted that older subjects are more likely to confirm the accuracy of news reports shared on social media sites as compared to younger subjects. The rationale behind this idea was based on the assumption that older individuals, potentially due to their wisdom and prior interactions with traditional media, would be more likely to speculate the information available online, and therefore be more likely to engage in fact-checking [13].

However, survey data contradicted this hypothesis, indicating an inverse relationship between age and the likelihood of fact-checking. As seen in Figure 1, findings showed that about 60% of participants aged 18 to 24 frequently engaged in fact-checking, and about 10% engaged in fact-checking very often. In contrast, only about 20% of participants aged 65 or older frequently engaged in fact-checking, and fewer than 5% did so very often. These results suggest that older individuals are less likely to verify information compared to younger users, thus disproving the initial hypothesis.

**Figure 1**

**Age Groups and the Frequency of Social Media Fact Checking**



### ***Hypothesis 2: Education and Critical Engagement***

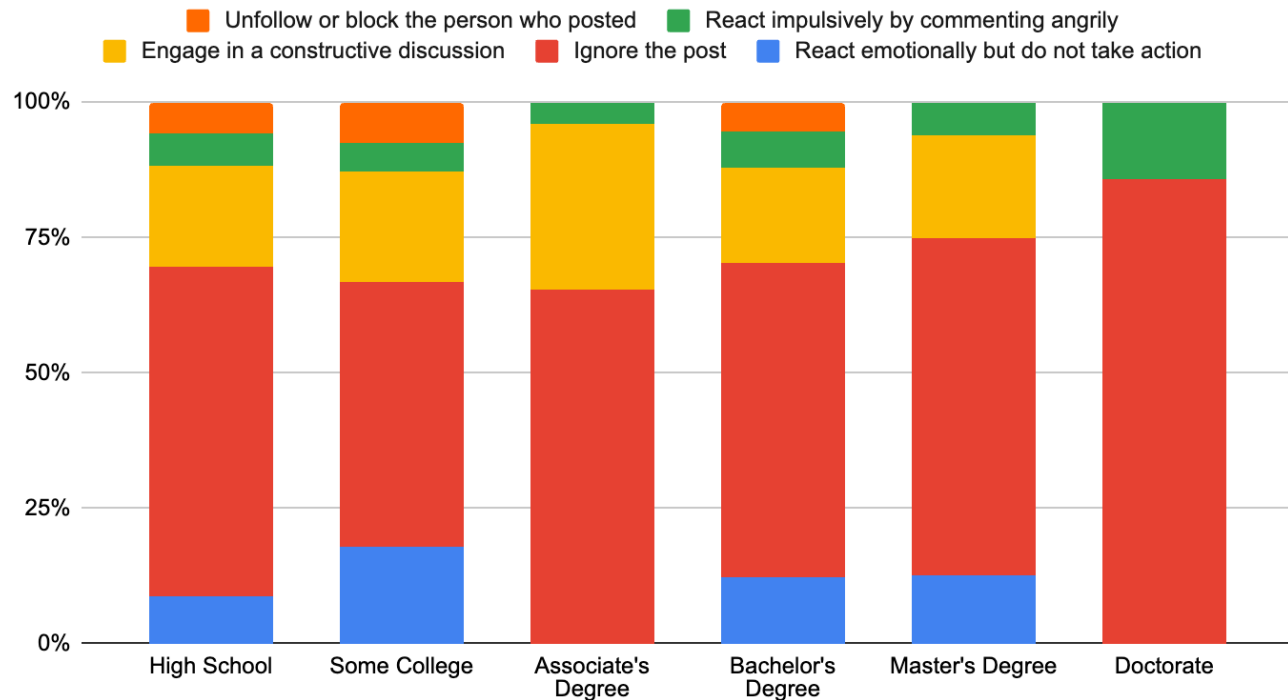
The second hypothesis posited that individuals with higher education levels would respond more critically to social media posts that contradict their beliefs, either assessing the admissibility of the post or engaging in a respectful discussion. This hypothesis was based on the idea that education enhances one's ability to critically think about and analyze issues [14].

The survey results, on the other hand, refuted this hypothesis by revealing a positive correlation between education level and the likelihood of ignoring contradictory posts. Specifically, as shown in Figure 2, the percentage of individuals ignoring the post increased from approximately 50% for those with only a high school education to around 70% for those with a Bachelor's Degree. The rate of ignoring the post increased to approximately 75% for

participants with a Doctorate level of education. These findings suggested that higher education does not necessarily lead to more critical engagement with opposing views on social media. Rather, it may be associated with a greater tendency to ignore these posts altogether.

**Figure 2**

### Education Level and Response to Controversial Social Media Content



### **Hypothesis 3: Social Media Usage and Information Trust**

The third hypothesis suggested that increased daily usage of social media is inversely related to the willingness to check the authenticity of news articles, hence increasing the likelihood of sharing fake news. The rationale was that people who are constantly connected may become overwhelmed by the sheer volume of information encountered, leading to mental fatigue. As a result, they may be less likely to verify the information they see or read, a phenomenon observed in prior research [15].

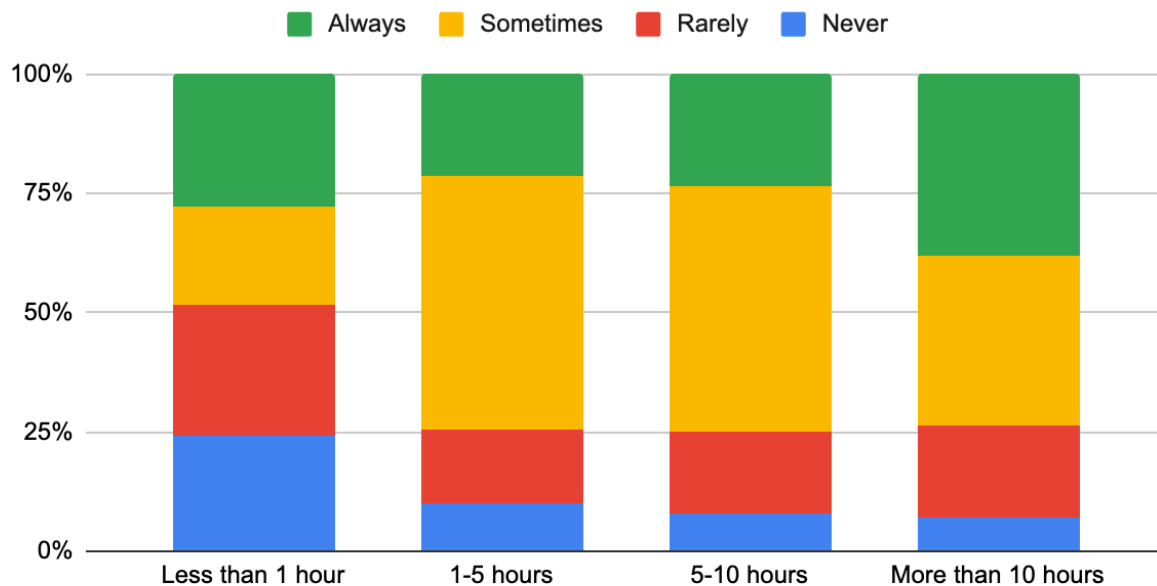
As demonstrated in Figure 3, the hypothesis that increased daily social media usage is inversely related to the willingness to fact-check information is not supported. For users who spent less than one hour on social media, 25% reported never fact-checking, while about 50% claimed to always fact-check. However, as social media usage increased to one to five hours, the percentage of users who sometimes fact-checked rose to approximately 50%, and the percentage of individuals reporting that they never fact-checked decreased slightly to around 15%.

Even among those using social media for more than 10 hours daily, the percentage of individuals who reported that they never fact-checked remained stable at about 15%, and the percentage of individuals who reported that they always fact-checked stayed consistently

around 30% across all usage levels. This data indicated that as social media use increased, there was not necessarily a significant decline in fact-checking behavior, challenging the proposed hypothesis. Instead, this increase may have been due to some users maintaining consistent fact-checking behaviors, regardless of the time spent online.

**Figure 3**

### Frequency of Social Media Use and Frequency of Fact Checking



#### **Hypothesis 4: Fact-Checking Habits and Misinformation Awareness**

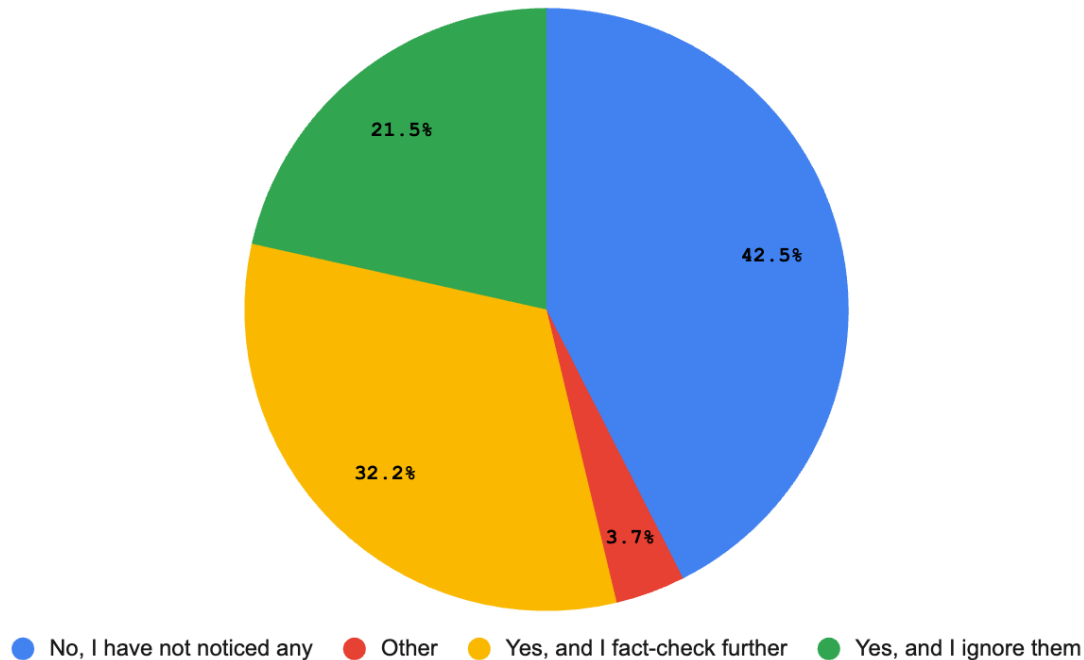
The fourth hypothesis posited that individuals who frequently encounter content warnings or fact-check notifications on social media would be more likely to flag any posts they believe to be fake news. This hypothesis was built on the assumption that having information about fact-checking tools reduces post-release reactions in reporting fake news [16].

These results supported this hypothesis, as 2.2% of users who noticed these labels, demonstrated in Figure 4, actively fact-checked the information presented to them. This finding aligns with the hypothesis, suggesting that exposure to fact-check labels indeed encourages users to scrutinize the content they encounter.

Further, 42.5% of participants reported that they did not observe any fact-checking labels or content warnings, which may be indicative of a gap in information. In contrast, 21.5% of the users admitted to seeing the labels and intentionally ignoring them, while 3.7% of participants stated that they are unclear or have mixed reactions not fitting any other categories.

**Figure 4**

### How People React to Fact Check Labels or Content Warnings



#### ***Hypothesis 5: Echo Chambers and Content Recommendation***

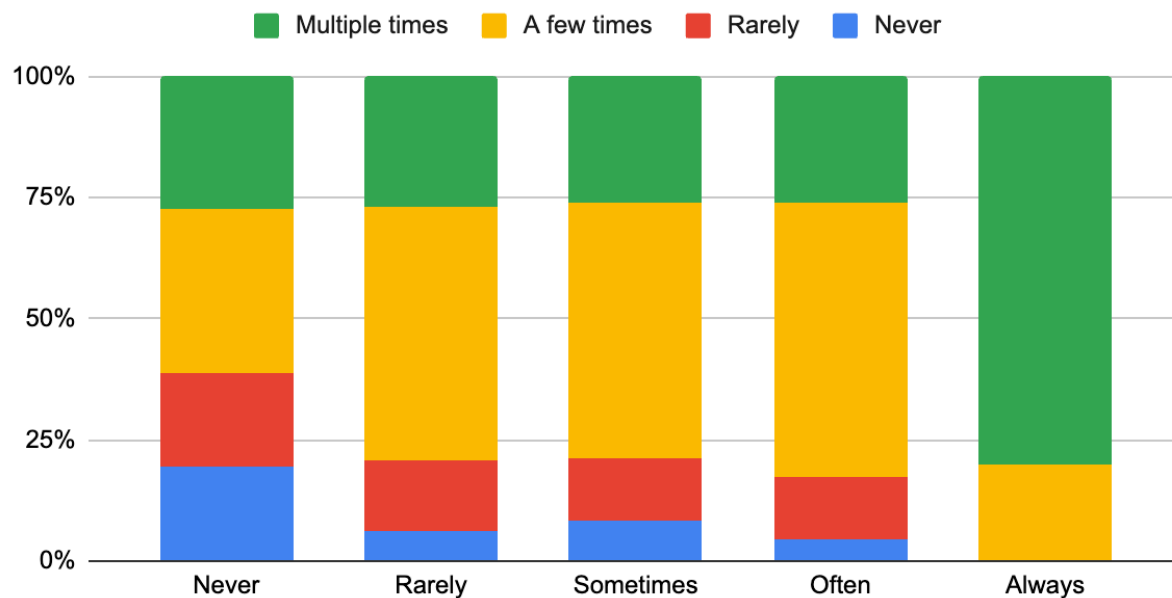
The fifth hypothesis suggested that users who find that social media algorithms recommend content aligning with their preexisting opinions are more likely to avoid new perspectives, thereby reinforcing confirmation bias. The reasoning for this hypothesis was that the processes of algorithmic curation only deepen people's immersion in echo chambers, and research shows a significant correlation between exposure to echo chambers and heightened confirmation bias [17].

This hypothesis, as seen in Figure 5, was supported by data showing that people who engage with content that matches their views are repeatedly exposed to similar content, with a significant percentage (70-75%) reporting that they see similar content multiple times. Meanwhile, participants who reported never engaging with differing political or social views still demonstrated a lower, though still notable, rate of repeated content (around 60%). Users who rarely or sometimes engage with content that aligns with their views reported experiencing a high frequency of repeated content, with about 70% of these users also encountering similar material multiple times.



**Figure 5**

## Frequency of Encountering Similar Content After Engaging with Unique Posts



### Discussion

#### **Hypothesis 1: Age and Information Verification**

The findings from this study provide implications for how various demographic factors influence information verification behaviors on social media. The initial hypothesis suggested that older individuals would be more likely to engage in information verification behaviors, yet the study's findings demonstrated that younger individuals are more inclined to fact-check information from social media.

One potential explanation for this unexpected outcome is the growing levels of media literacy among the youth, who are more accustomed to consulting multiple sources to corroborate the facts [18]. Additionally, the small sample size of older participants in the present study—only 45 individuals—might have affected these results. A larger and more diverse sample of the elderly population could reveal different patterns of verification behavior. Moreover, the study did not account for the specific ways older adults may uniquely interact with social media, such as their generational preferences for content and or their reliance on traditional forms of media, which may affect their fact-checking behaviors. These factors call for further research with a broader and more representative sample of older adults to draw more precise conclusions.

#### **Hypothesis 2: Education and Critical Engagement**

The present study also found that individuals with higher levels of education are more likely to dismiss conflicting social media posts, contrary to the initial hypothesis, which stated that they would critically engage with such material. Several factors could explain why this

hypothesis was not supported by the data. One possible explanation is that people with higher education levels are more likely to have access to up-to-date, reliable sources of information, leading them to see decreased value in engaging with contradictory information on social media.

In addition, limitations in the survey data may have potentially impacted the validity of the results. In particular, a majority of participants (62.5%) in the present study possessed a Bachelor's degree or greater, portraying a potentially insufficient representation of participants from various educational backgrounds. The overrepresentation of highly educated individuals may have introduced bias into the findings, as it potentially underrepresents the perspectives and behaviors of those with lower levels of educational attainment.

Furthermore, those with higher education may be more aware of the biases inherent in social media platforms, causing them to view the information shared online with existing skepticism or disinterest this could result in a tendency to dismiss posts conflicting with their beliefs, not out of a lack of critical engagement, but because they deem it unnecessary to invest time and effort in verifying or debating information consider less relevant.

### ***Hypothesis 3: Social Media Usage and Information Trust***

Regarding social media usage and users' trust in information, the study found that higher social media usage did not significantly reduce the willingness to fact-check, contrary to the hypothesis. One possible reason for the inaccuracy of the hypothesis could be the significantly limited number of responses from individuals reporting heavy social media usage for more than ten hours per week, potentially due to the lack of diversity in participants and, thus, participant responses.

The first three categories ("Less than 1 hour," "1-5 hours," and "5-10 hours") showed a clear trend supporting the hypothesis, with the proportion of users who always fact-check decreasing as usage increased. However, the last category of users utilizing social media for more than ten hours per week failed to follow this trend. This finding suggests that the small sample size of this group may not accurately represent the broader population, and a larger sample size might have provided more consistent support for the proposed hypothesis.

### ***Hypothesis 4: Fact-Checking Habits and Misinformation Awareness***

In addition, results demonstrated that individuals who encountered fact-checking labels or warning messages placed before the posts on social media were more likely to adopt fact-checking behaviors, supporting the hypothesis that exposure to these mechanisms urges users to scrutinize content. Given that 32.2% of users who noticed the fact-check labels and actively fact-checked the information, the data indicates that people who notice fact-check labels on social media are more likely to engage in fact-checking behavior. This suggests that the presence of fact-checking tools on social media can indeed promote awareness and encourage users to verify and report fake news.

The detection of these labels appears to act as a cue, prompting users to reflect on the credibility of the information they encounter. This proactive approach can likely be attributed to the growing sensitivity of social media users to fake news and their desire to prevent its spread. The motivation to engage in fact-checking behavior suggests that fact-check labels are effective in stimulating users to verify information. However, given that 42.5% of users reported that they did not notice any fact checking labels or content warnings at all, this lack of awareness may indicate a need for better visibility or communication of these tools on social media platforms.

As such, social media platforms might benefit from using more prominent and frequent fact-check cues to enhance their effectiveness. Informing users about the importance and use of fact-checking tools could further improve their efficiency. Future studies could explore how the design and placement of these labels influence user behavior, potentially leading to more effective strategies for combating fake news.

### ***Hypothesis 5: Echo Chambers and Content Recommendation***

Finally, the study's findings supported the hypothesis that social media algorithms reinforce confirming bias by exposing users to content that aligns with their preexisting beliefs. The data showed that users engaging with particular content resonating with their beliefs were more likely to encounter the repetition of similar content in their social media feeds. The discovered trend supported the idea of confirmation bias, in which algorithms show content that users have interacted with before, leading to repeated exposure to the same viewpoints. Data revealed that 50-75% of users who engage "sometimes," "often," or "always" with content matching their views were likely to see similar content multiple times, compared to lower rates for "rarely" (50%) and "never" (60%).

These results suggest the reinforcement of echo chambers through algorithmic recommendations, reinforcing confirmation biases and leading to polarization and less open-mindedness [19]. People in these echo chambers are less likely to see and consider opposing views, further entrenching their existing beliefs. To address this issue, social media platforms may benefit from promoting algorithms that show more diverse content and encourage users to explore different viewpoints through prompts and campaigns, reducing the impact of confirmation bias and addressing societal polarization.

### **Limitations and Future Directions**

A major potential limitation of the present study was the small sample groups of participants, particularly concerning older participants and individuals with lower levels of education. The overrepresentation of highly educated participants may have influenced the results, leading to conclusions that do not accurately represent the diversity of behaviors across demographic groups. Future research should aim to involve larger and more diverse participants, especially from older populations and those from varying educational backgrounds, in order to develop a comprehensive understanding of fact-checking behaviors on social media.

Another limitation of the study was the reliance on social media platforms for participant recruitment, which may have introduced selection bias. By primarily engaging individuals who are active on platforms like Facebook, Twitter, and Instagram, the study may have not addressed individuals who are less active on social media or do not utilize these particular social media platforms. This selection bias may have resulted in a sample that is not fully representative of the general population, thus leading to findings that may not be generalizable. Future work should look at alternative means of recruitment, such as participant recruitment from offline sources, to draw up a more representative sample of the population, which would promote more accurate insights into information verification behaviors across diverse user groups.

Additionally, the present study established a preliminary understanding of user interactions with fact-check labels and content warnings. Future research may delve into the effectiveness of these tools by exploring the influence of different designs and increased visibility of these cues on fact-checking behaviors.



## Conclusion

The present study highlights the complexity of information verification behaviors on social media, exploring assumptions about the influence of demographic factors on social media usage on fact-checking behaviors. Despite the original hypothesis, the results showed that age, education level, and social media usage do not align with expected patterns of information verification behaviors, portraying more variations across participant groups. These results suggest that fact-checking behaviors are indeed influenced by unique psychological and demographic factors that must be explored in future research.

Furthermore, these results emphasize the need for continuous adjustments to social media algorithms to address the prevalence of echo chambers and confirmation bias among users. Exposed to diverse sources of information, individuals may achieve a more critical engagement with online content, reducing the spread of misinformation. By continuing to examine these areas, research can contribute to more effective strategies for combating online misinformation, and promoting a more informed and vigilant public.

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