

# Exploring the Nature of the Cyberpsychology Concepts that Apply to COVID-19 Misinformation and Barriers to Health Literacy

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**ABSTRACT:** This study examines the critical role of cyberpsychology in mitigating the spread of COVID-19 and vaccine misinformation on social media which is an urgent global health concern with profound public health implications. Despite being a major conduit for misinformation, social media holds the potential to be part of an integrated solution. Traditional countermeasures, such as content moderation and fact-checking, have struggled to address the cognitive biases and emotional factors fueling misinformation's rapid spread. This research delves into the psychological mechanisms by which individuals process, trust, and share health information in digital spaces by leveraging cyberpsychology, a field that merges psychology, sociology, and computer science insights. This study sheds light on the cognitive, emotional, and social drivers of misinformation. This analysis advances practical, cyberpsychology-based recommendations, developed with contributions from leading experts, to inform future public health strategies. These strategies are not only adaptable but also effective in the increasingly complex digital information landscape, emphasizing the need for such approaches.

**KEYWORDS:** COVID-19 misinformation, Cyberpsychology, Media Psychology, Social Media, Health Misinformation, Digital Health Literacy, Public Health, Health Education, Vaccine hesitancy

## **Introduction**

The Internet's pervasive influence has also shaped behavioral patterns as digital interactions have increasingly supplanted face-to-face communication (Aiken and Gawande 2021; Aiken 2017). This trend was particularly pronounced during the COVID-19 pandemic, where the necessity for physical distancing underscored the dependence on digital platforms for social connection. Social media platforms and other digital tools have largely supplanted traditional forms of communication, with online messaging emerging as the preferred mode for professional and personal exchanges (Ancis 2020).

The widespread dissemination of misinformation surrounding COVID-19 constitutes a profound public health threat that has undermined trust in health and political authorities. Among the most dangerous aspects of this situation has been the circulation of fake news, including erroneous claims that only older adults were at risk from the virus or that ingesting bleach could serve as a cure. Such misinformation is propagated through formal and informal channels, creating widespread confusion and contributing to dangerous health behaviors (Montagni et al. 2021). The proliferation of COVID-19 misinformation on social media has fueled vaccine hesitancy within various communities, posing a serious challenge to public health efforts. This digital misinformation environment has significantly eroded public trust in health information, leading many to question the safety and efficacy of vaccines.

The consequences of COVID-19 misinformation extended beyond mere misunderstandings, manifesting in tangible harm and, in some cases, fatalities (Montagni et al. 2021). Complicating these dynamics was the initial scarcity of knowledge about the virus, contributing to an environment ripe for misinformation. COVID-19 misinformation spread rapidly across social media platforms during the pandemic, a phenomenon attributed to various factors that collectively undermined public health efforts (Bin Naeem and Kamel Boulos 2021).

As the primary information-sharing channels, social media platforms became significant conduits for unreliable COVID-19 information, with analyses indicating that over 40% of posts originated from sources lacking credibility (Bin Naeem and Kamel Boulos 2021). This dynamic was exacerbated by automated accounts or bots, which played a critical role in amplifying false narratives and conspiracy theories.

Media bias and trust issues also played a substantial role in spreading COVID-19 misinformation. Trust in specific media outlets significantly influenced individual behavior and adherence to public health measures, often leading to riskier behavior among those relying on partisan news sources. For example, individuals who trusted highly biased media sources were likelier to dismiss public health guidelines, thus intensifying the public health challenge (Bin Naeem and Kamel Boulos 2021). This fragmentation of trust across media channels complicated efforts to promote consistent public health messaging and fostered environments where misinformation could proliferate unchecked. The slow dissemination of accurate information further compounded these issues; when reliable information was not immediately available, individuals often turned to dubious sources that provided misleading information in real time. The delay in fact-based public health communication and the public's eroding trust in traditional media channels facilitated a fertile environment for misinformation to gain traction (Bin Naeem and Kamel Boulos 2021). Consequently, social media dynamics, digital health literacy deficits, media bias, and public health communication challenges contributed to a complex landscape where misinformation thrived and posed considerable risks to effective pandemic management.

### **Problem statement**

The rapid spread of COVID-19 misinformation on social media has presented a formidable public health challenge, as unreliable sources accounted for over 40% of posts on these platforms, undermining efforts to control the pandemic (Bin Naeem and Kamel Boulos 2021). Bots have significantly amplified false narratives and pseudoscientific claims, further eroding public understanding and trust in health information and the safety of vaccines. This misinformation surge has been compounded by low digital health literacy, leaving many users unable to critically assess the credibility of online sources, leading to the widespread acceptance of misleading content. Traditional interventions, including content moderation and factual correction, have proven inadequate in combating the deeply rooted cognitive biases and emotional responses that drive misinformation sharing. This gap in effective intervention highlights the need for an inquiry into cyberpsychology's potential to address the psychological mechanisms that shape information processing and dissemination behaviors online. By focusing on the cognitive and emotional processes that underpin engagement with misinformation, cyberpsychology offers a novel pathway for developing more responsive and effective public health strategies to mitigate misinformation's impact (Bin Naeem and Kamel Boulos 2021).

### **Originality, Novelty, and Importance of the Inquiry**

This inquiry stands at the intersection of cyberpsychology and public health, offering a novel approach to understanding and addressing the pervasive spread of COVID-19 misinformation through social media. Unlike traditional interventions focusing primarily on content moderation or debunking false claims, this study uniquely emphasizes the cognitive and emotional processes underlying individuals' engagement with misinformation, drawing attention to the mechanisms driving its rapid dissemination and acceptance. By focusing on the psychological and social behaviors associated with misinformation sharing, this research aims to develop targeted, psychologically-informed interventions that resonate with individuals' thought processes and emotional states, thereby advancing a more effective framework for managing the public health threats posed by digital misinformation (Bin Naeem and Kamel Boulos 2021). This work

contributes to the theoretical development of cyberpsychology. It holds significant practical implications for designing public health interventions that adapt to the complexities of digital misinformation in the age of social media.

### **The Importance of Understanding Cyberpsychology**

The field of cyberpsychology is indispensable in navigating the intersection of human behavior and digital environments, offering critical insights into how technology increasingly permeates and reshapes everyday life (Kirwan 2016). With the widespread integration of digital tools and platforms, understanding how these virtual contexts influence behavior, social interactions, and mental health is paramount (Aiken and Gawande 2021; Aiken 2017). Cyberpsychology provides a structured framework to analyze how individuals' personalities and relational dynamics evolve online, illuminating the subtle ways digital contexts shape communication patterns and socialization processes (Ancis 2020). By studying these interactions, researchers can better anticipate individuals' psychological adjustments when engaging with digital technologies, thus deepening our understanding of the effects of prolonged digital immersion on human behavior and interpersonal relationships (Ancis 2020).

Moreover, cyberpsychology plays a pivotal role in addressing the mental health issues associated with digital communication and social media usage, which have surged in recent years. Social media's prevalence has sparked concerns about its potential to exacerbate conditions like anxiety and depression, as well as issues such as cyberbullying, which can have profound psychological impacts (Aiken and Gawande 2021; Aiken 2017). Cyberpsychology is a cornerstone discipline for modern society, committed to ensuring that technology enriches human life, supporting mental well-being and ethical integrity as digital landscapes evolve (Aiken and Gawande 2021; Aiken 2017).

### **Health Belief Model (HBM)**

The Health Belief Model (HBM) is a widely accepted framework in health psychology, describing how individuals' health-related behaviors are influenced by their perceptions of vulnerability, severity of the threat, benefits of preventive action, and barriers to taking that action (Limbu et al. 2022; Raamkumar et al. 2020). These components, particularly perceived susceptibility and severity, are essential to understanding why individuals might believe misinformation or fail to adhere to health guidelines during a crisis. Misinformation can distort these perceptions, skewing risk assessment and undermining public adherence to recommended health behaviors (Limbu et al. 2022; Raamkumar et al. 2020). Current research underscores the significance of critical thinking in enhancing adaptive responses during health crises, enabling individuals to accurately assess the dangers and develop appropriate health beliefs and behaviors (Hita et al. 2023). Moreover, critical thinking reduces maladaptive behaviors like panic buying. It moderates the relationship between media exposure and fear, suggesting that while critical thinking can mitigate fear, its effectiveness is more pronounced at lower levels of media consumption (Hita et al. 2023).

### **Dual-Process Theory**

Dual-Process Theory outlines two distinct thinking processes—System 1, which is fast, automatic, and intuitive, and System 2, which is slow, deliberate, and analytical. During high-stress situations, such as the COVID-19 pandemic, individuals are more inclined to rely on System 1, leading to rapid judgments based on information that may appear intuitive but lacks accuracy (Costa et al. 2022; He et al., 2023; Wong et al., 2021). In such circumstances, misinformation that aligns with pre-existing fears or biases can be more readily accepted, as critical thinking (System 2) is often disengaged. This theory offers insight into the psychological underpinnings of how misinformation gains traction, especially when individuals do not pause to engage in deeper analysis. By

understanding the conditions under which System 1 thinking dominates, public health communication strategies can be tailored to encourage reflective thinking, helping individuals critically evaluate the credibility of information before accepting or sharing it (Costa et al. 2022; He et al. 2023).

### **Social Amplification of Risk Framework (SARF)**

The Social Amplification of Risk Framework (SARF) examines the role of social processes and media in amplifying or attenuating public perceptions of risk (Kasperson et al. 2022; Zhang and Cozma 2022). Within this framework, misinformation on social media is intensified through media repetition, emotional content, and widespread coverage, which can heighten public fear and skew perceptions of health risks. This amplification process can make risks seem more or less severe than they are, often leading to panic or, conversely, to complacency. SARF helps explain how certain narratives about COVID-19 and the vaccines were able to induce widespread anxiety, as emotionally charged misinformation was rapidly shared across platforms, creating a distorted perception of the virus's risks and undermining public compliance with health directives (Kasperson et al. 2022; Zhang and Cozma 2022).

### **Elaboration Likelihood Model (ELM)**

The Elaboration Likelihood Model (ELM), a social psychology theory of persuasion, posits that individuals process persuasive messages through either a central route, which focuses on evidence and logic, or a peripheral route, which relies on superficial cues like perceived credibility or attractiveness (Ahmad Rizal et al. 2022; Saini et al. 2022). When health literacy is low, individuals are more likely to process information via the peripheral route, making them susceptible to misinformation, especially if it appears to come from authoritative sources. In the context of the COVID-19 infodemic, ELM suggests that people overwhelmed by complex health information may turn to peripheral cues rather than evaluating the factual basis of health claims. This model underscores the importance of ensuring that credible information is accessible and easy to understand, thereby promoting central-route processing and reducing the reliance on potentially misleading superficial cues (Ahmad Rizal et al. 2022; Saini et al. 2022).

### **Health Literacy is the Key to Misinformation**

The rapid spread of misinformation termed an "infodemic," emerged as a critical challenge during the COVID-19 pandemic, exacerbating public health risks by encouraging inappropriate behaviors that undermine official health responses and foster public panic and xenophobia (Mheidly and Fares 2020; Chowdhury et al. 2023). This wave of false information, especially on social media platforms, created confusion, making it difficult for the public to discern accurate health information from misleading narratives. The implications of such misinformation are severe, as they compromise the efforts of health authorities and governments to manage the pandemic effectively, hindering compliance with guidelines and leading to erratic public responses (Chong et al. 2020; Chowdhury et al. 2023). Individuals with limited health literacy are particularly susceptible, often struggling to navigate the abundance of misinformation, which, in turn, heightens their vulnerability to harmful behaviors stemming from misinformed actions. The pervasiveness of the infodemic underscores an urgent need for targeted strategies to combat misinformation and reinforce public trust in credible health guidance (Chong et al. 2020; Chowdhury et al. 2023).

Health literacy, therefore, plays a pivotal role in shaping public responses to the pandemic, influencing how well individuals comprehend and act upon COVID-19-related information (Abdel-Latif 2020; Clemente-Suárez et al. 2022; Mian and Khan 2020; Caceres et al. 2022). Higher health literacy enables individuals to understand complex health guidance and distinguish credible information from falsehoods, promoting informed health decisions and

adherence to preventive measures, including becoming vaccinated. Those with adequate health literacy are better equipped to follow public health guidelines, including mask-wearing, social distancing, and vaccination, thus actively mitigating the spread of the virus. In contrast, individuals with lower health literacy may underestimate the severity of COVID-19, leading to poor adherence to safety protocols and, consequently, a heightened risk of infection (Abdel-Latif 2020; Clemente-Suárez et al. 2022; Mian and Khan 2020; Caceres et al. 2022). Enhancing health literacy, therefore, is essential for empowering individuals to make informed health decisions and crucial for equitable and effective public health responses in future crises, as it strengthens community engagement and fosters collective resilience.

### **Data Collection and Results**

Data was collected from a focus group of 12 participants. Each member is a highly qualified subject matter expert with advanced knowledge in fields crucial for understanding and tackling the psychological and cyber-psychological challenges of COVID-19 misinformation on social media. All twelve participants hold graduate degrees in psychology-related disciplines, showcasing their robust foundation in human cognition, behavior, and mental processes.

Two participants had graduate education in cyberpsychology, a field that provides unique insights into digital behaviors and online interactions that amplify misinformation. Their expertise is instrumental in developing interventions that effectively counter misinformation on social media. Another two participants hold advanced degrees in neuropsychology, offering a deep understanding of the neurological mechanisms that influence susceptibility to misinformation and cognitive biases. This knowledge is invaluable for identifying and mitigating the mental triggers that drive misinformation acceptance.

Additionally, two participants had advanced degrees in media psychology, which examines how media content influences perceptions, emotions, and behaviors. Their expertise allows nuanced analysis of how misinformation shapes public sentiment and trust in health information. The remaining six participants, with graduate degrees in clinical psychology, ground the group in a comprehensive understanding of mental health and emotional responses. This reassures the audience of the group's ability to address the fear, anxiety, and cognitive biases that make individuals vulnerable to misinformation.

This group of experts is exceptionally well-equipped to provide evidence-based best practices for countering misinformation. The value of the results is the ability to leverage their interdisciplinary expertise, which spans cyberpsychology, neuropsychology, media psychology, and clinical psychology, to address the complex psychological dynamics in spreading and accepting COVID-19 misinformation on social media.

### **Focus Group Question**

*"Given the challenges posed by COVID-19 misinformation on social media, including its amplification through bots, low digital health literacy, and the influence of cognitive biases and emotional responses, what innovative and practical solutions can we implement to improve public digital health literacy, build trust in credible health information, and effectively counter the spread of misinformation?"*

### **The group brainstormed and created this master list of practical and actionable recommendations:**

1. Develop interactive digital literacy programs to improve users' abilities in discerning credible sources, verifying information, and recognizing misinformation cues.
2. Introduce gamified fact-checking tools that reward users with points or badges for accurately identifying misinformation, engagingly reinforcing digital literacy.

3. Launch bias awareness campaigns to educate the public on cognitive biases, like confirmation bias, and help them recognize how biases affect their interpretation of health information.
4. Use emotionally balanced messaging to counteract the emotional triggers of misinformation, ensuring that public health messages are processed more analytically.
5. Establish networks of trusted “digital health ambassadors” who can share credible health information within their communities, enhancing social influence on credible information.
6. Encourage respectful community moderation on social media platforms to identify and address misinformation constructively.
7. Collaborate with social media platforms to implement AI-powered, real-time fact-checking tools that detect misinformation and provide immediate corrective information.
8. Integrate in-app prompts on social media that encourage users to verify the source of vaccine-related information before sharing.
9. Tailor health campaigns to use central and peripheral messaging routes to engage audiences with varying interest levels and critical thinking capacities.
10. Leverage visual storytelling and infographics to highlight the impact of misinformation, making data accessible and engaging for peripheral processors.
11. Implement community-driven misinformation reporting systems, allowing users to report suspicious content for further evaluation by health organizations and moderators.
12. Involve community members in developing health content to ensure messages resonate culturally and linguistically, increasing their acceptance.
13. Design health campaigns with emotionally intelligent messaging that uses positive framing to counteract misinformation’s emotional impact.
14. Create empathy-based health messages that acknowledge public fears, build trust, and reduce receptiveness to emotionally charged misinformation.
15. Conduct digital health literacy workshops to teach practical skills like identifying misinformation and evaluating source credibility.
16. Partner with social media platforms to develop real-time misinformation detection and labeling algorithms, slowing misinformation spread.
17. Establish local health ambassador networks to share accurate health information and reinforce community trust.
18. Create crowdsourced reporting channels for users to flag misinformation, empowering communities to manage misinformation collaboratively.
19. Develop bias recognition training to help users identify cognitive biases that increase susceptibility to misinformation.
20. Provide personalized corrective feedback to users who engage with misinformation, encouraging self-reflection and critical processing.
21. Support research on digital behavior and misinformation to develop cyberpsychology-informed interventions.
22. Partner with tech companies to study how platform features affect misinformation spread, leading to better user engagement without misinformation amplification.
23. Tailor health messages for different processing styles, using detailed content for central processors and simplified messages for peripheral processors.
24. Use infographics and visual storytelling to communicate data effectively, catering to users who rely on visual cues.
25. Implement feedback loops on health information campaigns, allowing users to report issues or rate helpfulness to adapt the content in real-time.
26. Deploy Natural Language Processing (NLP) algorithms to identify misinformation patterns and alert users of potentially inaccurate content.
27. Implement bot detection algorithms to identify and limit bot-driven misinformation, slowing automated misinformation spread.
28. Use network analysis tools to visualize and disrupt misinformation clusters driven by bots.
29. Incorporate behavioral nudges on social media, such as verification prompts, to encourage users to think critically before sharing information.
30. Integrate a credibility rating system on posts, allowing users to rate the accuracy of health information and adjust content visibility accordingly.

31. Develop AR-driven health literacy modules that guide users through myths and facts interactively.
32. Use virtual AR simulations to demonstrate misinformation's real-world impacts, enhancing understanding through visual experiences.
33. Implement sentiment analysis tools to adjust health messaging based on public emotions, reassuring when fear levels are high.
34. Categorize misinformation triggers with sentiment analysis to craft emotionally responsive health campaigns.
35. Use machine learning to deliver personalized health information based on user preferences, enhancing trust in credible content.
36. Create predictive models to identify users vulnerable to misinformation, directing them to tailored health literacy resources.
37. Develop interactive fact-checking games to increase digital literacy through engaging simulations.
38. Offer quizzes on misinformation detection that reward users with badges or incentives, fostering a vigilant community.
39. Blockchain technology can be used to authenticate health information sources, making it easier to verify content authenticity.
40. Establish decentralized trust networks on blockchain for healthcare professionals to share verified information securely.
41. Create training programs for healthcare influencers focused on cyberpsychology principles, enabling them to communicate credible information effectively.
42. Use AI to optimize influencer outreach strategies based on engagement metrics, enhancing accurate information dissemination.
43. Implement comprehensive user reporting systems on social media for misinformation, with AI prioritizing severe cases for fact-checking.
44. Adapt health communication strategies based on user engagement and feedback trends, ensuring content remains relevant and effective.

## **Conclusion**

This inquiry's integration of cyberpsychology with public health represents an innovative approach to understanding the rapid spread of misinformation and offers a comprehensive framework that moves beyond traditional solutions (Bin Naeem and Kamel Boulos 2021). The study draws on insights from psychology, sociology, and computer science to uncover the social and psychological behaviors that fuel misinformation by dissecting how individuals process, trust, and propagate information within digital spaces. Unlike existing strategies, this research emphasizes the cognitive and emotional processes that drive engagement with misinformation, making it uniquely positioned to address the limitations of past interventions. The contributions of this work extend beyond theory, holding substantial practical implications for crafting public health strategies that adapt to the intricacies of digital misinformation in an era dominated by social media. This research advances the discourse on cyberpsychology's role in combating misinformation, paving the way for more effective, evidence-based public health responses that align with individuals' psychological needs and digital behaviors.

## **The Darrell Norman Burrell Practical Digital Health Literacy Framework**

Based on the data collection and analysis, this framework was developed to address the pervasive challenge of digital health misinformation by leveraging insights from cyberpsychology. By focusing on the cognitive and emotional aspects of misinformation engagement, the framework provides a robust, multi-layered approach for public health practitioners, educators, and digital platforms to enhance digital health literacy, build resilience against misinformation, and promote informed health behaviors.

## **1. Interactive and Engaging Digital Literacy Education**

1. Develop comprehensive digital literacy programs that teach users to discern credible sources, verify information, and recognize cues associated with misinformation.
2. Create gamified fact-checking tools that reward users for correctly identifying misinformation, making digital literacy learning engaging and reinforcing critical evaluation skills.
3. Conduct digital health literacy workshops to educate the public on identifying misinformation, evaluating credibility, and understanding cognitive biases that affect information processing.
4. Develop interactive AR-driven health literacy modules and virtual simulations to help users navigate myths and facts, visually illustrating the real-world impacts of misinformation.

## **2. Cognitive Bias Awareness and Emotionally Intelligent Messaging**

5. Launch bias awareness campaigns highlighting cognitive biases, such as confirmation bias and the bandwagon effect, contribute to susceptibility to misinformation.
6. Design emotionally balanced health messaging to counteract misinformation's emotional triggers, helping the public process information more analytically.
7. Use empathy-based content that acknowledges public fears and concerns, builds trust, and reduces receptivity to emotionally charged misinformation.
8. Develop bias recognition training resources to guide users through identifying cognitive biases, enhancing self-awareness, and critical engagement with information.

## **3. Trusted Networks and Community Moderation for Credible Information Sharing**

9. Establish networks of trusted "digital health ambassadors" who share credible health information within their communities, enhancing social influence on accurate information dissemination.
10. Encourage community-driven moderation on social media platforms, training moderators to address misinformation constructively and collaboratively.
11. Involve community members in developing health messages to ensure cultural and linguistic relevance, increasing acceptance and trust in public health information.

## **4. Real-Time Detection and Corrective Feedback Mechanisms**

12. Collaborate with social media platforms to deploy AI-powered, real-time fact-checking tools that detect and correct misinformation as it is posted.
13. Integrate prompts on social media that encourage users to verify the credibility of vaccine-related information before sharing, reducing the spread of impulsive misinformation.
14. Implement bot detection and network analysis tools to identify and limit bot-driven misinformation clusters, slowing the spread of automated false narratives.

## **5. Emotionally Responsive, Data-Driven Health Campaigns**

15. Sentiment analysis can adjust health messaging based on public emotions, providing tailored reassurance when high levels of fear or anxiety are detected.
16. Categorize misinformation triggers with sentiment analysis to craft campaigns that address specific emotional drivers of misinformation acceptance.
17. Develop empathy-focused, visually engaging health campaigns using infographics and data visualizations to simplify complex health information and resonate with a broad audience.

## **6. Personalized Information Delivery and Engagement Feedback Loops**

18. Machine learning can deliver personalized health information based on user preferences, build trust in credible content, and improve information retention.



19. Create predictive models to identify users vulnerable to misinformation, guiding them toward curated health literacy resources.
20. Implement dynamic feedback loops that allow users to report issues, rate content helpfulness, and provide feedback, allowing health campaigns to be adapted in real-time.

### **7. Innovative Technology-Driven Approaches to Strengthen Digital Health Resilience**

21. Blockchain technology can authenticate health information sources, providing a verifiable record of credible information and enhancing transparency.
22. Establish decentralized trust networks for healthcare professionals to share verified health information securely, ensuring reliability and fostering public confidence.
23. Develop and offer quizzes or gamified challenges on misinformation detection, awarding badges or incentives to encourage vigilance and active participation in digital health literacy.

### **8. Training and Optimization for Health Information Influencers**

24. Create specialized training programs for healthcare influencers on cyberpsychology principles, equipping them to communicate accurate health information effectively.
25. Use AI to track influencer engagement and optimize outreach based on metrics like reach and content shares, amplifying accurate information dissemination.

The Darrell Norman Burrell Practical Digital Health Literacy Framework provides a comprehensive approach that combines digital education, bias awareness, community-based strategies, real-time corrections, and cutting-edge technologies. It underscores the critical need to understand cognitive and emotional processes in combating misinformation, paving the way for public health strategies that are responsive, adaptable, and resilient in the face of evolving digital challenges.

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