

The Influence of Prior Attitudes on Selective Information Behavior and Cognitive Mechanisms: Postprint

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Abstract

[Purpose/Significance] This study aims to investigate the influence of prior attitudes on users' acquisition of counter-attitudinal information, particularly concerning the characteristics of behaviors such as selective exposure, selective perception, and selective memory. [Method/Process] An experimental approach was adopted: participants' prior attitudes were first assessed through a pre-test questionnaire; they were then provided with articles containing both consistent and opposing viewpoints and allowed to freely select articles for reading while thinking aloud; after reading, they reconsidered their decision and articulated their rationale; upon completion of the experiment, participants filled out a post-test questionnaire. [Results/Conclusions] The findings reveal that participants exhibited selective exposure and selective memory, with prior attitudes exerting a significant influence on selective exposure behavior and memory retention after one day. Building upon selective exposure, participants demonstrated four distinct cognitive and comprehension processes toward information, encompassing eleven cognitive mechanisms including "key item extraction," "restatement," "semantic matching," and "exclusion." From a theoretical standpoint, this study supplements existing research on selective information behavior and enriches the field of information behavior research; from a practical perspective, it facilitates the promotion of more objective cognition and scientific decision-making among users.

Full Text

Exploring the Influence of Prior Attitude on Selective Information Behavior and Cognitive Mechanisms

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Abstract: [Purpose/Significance] This study aims to understand how prior attitudes influence users' access to opposing information, particularly the behavioral characteristics of selective exposure, selective understanding, and selective recall. [Method/Process] Using an experimental approach, participants' prior attitudes were first assessed through a pre-test questionnaire. They were then provided with articles presenting both consistent and opposing viewpoints, allowed to freely choose which articles to read while thinking aloud, and asked to make decisions and list reasons after reading. Following the experiment, participants completed a post-test questionnaire. [Result/Conclusion] The study found that participants exhibited selective exposure and selective recall behaviors, with prior attitudes having a significant impact on selective exposure behavior and recall after one day. Based on selective exposure, participants demonstrated four cognitive and understanding processes for information, involving eleven cognitive mechanisms including "key item extraction," "restatement," "semantic fit," and "elimination." Theoretically, this research supplements existing findings on selective information behavior and enriches the field of information behavior studies. Practically, it helps promote more objective cognition and scientific decision-making among users.

Keywords: selective exposure; selective understanding; selective recall; cognitive mechanisms

2 Literature Review

2.1 Information Behavior Research

Information behavior encompasses all human behaviors related to information sources and channels, including active information seeking, passive information encountering, and eventual information use [1-3]. It comprises information querying/searching, retrieval, acquisition, selection, utilization, sharing, and adoption behaviors [4-6]. Researchers have also examined information adoption, information encountering, information avoidance, and information disclosure, leading to the concept of collaborative information behavior involving multiple actors [6-10]. With the development of the internet and self-media, information behaviors in online communities and media have garnered increasing attention [11-12].

Information seeking behavior, defined as purposeful information searching activities to satisfy needs, is the most common information behavior [1]. Broadly speaking, information retrieval and information foraging are closely related concepts, connected to the context, tasks, stages, and disciplines of information seeking [13-14]. Previous research has produced rich theoretical models of information seeking processes [15-16] and extensively investigated influencing factors across library science, information science, psychology, and sociology [17-19].

Health information behavior refers to information behaviors in the health do-

main, driven primarily by health-related information needs. Research in this area covers health information seeking, sharing, adoption, and evaluation [20]. Health information seeking behavior is defined as “searching for and receiving information that helps reduce uncertainty about health conditions and construct social and personal health perceptions” [21]. Studies have explored its causes, motivations, theoretical models, and influencing factors, revealing that objective factors such as media type, gender, employment status, internet familiarity, and specific health conditions, as well as more subjective factors like perceived relevance and trust, affect health information seeking [22-24].

2.2 Selective Information Behavior

American communication scholar K. Joseph proposed that audience psychology involves three sequential stages: selective exposure (also called selective contact), selective understanding, and selective recall. These constitute three defensive lines or processes that information must penetrate to be fully received, with selectivity increasing at each stage [25]. Selective exposure refers to individuals’ tendency to contact information that protects their attitudes, beliefs, and behaviors from challenge [26], and has been studied extensively in political and health contexts [27-29]. Domestic scholars have also explored its concepts, motivations, and influencing factors [30-31], identifying two primary motivations: defensive motivation (strengthening one’s own views) and accuracy motivation (forming accurate evaluations) [32].

Influencing factors include information characteristics (quantity limits, usefulness, novelty, source authority, attitude strength, length, title features) and user factors (prior attitudes and their strength, familiarity, confidence, scientific literacy, interest, emotional state) [33-34]. Prior attitude is a particularly common factor. Most scholars agree that audiences select information consistent with their prior attitudes to reduce psychological discomfort from information conflict [35-36]. Studies have found that health risk severity, costs of avoiding negative outcomes, and information type (factual or experiential) relate to selective exposure to health information, though some find weak correlations between perceived risk and selective exposure [37-38]. Research on information quantity limits shows mixed results: some suggest that limited choices or scarcity cues lead to stronger confirmation bias, while abundant information promotes more balanced selection [39]; others argue that more information exacerbates selective exposure, creating echo chambers and information cocoons [32, 40].

Selective understanding (also called selective interpretation or cognition) refers to how different people interpret and react to the same information differently, typically based on their existing experiences or beliefs, while rejecting or distorting contradictory information to maintain their own positions [31]. Consequently, the meaning perceived by information recipients may not align with the meaning intended by communicators. Selective recall describes how people do not remember all information they encounter equally, but rather selectively retain content aligned with their desires, needs, attitudes, and other psychological

factors, tending to forget information that contradicts their opinions [31].

2.3 Sense-Making Research

Information seeking, retrieval, sharing, and utilization all involve processes of understanding and discriminating information, a phenomenon summarized as “sense-making.” B. Dervin’s Sense-Making Theory aims to understand how users interpret their situations, experiences, and future possibilities, and how they construct and create meaning [41-42]. Sense-making is also viewed as an information task that creates understanding of concepts, knowledge domains, situations, or problems to guide action [43-44], forming effective understanding for decision-making [45].

Researchers have identified iterative search-sense-making mechanisms, including planned and opportunistic search, and extraction and synthesis of information [46]. Studies show that users with strong prior attitudes exhibit stronger confirmation bias, reading more attitude-consistent articles.

4 Results

4.1 Selective Information Behavior

One-sample Wilcoxon signed-rank tests showed no significant confirmation bias in the number of articles read ($p = 0.539$) or article clicks ($p = 0.300$). However, significant confirmation bias appeared in the number of articles excerpted in reports ($p = 0.045$) and time spent reading articles ($p = 0.038$). Table 1 presents the specific data for these four behaviors (positive differences indicate confirmation bias).

When analyzing both tasks together, one-sample Wilcoxon signed-rank tests revealed no significant confirmation bias in the number of articles read ($p = 0.138$), articles excerpted ($p = 0.120$), article clicks ($p = 0.255$), or reading time ($p = 0.506$). However, one-sample t-tests showed significant confirmation bias in memory scores after one day ($t = 2.019$, $p = 0.047$), though not in immediate or six-day recall. This indicates users exhibited selective recall, remembering attitude-consistent information more accurately after one day. Table 2 shows the distribution of memory-related metrics.

4.2 Influencing Factors of Selective Information Behavior

4.2.1 Selective Understanding In the vaccination task, one-way ANOVA revealed that prior attitude significantly affected confirmation bias in the number of articles read ($F = 7.045$, $p = 0.012$) and articles excerpted in reports ($F = 8.395$, $p = 0.007$). Participants with negative attitudes toward vaccination showed stronger confirmation bias, reading and excerpting significantly more

attitude-consistent articles. Mann-Whitney U tests showed prior attitude significantly affected the difference in reading time between attitude-consistent and inconsistent articles ($U = 74.0$, $p = 0.029$), but not article clicks ($F = 3.291$, $p = 0.079$). Perceived risk level and information limits showed no significant correlation with selective exposure behaviors. Table 3 presents the specific values.

In the study-abroad task, Mann-Whitney U tests indicated that prior attitude significantly affected confirmation bias in the number of articles read. Participants with negative attitudes toward studying abroad showed stronger confirmation bias, reading more attitude-consistent articles. Prior attitude also significantly influenced reading time differences ($p = 0.015$) and article clicks ($p = 0.015$), with negative-attitude participants spending more time on and clicking more attitude-consistent articles. Perceived risk level significantly affected the number of articles excerpted ($p = 0.010$) and article clicks ($p = 0.031$), but not the number of articles read ($p = 0.079$) or reading time ($p = 0.284$). Information limits showed no significant effects on any measures. Table 4 shows the specific values.

In the combined data, Mann-Whitney U tests showed prior attitude significantly affected reading time differences but not other behaviors. Participants with negative attitudes spent significantly more time reading attitude-consistent articles. Table 5 presents these results.

4.2.2 Selective Recall In the vaccination task, one-way ANOVA showed prior attitude significantly affected confirmation bias in memory scores after one day ($F = 9.128$, $p = 0.005$). Participants with negative attitudes remembered more attitude-consistent information. Perceived risk level also significantly affected one-day memory scores ($F = 3.107$, $p = 0.040$). Information limits showed no significant effects.

In the study-abroad task, prior attitude significantly affected both immediate ($F = 4.408$, $p = 0.020$) and one-day memory scores ($F = 4.678$, $p = 0.016$). Risk perception and information limits showed no effects.

In the combined data, prior attitude significantly affected one-day memory scores ($F = 2.262$, $p = 0.014$), while risk perception and information limits did not.

4.3 Selective Understanding and Cognitive Mechanisms

4.3.1 Cognitive Processes Participants exhibited four distinct cognitive processes during article selection, reading, and report completion. The first process, “determining viewpoint - constructing structure,” involved participants starting with relatively open attitudes, gradually forming viewpoints while reading, and building their own structures. These users showed little bias in article selection, choosing based on title attractiveness or information novelty.

The second process, “determining viewpoint - validating viewpoint - constructing structure - maintaining viewpoint,” involved participants forming attitudes based on prior knowledge, then continuously validating their views while reading and constructing supporting structures without changing their positions.

The third process, “determining viewpoint - constructing structure - validating structure - adjusting structure - maintaining viewpoint,” involved participants building their own argumentative structures first, then mapping and adjusting them against article structures while maintaining their original viewpoints.

The fourth process, “determining viewpoint - constructing structure - validating viewpoint - changing viewpoint - adjusting structure,” differed from the third in that participants actively sought inconsistent information, validated their views, changed their viewpoints during reading, and adjusted their cognitive structures accordingly.

4.3.2 Cognitive Mechanisms Participants with different prior attitudes processed information differently. Through analysis of think-aloud protocols and interview transcripts, we identified eleven cognitive mechanisms used when reading attitude-consistent versus inconsistent information, as shown in Table 6 .

Common mechanisms across both attitude types included summarization, key item extraction, judgment and evaluation, and Socratic dialogue (questioning encountered information and concepts). Restatement also helped participants understand information in their own cognitive terms.

Mechanisms specific to attitude-consistent information included analogy, stereotyping, and semantic fit. For example, participant P49 analogized COVID-19 vaccines to smallpox vaccines for children to better understand vaccine functions. Stereotyping appeared among participants with positive prior attitudes who trusted vaccine reliability based on faith in national emergency response capabilities. Semantic fit involved examining the reasonableness of facts, concepts, or viewpoints from a semantic perspective.

For attitude-inconsistent information, participants used semantic adaptation, explanation-based mechanisms (understanding causal relationships between concepts), and elimination (excluding inapplicable facts, concepts, or relationships). For instance, participant P42 eliminated scenarios mentioned in articles to refute inconsistent information.

5 Conclusion and Discussion

Regarding selective exposure, understanding, and recall, this study found that prior attitude significantly influences selective exposure and recall behaviors, consistent with previous research. Notably, we discovered for the first time that participants with negative attitudes more frequently selected, clicked, and read attitude-consistent information. We also confirmed that perceived risk

level significantly affects selective exposure, likely because uncertainty about the environment enhances desire for consistent information [27].

Regarding information limits, our findings differ from previous studies: removing article quantity limits did not change participants' behavior, possibly due to strong defensive motivations requiring further investigation.

In terms of cognitive processes, participants demonstrated four main patterns: "determining viewpoint - constructing structure," "determining viewpoint - validating viewpoint - constructing structure - maintaining viewpoint," "determining viewpoint - constructing structure - validating structure - adjusting structure - maintaining viewpoint," and "determining viewpoint - constructing structure - validating viewpoint - changing viewpoint - adjusting structure." We identified the importance of viewpoint determination, validation, and change, and consequent cognitive structure adjustments. Participants' selective exposure correlated with their understanding processes: those choosing only attitude-consistent articles never changed viewpoints, while those selecting balanced or opposing information were more likely to change viewpoints.

For cognitive mechanisms of selective information behavior, we validated eleven of seventeen mechanisms identified in previous research [47] and distinguished different mechanisms for attitude-consistent versus inconsistent information. For consistent information, participants used "shortcut" mechanisms like analogy, stereotyping, norms, and semantic fit to minimize effort in judgment and strengthen their positions. For inconsistent information, they employed semantic adaptation, explanation-based mechanisms, and elimination to scrutinize, critically evaluate, and discard information when unreasonable. This enriches previous cognitive mechanism research and demonstrates prior attitude's influence on selective understanding.

Overall, selective exposure, understanding, and recall exist, though some participants driven by accuracy motivation sought more balanced information. However, most preferred to contact, understand, consolidate, and recall attitude-consistent information, which hinders scientific decision-making. "Stereotyping" and similar mechanisms may produce conclusions that cannot withstand scrutiny. Limitations include a student-dominated sample lacking representativeness, and incomplete think-aloud data requiring triangulation with post-experiment interviews and decision reports.

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Author Contributions:

Li Ke: Research design, experimental design and implementation, data analysis, and initial draft.

Zhang Pengyi: Research design, experimental design, and manuscript revision.

Note: Figure translations are in progress. See original paper for figures.

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