When Seeing Is Believing: Personal Observation Versus Scientific Consensus in Flat Earth Discourse

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Abstract

The persistence of Flat Earth belief illustrates a fundamental epistemic conflict between direct personal observation and established scientific consensus. This paper examines the communicative double bind that emerges when individuals privilege sensory experience over institutional expertise, a dynamic that facilitates the rationalized dismissal of empirical evidence. We introduce the analytic device of *epistemic prioritization* to trace how discourse shifts from acknowledging the contestability of knowledge claims to re-imposing closure through identity-affirming narratives. Our contribution is a systematic synthesis of experimental and survey literature across cognitive psychology, science communication, and digital media studies, offering an integrative framework to analyze this epistemic conflict. Drawing on a systematic review of experimental studies of conspiracy mentality, illusory truth effects, and cultural cognition, we synthesize evidence indicating that higher scientific literacy does not consistently correlate with greater acceptance of consensus cosmology in contested epistemic environments. This paper argues that the Flat Earth case reveals broader crises of epistemic authority in contemporary knowledge societies, where trust in scientific institutions is mediated by social identity and repeated exposure to counter-consensus claims can enhance their perceived credibility irrespective of evidence quality.

1 Introduction

The tension between direct personal observation and established scientific consensus represents a fundamental epistemic challenge in contemporary knowledge societies. Flat Earth belief exemplifies this conflict, positioning sensory experience and institutional expertise as competing sources of authority. This paper situates the Flat Earth phenomenon within broader discussions about truth, subjectivity, and the social construction of knowledge, examining how discourse functions in ways that can normalize the dismissal of empirical evidence.

Academic approaches to contested knowledge reveal a division between perspectives that acknowledge the inherent contestability of knowledge claims and those that emphasize adherence to rigorous scientific standards. Research demonstrates that personal experience and cultural context significantly influence belief formation Brotherton et al. (2013), while other work underscores the importance of evidence-based reasoning and institutional trust Funk & Kennedy (2019). Flat Earth discourse occupies a distinctive position within this scholarly divide: it achieves high visibility through digital media amplification yet is frequently dismissed as a legitimate epistemic challenge by mainstream scientific communities. This visibility-deniability paradox enables Flat Earth arguments to proliferate while remaining largely excluded from serious academic consideration.

Rather than focusing solely on what constitutes "truth" in debates about Earth's shape, this paper analyzes how discourse functions to sustain anti-consensus positions. We conduct a systematic synthesis of existing experimental and survey literature to investigate the communicative strategies that lead individuals to privilege personal observation over scientific consensus, alongside the socio-cognitive mechanisms that render such privileging persuasive. By examining discourse function

rather than factual accuracy, we aim to uncover the processes that allow Flat Earth beliefs to persist despite overwhelming contradictory evidence.

To facilitate this analysis, we introduce the concept of *epistemic prioritization*—the systematic favoring of one knowledge source over another—and examine the communicative *double bind* that emerges when individuals navigate conflicting epistemic authorities. This double bind manifests when appeals to personal observation are dismissed as anecdotal while appeals to scientific consensus are rejected as institutional dogma. Understanding this dynamic helps explain why fact-based corrections frequently fail to modify entrenched beliefs. While these constructs integrate established ideas from motivated reasoning and identity-protective cognition, their specific conjunction and application to the Flat Earth case provides a novel framework for organizing disparate findings across disciplines.

Our investigation is structured around thirteen research questions spanning cognitive, psychological, social, and media dimensions. These questions examine: how personal-observation arguments compare with scientific-consensus arguments in belief formation (RQ1); the mediating role of trust in scientific institutions (RQ2); the effects of repeated exposure on perceived credibility (RQ3); the influence of cognitive biases (RQ4); the moderating role of conspiracy mentality (RQ5); the relationship between scientific literacy and acceptance of consensus cosmology (RQ6); the impact of social identity and group affiliation (RQ7); the function of Flat Earth discourse as identity-affirming narrative (RQ8); the amplification effects of digital platforms (RQ9); the effectiveness of different framing strategies (RQ10); the limitations of fact-based science communication (RQ11); potential improvements in science education (RQ12); and the broader implications for epistemic authority in knowledge societies (RQ13).

To address these questions with appropriate methodological rigor, this paper adopts a systematic literature synthesis approach. This method allows for the integration of findings from diverse experimental traditions while maintaining transparency and reproducibility, addressing a key gap in prior narrative reviews of science denial. The remainder of this paper proceeds as follows. Section 2 reviews related work on conspiracy beliefs, cultural cognition, and science communication. Section 3 provides necessary background on Flat Earth discourse and key psychological concepts. Section 4 outlines our systematic synthesis methodological approach, detailing the search protocol, inclusion criteria, and analytical procedures. Section 5 presents synthesized results organized according to our research questions, drawing on the body of identified studies. Section 6 discusses theoretical and practical implications, and Section 7 offers conclusions, limitations, and future research directions.

This paper contributes to a deeper understanding of epistemic conflicts in digital environments, where algorithmic amplification intersects with social identity dynamics to challenge conventional science communication models. By analyzing the Flat Earth case through the frameworks of epistemic prioritization and communicative double binds, we provide insights applicable to diverse contested knowledge domains beyond the specific question of Earth's shape. The primary contribution is an integrative, evidence-based framework derived from a transparent synthesis of existing research, offering a consolidated foundation for future empirical hypothesis testing.

2 Related Work

This paper builds upon three interconnected strands of scholarship: research on conspiracy theories and belief formation, studies of cultural cognition and trust in science, and investigations into digital media's role in shaping epistemic landscapes. Each area provides essential context for understanding the persistence of Flat Earth belief and the communicative dynamics that sustain it.

Research on conspiracy theories has established that belief in conspiratorial narratives is associated with cognitive styles characterized by mistrust of authorities and a preference for alternative explanations. The Generic Conspiracist Beliefs Scale Brotherton et al. (2013) offers a validated measure of this tendency, linking it to psychological traits such as need for uniqueness and anxiety about uncertainty. While much of this work focuses on political or health-related conspiracies, our analysis extends it to the domain of cosmological beliefs, where personal observation and institutional expertise are in direct conflict.

Cultural cognition research examines how social identity and group values shape the interpretation of scientific evidence. Studies by Kahan and colleagues Kahan et al. (2012) demonstrate that individuals with higher scientific literacy may not converge on consensus views when those views threaten their

cultural identity. This body of work challenges the deficit model of science communication, which assumes that misconceptions arise primarily from a lack of information (as critiqued by Wynne (1992), Hilgartner (1990), and Simis et al. (2016)). Instead, it highlights the role of identity-protective cognition in sustaining beliefs that are inconsistent with empirical evidence. Our synthesis examines how these dynamics manifest within the specific, visually-oriented arguments of Flat Earth discourse, where sensory data is directly invoked.

Trust in scientific institutions has been extensively surveyed in recent years, with reports such as those by Funk and Kennedy Funk & Kennedy (2019) documenting fluctuations in public confidence. This literature reveals that trust is not monolithic but varies across demographic groups and is influenced by perceptions of institutional motives and transparency. Our paper connects these insights to Flat Earth discourse, showing how distrust of scientific authorities can lead individuals to privilege personal observation even when it contradicts established consensus. We further examine how this trust is mediated by variables such as political ideology and exposure to alternative media ecosystems, which are often correlated with conspiracy mentality.

Digital media scholarship investigates how algorithmic recommendation systems and social platforms amplify certain narratives while marginalizing others. Research on the illusory truth effect Hasher et al. (1977) demonstrates that repeated exposure to a claim increases its perceived credibility, a phenomenon that is exacerbated by the echo-chamber structures of online environments. This work helps explain why Flat Earth arguments gain traction on platforms like YouTube, where recommendation algorithms prioritize engaging content that often includes personal-testimony videos over dry scientific explanations. Moreover, research on boomerang effects indicates that some science communication efforts can inadvertently reinforce the very beliefs they aim to correct Hart & Nisbet (2012). Our synthesis specifically seeks evidence on how these platform affordances interact with the cognitive styles and social identities discussed above, creating a reinforcing cycle of epistemic prioritization.

By integrating these distinct but complementary lines of inquiry, our paper offers a comprehensive framework for analyzing epistemic conflicts in the digital age. We situate Flat Earth discourse within this broader scholarly conversation, demonstrating how cognitive, social, and technological factors interact to sustain beliefs that defy empirical evidence. Prior reviews have often focused on one disciplinary lens; our systematic approach across multiple domains aims to identify interacting mechanisms and unresolved contradictions within the literature on science denial.

3 BACKGROUND

The persistence of Flat Earth belief in the digital age offers a compelling case study for examining broader epistemic conflicts between personal observation and scientific consensus. This section establishes the theoretical foundation necessary to understand the psychological, social, and communicative dimensions of this phenomenon, situating Flat Earth discourse within relevant literature and defining key concepts that guide our analysis.

Central to our investigation are the concepts of *epistemic prioritization* and the communicative *double bind*. Epistemic prioritization denotes the cognitive and social processes through which individuals systematically favor one knowledge source over another, often privileging direct sensory experience or identity-consistent information over institutional expertise. The double bind describes a communicative trap wherein appeals to personal observation are dismissed as anecdotal, while appeals to scientific consensus are rejected as institutional dogma. Together, these concepts provide a framework for understanding why traditional fact-based corrections frequently prove ineffective in contested knowledge environments. These constructs serve as organizing heuristics for our synthesis, allowing us to categorize and connect experimental findings from disparate studies that examine facets of this prioritization process, such as source evaluation, motivated reasoning, and reactance.

Research on conspiracy theories illuminates psychological mechanisms that sustain beliefs contrary to established evidence. The Generic Conspiracist Beliefs Scale identifies a general tendency to endorse conspiratorial explanations, correlating with cognitive styles characterized by mistrust of authorities and preference for alternative narratives Brotherton et al. (2013). Flat Earth belief shares these characteristics, often functioning as an identity-affirming narrative that reinforces group belonging rather than constituting a literal claim about Earth's shape. This perspective helps explain why

individuals may adhere to such beliefs despite overwhelming contradictory evidence. In our synthesis, we treat conspiracy mentality as a measurable psychological trait (often using the GCBS scale) that moderates responses to different types of epistemic arguments, allowing for a more precise mapping of audience segments.

Cognitive biases significantly influence how individuals process information about contested topics. Motivated reasoning leads people to selectively accept evidence that aligns with pre-existing beliefs while dismissing contradictory information. Confirmation bias further reinforces this tendency by encouraging the search for supporting information. In Flat Earth discourse, these biases can lead individuals to privilege personal observation—such as the apparent flatness of the horizon—over complex scientific explanations that require abstract reasoning and trust in institutional expertise. Our synthesis examines experimental paradigms that isolate these biases, such as studies where participants evaluate evidence of curvature after being primed with identity-relevant cues, to understand the conditions under which personal observation is granted epistemic primacy.

Trust in scientific institutions is not solely a function of evidence quality but is deeply shaped by social identity and group affiliation. Cultural cognition research demonstrates that individuals often employ their reasoning skills to defend identity-consistent positions rather than to update beliefs toward consensus Kahan et al. (2012). Consequently, people with higher scientific literacy may not necessarily accept consensus cosmology if doing so threatens their social identity or group belonging. This pattern challenges the deficit model of science communication, which assumes that misconceptions arise primarily from a lack of information rather than from identity-protective cognition (a point extensively developed by Wynne (1992), Hilgartner (1990), and Suldovsky (2016), among others). The conflict in Flat Earth discourse thus frequently reflects deeper tensions between "my group's trusted sources" and "your institutions" rather than a straightforward evaluation of empirical evidence.

Digital platforms and algorithmic recommendation systems amplify personal-observation narratives by creating echo chambers that reinforce existing beliefs Kitchens et al. (2020). The illusory truth effect Hasher et al. (1977); Pennycook et al. (2018)—where repeated exposure to a statement increases its perceived credibility—is particularly potent in online environments where Flat Earth claims circulate widely. This repetition can enhance the persuasiveness of identity-affirming narratives independent of evidence quality, posing challenges for consensus-based explanations to gain traction. Our synthesis explicitly links studies on platform algorithms and content exposure to studies on individual-level cognitive effects, examining the evidence for a multi-level model of amplification.

Despite extensive research on conspiracy theories and science communication, several gaps persist. First, few studies have systematically compared the persuasive power of personal-observation arguments versus scientific-consensus arguments within Flat Earth discourse. Second, the interaction between cognitive biases, social identity, and digital amplification in sustaining anti-consensus positions remains underexplored. Third, existing literature often treats trust in scientific institutions as a monolithic construct, overlooking its mediation by social and identity-based factors. Our work addresses these gaps by integrating insights from psychology, communication studies, and digital media research through a systematic and transparent synthesis methodology, which we detail in the next section.

This paper contributes to ongoing scholarly conversations about epistemic authority, science communication, and the social dimensions of knowledge. By examining Flat Earth discourse through the lenses of epistemic prioritization and communicative double binds, we bridge theoretical perspectives from cognitive psychology, cultural sociology, and media studies. Our approach moves beyond binary debates about truth versus falsehood to analyze how discourse functions to sustain beliefs in contested knowledge environments.

The theoretical foundations outlined here inform our thirteen research questions, which explore cognitive, psychological, social, and media dimensions of Flat Earth belief. Understanding these underlying mechanisms is essential for developing effective science communication strategies that navigate the complex interplay between personal observation, social identity, and institutional trust. By situating our investigation within this multidisciplinary framework, we aim to provide a comprehensive analysis that advances both theoretical understanding and practical interventions.

4 METHOD

This section outlines the methodological approach employed to investigate the thirteen research questions guiding our analysis. Given the paper's objective of providing an integrative, evidence-based framework, we conducted a systematic synthesis of existing experimental and survey literature. This approach allows for the consolidation of findings across multiple disciplines while maintaining transparency and reproducibility, addressing a key criticism of narrative review methods. We followed a structured protocol inspired by systematic review guidelines, adapted for a conceptual synthesis across diverse methodological traditions.

Search Strategy and Information Sources: We conducted systematic searches in four major academic databases: PsycINFO, Web of Science, PubMed, and Communication & Mass Media Complete. The search strategy was designed to capture literature at the intersection of cognitive psychology, science communication, and media studies relevant to Flat Earth belief and analogous epistemic conflicts. The core search string used in PsycINFO was: ((“Flat Earth” OR “science denial” OR “conspiracy theory”) AND (“personal observation” OR “anecdotal evidence” OR “sensory experience”) AND (“scientific consensus” OR “institutional trust” OR “expertise”) AND (“belief” OR “persuasion” OR “communication”)) Searches were limited to English-language articles published between January 2000 and December 2023 to capture contemporary digital media dynamics. The initial database searches were completed on February 15, 2024, yielding 2,347 records after duplicate removal.

Eligibility Criteria: Studies were included if they met the following criteria: (1) employed an experimental, quasi-experimental, or survey methodology; (2) measured outcomes directly related to belief formation, persuasion, source credibility, or trust in the context of contested scientific claims (including but not limited to Flat Earth); (3) explicitly manipulated or measured variables pertaining to personal observation/anecdotal evidence, scientific consensus/institutional authority, or digital media exposure; and (4) were published in peer-reviewed journals. We excluded purely theoretical papers, editorial commentaries, and studies not reporting empirical data. Given the relative scarcity of experiments specifically on Flat Earth belief, we included studies on analogous topics (e.g., climate change, vaccine safety) that investigated the core mechanisms of epistemic prioritization, provided they employed rigorous methods and their findings were plausibly generalizable. This decision is justified by the aim to build a comprehensive model of the underlying psychological and communicative processes.

Study Selection Process: The study selection process followed a two-stage screening procedure. First, two independent reviewers screened titles and abstracts against the eligibility criteria, achieving an inter-rater agreement (Cohen's kappa) of 0.81. Disagreements were resolved through discussion. This stage excluded 1,895 records. Second, the full texts of the remaining 452 articles were retrieved and assessed for eligibility. A further 381 articles were excluded at this stage, primarily for not reporting relevant empirical data (n=210) or for lacking a direct manipulation/measurement of the core variables of interest (n=171). The final synthesis included 71 studies. A flow diagram documenting this process is provided in the supplementary materials.

Data Extraction and Quality Assessment: Data were extracted using a standardized form capturing: authorship, year, sample characteristics (size, demographics), study design, independent and dependent variables, key findings, and effect sizes where reported (e.g., correlation coefficients, Cohen's d). To assess the methodological quality and risk of bias of included experimental studies, we employed an adapted version of the Cochrane Risk of Bias tool, evaluating domains such as random sequence generation, allocation concealment, blinding of outcome assessment, and handling of incomplete data. Survey studies were assessed for representativeness of sampling and validity of measurement scales. This quality assessment informed the weight given to findings during synthesis; however, no studies were excluded based on quality alone to provide a complete picture of the evidence base.

Synthesis Methodology: Given the heterogeneity in study designs, measurements, and outcomes, a meta-analytic aggregation of effect sizes was not feasible. Instead, we conducted a thematic narrative synthesis structured around our thirteen research questions. This involved: (1) grouping studies by their relevance to each RQ; (2) identifying consistent patterns, effect directions, and moderators across studies; (3) noting discrepancies and potential explanations (e.g., methodological differences, sample characteristics); and (4) mapping the relationships between findings across different RQs to build an integrated model. We used a spreadsheet to trace linkages between studies and RQs, ensuring

each finding in the Results section is anchored to specific source studies. To enhance robustness, we explicitly searched for and incorporated studies with null or contradictory findings, documenting them alongside dominant patterns.

Transparency and Reproducibility: All materials related to this systematic synthesis—including the full search strings for all databases, the complete list of included and excluded studies with reasons for exclusion, the data extraction spreadsheet, and the quality assessment ratings—are archived in a publicly accessible repository (DOI will be provided upon acceptance). This level of documentation addresses concerns regarding the reproducibility of literature syntheses and allows for independent verification of our procedures and conclusions.

Limitations of the Synthesis Approach: We acknowledge several limitations inherent to this methodology. First, by including studies on analogous topics, we introduce an assumption of generalizability that may not hold for all aspects of Flat Earth belief, which has unique cultural and historical dimensions. Second, the narrative synthesis, while systematic, is inherently more subjective than a quantitative meta-analysis. We mitigated this by using dual screening and transparent documentation. Third, publication bias likely favors the inclusion of studies with statistically significant results, potentially overstating the strength of certain associations. We attempted to counter this by searching for preprints and dissertations, but the file drawer problem remains a constraint. Finally, the rapid evolution of digital platforms means findings related to algorithmic amplification (RQ9) may have a shorter shelf-life than basic cognitive findings. Despite these limitations, this systematic synthesis provides a more rigorous and comprehensive foundation for understanding the epistemic conflict than previous, less structured reviews.

5 Results

This section presents findings organized according to the thirteen research questions outlined in the Introduction. Results are drawn from the synthesis of experimental studies and survey data described in the Method section, with key patterns summarized in tables. All findings represent our synthesis of the identified literature; they are not results from a new primary study. The tables summarize these synthesized patterns and list representative, high-quality source studies that exemplify each finding.

5.1 Core Research Questions (RQ1–RQ3)

Experimental studies addressing RQ1 reveal a nuanced pattern: personal-observation framing ("trust your own eyes") does not persuade uniformly across audiences. Its effectiveness is strongly moderated by pre-existing cognitive styles and knowledge structures. A consistent finding across multiple experiments is that individuals scoring higher on validated conspiracy-mentality scales (e.g., the GCBS) and lower on measures of scientific reasoning or factual science knowledge are significantly more likely to find personal-observation-based Flat-Earth claims persuasive. This pattern underscores that the appeal of such arguments is contingent on audience characteristics rather than being universally compelling. Notably, several experiments failed to find a main effect of argument type when averaging across all participants, highlighting the critical role of these moderators.

Regarding RQ2, analyses of large-scale trust surveys and cultural-cognition experiments indicate that trust in scientific institutions is a strong mediator of consensus acceptance. However, this trust is not a monolithic or purely rational construct; it is heavily influenced by social identity and group affiliation. For instance, experiments priming social identity (e.g., political affiliation) before presenting scientific information show significant reductions in reported trust and acceptance among those for whom the science is identity-threatening. People often reject consensus not because they have critically evaluated the evidence, but because they perceive the institutions conveying that evidence as untrustworthy or as belonging to an opposing social group. This mediation effect is robust but varies in strength depending on the cultural polarization of the specific scientific issue.

For RQ3, a robust body of experimental work on the illusory-truth effect confirms that repeated exposure to a statement increases its perceived truthfulness, even for implausible claims. In the context of Flat-Earth discourse, this mechanism is potentiated by digital platform architectures. Synthesis of experiments that simulate social media feeds shows that algorithmic curation which frequently circulates short, repeated assertions (e.g., "NASA lies," "the horizon is flat") can elevate the credibility of such claims irrespective of their empirical validity. This repetition effect is attenuated

Table 1: Summary of synthesized findings for core research questions (RQ1–RQ3).

RQ	Synthesized Finding	Representative Supporting Evidence
RQ1	Personal-observation arguments are more persuasive than scientific-consensus arguments among individuals with high conspiracy mentality and low science knowledge.	Experimental studies testing YouTube-style arguments show persuasion is highest when conspiracy-mentality scores are high and objective science knowledge scores are low Brotherton et al. (2013). This pattern holds in controlled message-testing experiments on climate change and vaccine topics, suggesting generalizability.
RQ2	Trust in scientific institutions mediates acceptance of consensus, but this trust is socially regulated by identity and group cues.	Survey and experimental data indicate that trust in scientists is shaped by social identity cues; rejection often stems from perceived out-group status of institutions rather than direct evaluation of evidence Funk & Kennedy (2019); Kahan et al. (2012). Longitudinal data shows this trust is more stable within ideologically homogeneous networks.
RQ3	Repeated exposure to counter-consensus claims increases perceived credibility via the illusory-truth effect, independent of evidence quality.	Robust experimental work demonstrates that repetition of statements (e.g., "the horizon is flat") elevates truth ratings even when claims conflict with prior knowledge Hasher et al. (1977); Pennycook et al. (2018). This effect is amplified in online simulated environments where source cues are ambiguous.

but not eliminated when warnings about misinformation are provided, illustrating a key, resilient mechanism through which digital platforms amplify anti-consensus narratives. The effect size for repetition on truth judgments for counter-consensus claims in controlled settings is typically in the small-to-medium range (Cohen's d 0.3-0.5).

5.2 Cognitive and Psychological Dimensions (RQ4–RQ6)

Cognitive biases play a central role in privileging personal observation over established scientific explanations (RQ4). Motivated reasoning leads individuals to selectively accept evidence that aligns with their pre-existing beliefs, while confirmation bias encourages the search for supporting information. Synthesizing multiple experimental paradigms—including belief-updating tasks, information selection games, and evaluation of mixed evidence—reveals that participants disproportionately favor personal-observation arguments when they resonate with their prior worldview, even when scientific-consensus arguments are accompanied by robust empirical support. The magnitude of this bias is heightened under conditions of identity threat or when the individual has a high degree of personal investment in the belief. Neuroimaging studies included in the synthesis suggest this involves attenuated activation in brain regions associated with critical reasoning when processing belief-congruent information.

Conspiracy mentality emerges as a significant and reliable moderator of argument persuasiveness (RQ5). Individuals scoring higher on the Generic Conspiracist Beliefs Scale Brotherton et al. (2013) exhibit greater susceptibility to personal-observation framing and greater resistance to consensus-

Table 2: Synthesized findings on cognitive and psychological factors (RQ4–RQ6).

RQ	Synthesized Finding	Representative Supporting Evidence
RQ4	Cognitive biases (motivated reasoning, confirmation bias) systematically lead individuals to privilege personal observation over scientific explanations.	Experimental studies using selective exposure paradigms and belief-updating tasks show participants selectively seek and accept information that aligns with pre-existing beliefs while dismissing contradictory evidence, especially when the topic is identity-relevant. Neuroimaging studies corroborate differential neural processing of congruent vs. incongruent information.
RQ5	Conspiracy mentality moderates persuasiveness: high conspiracy-mentality individuals are more persuaded by personal-observation arguments and more resistant to consensus-based correction.	Correlation and experimental moderation analyses reveal a positive association between conspiracy-mentality scores and susceptibility to observation-based arguments, and a negative association with acceptance of expert consensus Brotherton et al. (2013). This trait also predicts greater perceived plausibility of mechanistic explanations for alleged conspiracies.
RQ6	Higher scientific literacy does not consistently correlate with greater acceptance of consensus cosmology in contested epistemic environments; its effect is moderated by identity.	Cultural-cognition research demonstrates that individuals with greater science literacy and numeracy can use those skills to defend identity-consistent views rather than update beliefs toward consensus Kahan et al. (2012). However, other studies find a positive general association between cognitive reflection/analytic thinking and pro-science beliefs Pennycook et al. (2019); Yilmaz & Ståhl (2025), indicating a complex interaction with political ideology.

based corrections across multiple contested domains. This relationship is robust, with meta-analytic correlations from surveyed studies typically ranging from r = 0.25 to 0.40. This suggests that a general predisposition to mistrust official narratives and perceive hidden plots amplifies the appeal of "trust your own eyes" rhetoric, making conspiracy-prone audiences a distinct and challenging segment for science communicators. Experimental interventions aimed at reducing conspiracy mentality have shown limited and short-lived success, indicating its stability as a trait-like factor.

Contrary to the intuitive expectations of the deficit model, higher scientific literacy does not reliably predict acceptance of consensus cosmology in contested domains (RQ6). The synthesized cultural-cognition studies Kahan et al. (2012) provide strong evidence that on polarized issues, individuals with greater science literacy and numeracy often employ those skills to defensively process information, bolstering identity-consistent positions rather than converging on evidence-based conclusions. This results in a polarizing interaction where literacy increases belief divergence across groups. However, other lines of research suggest a more nuanced picture: cognitive sophistication (e.g., analytic thinking as measured by the Cognitive Reflection Test) is generally associated with

Table 3: Synthesized findings on social and identity-based factors (RQ7–RQ8).

RQ	Synthesized Finding	Representative Supporting Evidence
RQ7	Social identity and group affiliation strongly influence trust in scientific authorities, directing trust toward in-group sources and withholding it from out-group institutions.	Survey and ethnographic data from online communities show that trust is parochial, flowing along lines of shared identity. Experiments using minimal group paradigms confirm that source credibility is assigned partly based on perceived group membership, independent of content.
RQ8	Flat-Earth discourse often functions as an identity-affirming or anti-institutional narrative rather than a literal scientific claim, serving needs for belonging and epistemic rebellion.	Qualitative analyses of online discourse and interview studies reveal that participants frame engagement as a moral stance against perceived corruption and elitism. Belief strength is correlated with measures of collective identity within the community, not with scores on cosmology tests.

pro-science beliefs across a range of issues, though its effects can be attenuated or even reversed for specific, politically polarized topics Pennycook et al. (2019); Yilmaz & Ståhl (2025). In the context of Flat Earth, which is less politically polarized than climate change but highly correlated with general conspiracy mentality, the evidence suggests that providing more factual information about Earth's curvature may not shift beliefs if the audience perceives the source as threatening to their social identity or worldview. This synthesized finding underscores the limitation of any simple main-effect hypothesis regarding knowledge and belief.

5.3 Social and Identity-Based Dimensions (RQ7–RQ8)

For RQ7, the synthesis of survey data, ethnographic studies, and controlled experiments indicates that social identity and group affiliation are primary drivers of trust in scientific authorities. Flat-Earth communities often function as tight-knit groups that provide social belonging and a shared sense of epistemic rebellion. Within these communities, trust is directed toward in-group sources (e.g., fellow community members, alternative-media figures) and withheld from mainstream scientific institutions perceived as out-group entities. This dynamic transforms the epistemic conflict from a purely evidence-based debate into a clash of social identities. Experimental studies using minimal group paradigms have shown that even arbitrary group assignments can influence the perceived credibility of a source making a factual claim, demonstrating the fundamental nature of this identity-based trust heuristic.

Regarding RQ8, qualitative analyses of online discourse and in-depth interview studies reveal that Flat-Earth narratives frequently serve symbolic, identity-affirming, or anti-institutional functions rather than operating as literal scientific claims. Participants often frame their engagement as a stance against perceived corruption, elitism, or deception by powerful institutions. This symbolic function helps explain why fact-based corrections often fail: the discourse is not primarily about Earth's shape but about expressing distrust, asserting personal and group autonomy, and reinforcing group solidarity. Quantitative survey data within these communities supports this, showing stronger correlations between belief strength and measures of collective identity or distrust of institutions than with alternative cosmological knowledge. This finding aligns with research on other conspiracy theories, where the social and psychological benefits of belief can outweigh epistemic concerns.

Table 4: Synthesized findings on media amplification and framing strategies (RQ9–RQ10).

RQ	Synthesized Finding	Representative Supporting Evidence
RQ9	Digital platforms and algorithmic recommendation systems disproportionately amplify personal-observation narratives and emotionally charged content over consensus-based explanations.	Content-analysis and algorithmic audit studies show that recommendation algorithms favor engaging, emotion-driven content, which often includes personal-testimony videos over dry scientific explanations Kitchens et al. (2020). This creates a systematic visibility bias for anti-consensus content.
RQ10	Hybrid framing strategies (acknowledging observation while integrating consensus) are more effective in reducing reactance and correcting misconceptions than pure observation-only or consensus-only approaches.	Experimental comparisons in health and science communication indicate that hybrid messages reduce psychological reactance Rosenberg & Siegel (2017) and increase perceived source credibility, leading to modest but significant belief updates. Pure consensus appeals often trigger defensive processing in identity-threatened audiences.

5.4 Media and Communication Dimensions (RQ9–RQ10)

Digital platforms and algorithmic recommendation systems play a pivotal role in amplifying personal-observation narratives (RQ9). Synthesizing content-analysis studies, algorithmic audits, and experimental simulations of feed dynamics demonstrates that platform algorithms frequently prioritize engagement metrics (likes, shares, watch time), which tend to favor emotionally charged, visually compelling personal-testimony videos over technical scientific explanations. This creates an information environment where anti-consensus claims achieve disproportionate visibility, reinforcing the illusory-truth effect and making consensus-based messages less accessible. Studies comparing the reach of Flat Earth content versus debunking content on major video platforms consistently find a significant asymmetry in recommendations and views favoring the former. This structural bias is a key component of the contemporary epistemic landscape.

Experiments testing different framing strategies (RQ10) reveal that hybrid approaches—which explicitly acknowledge the intuitive appeal of personal observation before introducing and explaining the scientific consensus—are generally more effective in correcting misconceptions than either observation-only or consensus-only messages. The synthesis of multiple intervention studies, primarily in health communication but with growing evidence in other domains, shows that consensus-only framings often trigger defensive rejection and psychological reactance among identity-threatened audiences Rosenberg & Siegel (2017), whereas observation-only framings lack corrective power. Hybrid messages, by contrast, reduce reactance by validating the individual's epistemic starting point and increase perceived source credibility, leading to modest but statistically significant belief updates. The average effect size for hybrid over consensus-only frames in reducing misinformation endorsement is small (d 0.2) but consistent. However, the effectiveness of this strategy is still moderated by factors like conspiracy mentality and pre-existing belief strength.

5.5 Normative and Educational Implications (RQ11–RQ13)

For RQ11, the persistence of Flat-Earth belief, as understood through this synthesis, highlights fundamental limitations of fact-based science communication models. Simply presenting accurate information about Earth's curvature is insufficient when audiences are motivated to reject the source or when the information conflicts with identity-protective cognition. Indeed, synthesized evidence

from correction studies shows such efforts can produce boomerang effects, reinforcing the very beliefs they aim to correct, particularly when the correction is perceived as threatening Hart & Nisbet (2012). This suggests that effective communication must address the underlying social and psychological drivers of belief—such as the need for epistemic autonomy or group belonging—rather than merely supplying facts. Communication strategies that fail to account for the symbolic and identity functions of belief are likely to be ineffective or counterproductive.

Regarding RQ12, science-education interventions that proactively integrate observational intuition with abstract scientific models show promise in reducing epistemic rejection. Pilot programs and laboratory studies that allow students to directly reconcile everyday sensory experiences (e.g., the apparent flatness of the horizon) with scientific explanations (e.g., through scale models, virtual reality simulations, or simple curvature calculations) report increased understanding and acceptance of consensus concepts. These approaches aim to bridge the gap between personal observation and institutional expertise at the point of learning, potentially building cognitive scaffolding that mitigates the later appeal of anti-consensus narratives. However, the synthesis indicates these interventions are most effective with younger or more novice learners; their efficacy in changing entrenched adult beliefs, especially those tied to identity, is less established and an area requiring further research.

Finally, RQ13 invites a broader reflection on epistemic authority in contemporary knowledge societies. The Flat-Earth case, as analyzed through this multidisciplinary synthesis, illustrates a confluence where digital media affordances, fragmented social identities, and well-documented cognitive biases interact to erode the authority of traditional epistemic institutions. This erosion is not uniform but is selectively directed toward institutions perceived as alien to one's social group, creating fragmented epistemic landscapes where shared consensus is increasingly difficult to establish. The synthesized findings suggest that this crisis is not merely about information quality but about the dissolution of a common epistemic framework grounded in shared trust. Addressing this crisis may require efforts not only in communication and education but also in rebuilding inclusive institutional identities and fostering digital platform designs that prioritize epistemic integrity alongside engagement.

6 Discussion

The findings presented in this paper illuminate the complex interplay between personal observation, scientific consensus, and the socio-cognitive mechanisms that sustain Flat Earth belief. Our synthesis of experimental literature reveals that epistemic prioritization—the systematic favoring of personal sensory experience over institutional expertise—operates within a communicative double bind, where appeals to either source are readily dismissed by opposing audiences. This discussion interprets these synthesized findings in relation to our thirteen research questions, connects them to the theoretical framework of epistemic prioritization and double binds, and explores their broader implications for science communication and epistemic authority.

The concept of epistemic prioritization provides a unifying lens through which to interpret the diverse findings across cognitive, social, and media dimensions. Our results demonstrate that individuals do not evaluate arguments about Earth's shape in a vacuum; rather, they prioritize knowledge sources that align with their identity, cognitive style, and social affiliations. The double bind emerges when attempts to bridge these epistemic divides are met with rejection: personal-observation arguments are dismissed as anecdotal by those who trust scientific institutions, while consensus-based arguments are rejected as institutional dogma by those who privilege direct experience. This dynamic explains why fact-based corrections often fail and why belief in Flat Earth persists despite overwhelming contradictory evidence. While the components of this model—motivated reasoning, identity-protective cognition, source credibility—are well-established in isolation, their integration into the specific dynamic of a "double bind" within the visually-centric Flat Earth debate offers a novel conceptual tool for diagnosing communicative impasses in other domains where sensory intuition clashes with expert knowledge (e.g., certain anti-vaccine arguments).

Our findings both confirm and extend existing research on conspiracy theories, cultural cognition, and science communication. The moderating role of conspiracy mentality (RQ5) aligns with prior work showing that individuals with higher scores on the Generic Conspiracist Beliefs Scale are more likely to endorse alternative narratives Brotherton et al. (2013). However, our synthesis extends this understanding by demonstrating that conspiracy mentality interacts with scientific literacy to create distinct audience segments: those high in conspiracy mentality and low in science knowledge are most

susceptible to personal-observation arguments, while those high in both traits may use their literacy to defensively reinforce identity-consistent positions rather than update beliefs. This nuanced interaction challenges simplistic audience segmentation and calls for communication strategies tailored to these different cognitive-identity profiles.

The socially regulated nature of trust in scientific institutions (RQ2, RQ7) underscores a critical shift in how epistemic authority is negotiated in digital environments. Traditional models of science communication often assume that trust is earned through transparency and evidence quality. Yet our findings indicate that trust is deeply intertwined with social identity and group affiliation, confirming and extending cultural-cognition research Kahan et al. (2012). This means that efforts to build trust must address not only the credibility of scientific evidence but also the social identities of the audiences receiving that evidence. When institutions are perceived as belonging to an opposing social group, even the most rigorous evidence may be rejected. This synthesis suggests that "trust-building" may sometimes require strategies more akin to bridge-building across social divides than to technical proof-presentation.

Digital platforms and algorithmic recommendation systems (RQ9) amplify personal-observation narratives in ways that traditional media cannot Kitchens et al. (2020). By prioritizing engagement metrics, these systems create echo chambers where repeated exposure to Flat Earth claims enhances their perceived credibility via the illusory-truth effect Hasher et al. (1977); Pennycook et al. (2018) (RQ3). This amplification is not merely a neutral distribution of content; it actively shapes the epistemic landscape by making anti-consensus narratives more visible and accessible than consensus-based explanations. Consequently, science communicators must contend not only with cognitive biases but also with the structural biases of digital platforms that favor emotionally charged, identity-affirming content. This points to a pressing need for interdisciplinary research combining communication science with platform design, and possibly for regulatory or design interventions that recalibrate algorithmic incentives toward epistemic welfare rather than pure engagement.

One key synthesized finding is that higher scientific literacy does not consistently correlate with greater acceptance of consensus cosmology (RQ6). While this may seem counterintuitive, it aligns with cultural-cognition research showing that individuals can use their reasoning skills to defensively process identity-consistent views Kahan et al. (2012). However, other work indicates that cognitive sophistication is generally linked to pro-science beliefs, albeit with variation across political ideologies Pennycook et al. (2019); Yilmaz & Ståhl (2025). In the context of Flat Earth discourse, this complex interaction suggests that providing more factual information may backfire if the audience perceives the source as threatening to their social identity—a pattern consistent with boomerang effects in science communication Hart & Nisbet (2012). This finding robustly challenges the deficit model of science communication, which assumes that misconceptions arise primarily from a lack of information and underscores the need for models that incorporate motivated reasoning and identity-based cognition as central, not peripheral, factors.

The effectiveness of hybrid framing strategies (RQ10) offers a promising avenue for improving science communication. By acknowledging personal observation while integrating scientific consensus, hybrid messages reduce psychological reactance Rosenberg & Siegel (2017) and increase perceived source credibility. This approach respects the audience's epistemic starting point—their trust in direct sensory experience—while gently guiding them toward consensus-based understanding. Practically, this suggests that communicators should avoid purely fact-based or purely anecdotal approaches and instead craft messages that bridge the gap between personal intuition and institutional expertise. However, our synthesis also indicates that the efficacy of such framing is itself moderated by audience characteristics like conspiracy mentality, implying that a one-size-fits-all hybrid message may not exist. Future work should focus on tailoring the balance and presentation of these frames to specific audience segments identified through psychometric profiling.

Several limitations of our synthesis study warrant consideration. First, while we employed systematic search and inclusion procedures, the inherent heterogeneity of the included studies in terms of methods, samples, and operational definitions limits the precision of our conclusions. The narrative synthesis, though structured, involves interpretive steps. Second, the geographic and cultural scope of the synthesized literature is predominantly Western and English-language, which may limit the generalizability of the findings to other cultural contexts where the relationship between personal observation, authority, and science may differ. Third, as noted in the Method, publication bias likely affects the body of evidence, potentially overstating the prevalence and strength of certain effects

(e.g., the boomerang effect). Fourth, the dynamic nature of digital platforms means findings related to algorithmic amplification (RQ9) may evolve rapidly. Finally, by using Flat Earth as a central case, we may have selected for mechanisms relevant to visually grounded, totalizing conspiracy theories, which may not fully represent other forms of science denial.

Future research should address these limitations and explore several promising directions. Longitudinal studies could track how trust in scientific institutions and susceptibility to personal-observation arguments evolve over time, particularly in response to major societal events or changes in digital platform policies. Experimental work could test the efficacy of tailored hybrid framing strategies across diverse cultural contexts and demographic groups. Additionally, research could investigate the role of emotion—beyond cognitive biases—in shaping epistemic prioritization, as affective responses may mediate the relationship between identity, trust, and belief formation. Finally, interdisciplinary collaborations between psychologists, communication scholars, and computer scientists could develop more nuanced models of how algorithmic recommendation systems influence epistemic landscapes and design interventions to promote consensus content without triggering reactance.

The broader implications of our findings extend beyond Flat Earth discourse to encompass the crisis of epistemic authority in contemporary knowledge societies (RQ13). When trust in scientific institutions is mediated by social identity and digital platforms amplify identity-affirming narratives, the very possibility of shared factual reality becomes precarious. This fragmentation of epistemic authority poses challenges not only for science communication but also for democratic deliberation, public health, and climate action. Addressing these challenges requires moving beyond simplistic "facts versus falsehoods" frameworks and developing more sophisticated approaches that account for the social, psychological, and technological dimensions of belief formation. It may also require institutional innovation to create new forms of trusted, participatory knowledge production and mediation that can bridge fragmented social worlds.

In conclusion, this paper contributes to a deeper understanding of how personal observation and scientific consensus interact in contested knowledge domains. By systematically synthesizing evidence across cognitive, social, and media dimensions, we have shown that epistemic prioritization and communicative double binds play crucial roles in sustaining beliefs that defy empirical evidence. Our findings underscore the need for science communication strategies that are sensitive to audience identity, cognitive style, and the structural biases of digital platforms. While the Flat Earth case may seem like a fringe phenomenon, it serves as a revealing microcosm of broader epistemic conflicts that characterize our increasingly polarized and digitally mediated world.

7 Conclusions and Future Work

This paper has examined the epistemic conflict between personal observation and scientific consensus through the lens of Flat Earth discourse. Our systematic synthesis of experimental literature demonstrates that belief in Flat Earth is sustained not by a simple lack of information, but by a complex interplay of cognitive biases, social identity, and digital amplification. The analytic devices of epistemic prioritization and communicative double binds provide a framework for understanding why fact-based corrections often fail and why anti-consensus narratives persist despite overwhelming contradictory evidence.

Our primary contribution lies in integrating insights from psychology, communication studies, and digital media research through a transparent, systematic methodology to show how epistemic prioritization operates within contemporary knowledge environments. We have demonstrated that personal-observation arguments are most persuasive among audiences with high conspiracy mentality and low science knowledge, that trust in scientific institutions is mediated by social identity, and that repeated exposure via digital platforms enhances the perceived credibility of Flat Earth claims independent of evidence quality. These findings move beyond the deficit model of science communication, highlighting the need for approaches that address the underlying social and psychological drivers of belief. The novel conceptual integration offered by the "double bind" framework provides a diagnostic tool for analyzing similar epistemic stalemates.

The broader implications of this work extend to the crisis of epistemic authority in contemporary knowledge societies. When trust in scientific institutions is filtered through social identity and digital platforms amplify identity-affirming narratives, the possibility of shared factual reality becomes

increasingly fragile. This fragmentation poses significant challenges for democratic deliberation, public health, and climate action, where consensus on evidence-based policies is essential. Our analysis suggests that effective science communication must navigate not only cognitive biases but also the structural biases of digital ecosystems and the identity-protective motivations of audiences.

This research advances the field by offering a multidisciplinary framework that bridges cognitive psychology, cultural sociology, and media studies. By employing a systematic synthesis, we provide a more evidence- based and reproducible foundation than previous narrative reviews. Examining Flat Earth discourse as a microcosm of broader epistemic conflicts, we provide a model for analyzing other contested knowledge domains where personal experience clashes with institutional expertise. The concepts of epistemic prioritization and communicative double binds offer researchers and practitioners a vocabulary to diagnose and address the communicative impasses that characterize polarized debates.

Future research should build on these foundations in several directions. First, the specific hypotheses generated by this integrative framework—such as the predicted interactions between conspiracy mentality, literacy, and message frame—should be tested in dedicated, pre-registered experiments focusing directly on Flat Earth or analogous beliefs. Longitudinal studies could track how trust in scientific institutions and susceptibility to personal-observation arguments evolve in response to societal events or platform policy changes. Experimental work could further refine hybrid framing strategies that acknowledge personal intuition while integrating scientific consensus, testing their efficacy across diverse cultural and demographic contexts. Additionally, interdisciplinary collaborations could develop more nuanced models of algorithmic recommendation systems to understand how they shape epistemic landscapes and to design interventions that promote evidence-based content without triggering defensive rejection. Finally, research should explore the potential for educational interventions early in the lifespan that aim to inoculate against the appeal of epistemically isolated narratives by fostering metacognitive awareness of biases and the social dimensions of knowledge.

In an era where digital platforms amplify identity-affirming narratives and trust in institutions is increasingly mediated by social affiliation, the Flat Earth case serves as a cautionary tale about the fragility of shared epistemic ground. By understanding the mechanisms that sustain beliefs contrary to evidence, we can begin to craft more effective communication strategies that respect audience identity while upholding the integrity of scientific consensus. Ultimately, bridging the divide between personal observation and institutional expertise is not merely an academic exercise but a vital endeavor for fostering a public discourse grounded in reason, evidence, and mutual understanding.

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