

Element Characteristics and Behavioral Pathways of Traditional Chinese Medicine Information Processing Behavior Among Older Adults: Postprint

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Abstract

[Purpose/Significance] Information processing constitutes a crucial link in the information behavior process of elderly individuals regarding traditional Chinese medicine (TCM), and theoretical exploration of elderly TCM information processing behavior represents an important prerequisite for enhancing their information processing capabilities and TCM information literacy. [Method/Process] This study employs a qualitative research design, utilizing semi-structured in-depth interviews for data collection, and performs grounded theory coding analysis on the interview data. Through continuous analysis, comparison, and dialogue with existing theories, the elements, characteristics, and typical pathways of elderly TCM information processing behavior are identified. [Results/Conclusion] Elderly TCM information processing behavior encompasses three basic elements (goal orientation, basis selection, and means adoption) and nineteen specific elements. By integrating the Elaboration Likelihood Model and the Heuristic-Systematic Model, the goal orientation and behavioral pathways of elderly TCM information processing behavior can be classified into three categories: low cognitive effort (peripheral pathway, primarily employing three types of information processing means: perception, verification, and comparison), high cognitive effort (central pathway, primarily employing reasoning), and general cognitive effort (combining both). Elderly TCM information processing behavior exhibits characteristics such as stage-specificity, difficulty, spatiotemporal differences in processing goals, and developmental nature of the processing process.

Full Text

A Study on the Characteristics of Elements and Behavioral Paths of Traditional Chinese Medicine Information Processing Behavior Among the Elderly

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Abstract:

[Purpose/Significance] Information processing constitutes a crucial component of traditional Chinese medicine (TCM) information behavior among the elderly. Theoretical exploration of this behavior is an essential prerequisite for enhancing their information processing capabilities and TCM information literacy. **[Method/Process]** This study employed a qualitative research design, utilizing semi-structured in-depth interviews for data collection and grounded theory coding analysis for data interpretation. Through continuous analysis, comparison, and dialogue with existing theories, we identified the elements, characteristics, and typical paths of TCM information processing behavior among older adults. **[Results/Conclusions]** The findings reveal that elderly individuals' TCM information processing behavior comprises three basic elements (target orientation, basis selection, and means selection) and 19 specific elements. Integrating the Elaboration Likelihood Model (ELM) and the Heuristic-Systematic Model (HSM), the target orientation and behavioral paths can be categorized into three types based on cognitive effort: low cognitive effort (peripheral path, primarily employing perception, verification, and comparison), high cognitive effort (central path, mainly using reasoning), and general cognitive effort (a combination of both). The behavior is characterized by phasing, difficulty, spatiotemporal differences in processing targets, and developmental progression.

Keywords: elderly; traditional Chinese medicine information; information processing; central path; peripheral path

1. Introduction

The “Healthy China 2030” Planning Outline emphasizes the vital role of traditional Chinese medicine in improving public health. China’s aging process continues to accelerate, with people aged 60 and above accounting for 18.1% of the total population by the end of 2019 [1]. TCM, with its distinctive strengths in preventive treatment, health preservation, and rehabilitation, plays a significant role in helping older adults prevent and manage chronic diseases [2-4], control complications, and improve quality of life. Acquiring TCM information,

processing and evaluating it, and ultimately applying it to health promotion for themselves and their families represents an important self-health management strategy for Chinese elderly.

However, with the widespread adoption of mobile communications, new media, and social networks, older adults now have unprecedented access to diverse TCM information sources. Information from the internet, traditional media, interpersonal networks, commercial promotions, and professional medical personnel varies greatly in quality, creating a complex landscape. Coupled with generally low health information literacy among Chinese elderly [5], this presents serious challenges for TCM information processing. The growing demand and increasing difficulty of information processing have become defining features of this issue. Therefore, studying the fundamental characteristics and behavioral paths of TCM information processing among the elderly is crucial for helping them improve their processing capabilities and TCM information literacy.

In human information behavior, individuals typically process information after acquisition but before utilization [6]. This study defines elderly TCM information processing behavior as the evaluation and assessment activities conducted between information acquisition and application. Evaluating medical or health information is particularly critical as it directly impacts individual health and wellbeing [7].

Existing literature on health information processing can be divided into expert and user perspectives. The expert perspective focuses on establishing health information quality evaluation standards [8] and developing models for health information assessment [9] and discrimination [10]. The user perspective, more common in research, primarily employs questionnaires [11] and qualitative interviews [12] to investigate credibility evaluation mechanisms and influencing factors of health information processing among various user groups, including adolescents [13], university faculty [14], and online users [15-16]. However, research specifically targeting elderly populations remains limited. Notably, L. Chang et al. used qualitative methods to explore health information processing among older Chinese women in Singapore, finding that their evaluation of health information credibility was based on perceived trustworthiness, professionalism of the source, provider intentions, and comparison with past experiences. The study also examined central versus peripheral processing paths [22].

Since Western medical systems typically categorize TCM as complementary and alternative medicine (CAM), research on TCM information processing is scarce. Moreover, TCM information behavior is not merely a “doctor-patient” information behavior; it is rooted in Chinese cultural and social contexts, deeply integrated with daily life across multiple dimensions. Its characteristics include broad behavioral boundaries, diverse scenarios, rich content, and complex processes. Currently, there is a lack of basic analytical frameworks for such behavior, making it difficult to directly apply existing general models of health information processing for quantitative empirical research. Therefore, this study adopts a qualitative design, using in-depth interviews to collect case materials

on elderly TCM information processing behavior. Grounded theory serves as the primary analytical method, combined with theoretical dialogue to identify the most important and essential concepts and meanings, thereby constructing a theoretical framework of behavioral elements, characteristics, and patterns. This provides a theoretical basis for understanding elderly TCM information processing behavior in China and offers references for developing information service strategies to enhance processing capabilities and improve TCM information literacy.

2. Research Methods

This study employed a qualitative research design, using semi-structured in-depth interviews for data collection and grounded theory techniques including constant questioning, comparison, and coding for data analysis.

2.1 Interview Participants The study recruited participants aged 60 and above who believed in TCM and were willing to incorporate it into their health management, with no communication barriers or severe cognitive/psychiatric impairments. Participants were recruited through TCM medical institutions, personal networks, friends, and WeChat groups. Selection considered age, gender, education level, living environment, and employment status to ensure diversity. Between March 2017 and August 2018, 22 elderly individuals from eight provinces or municipalities were interviewed. Participants ranged from 60 to 85 years old, including 14 women and 8 men. presents the basic characteristics of interviewees.

2.2 Interview Topics Interviews focused on the following themes: typical situations of encountering TCM information; types of TCM information consumed; evaluations of this information (what was considered credible vs. not); criteria for judgment; perceived differences among various TCM information sources; actual usage patterns (what information was applied in daily life and what was not); decision-making processes before use; and specific examples.

2.3 Data Analysis Data analysis proceeded concurrently with collection, employing constant questioning and comparison strategies through open, axial, and selective coding. Theoretically sensitive data were selected and coded to identify key concepts and categories related to elderly TCM information processing behavior. Due to space limitations, presents examples of open coding and conceptualization. The analysis then examined relationships among elements, integrating the Elaboration Likelihood Model (ELM) and Heuristic-Systematic Model (HSM) to propose central and peripheral paths for elderly TCM information processing.

3. Elements of Elderly TCM Information Processing Behavior

Coding analysis identified three basic elements and 19 specific elements of elderly TCM information processing behavior, as shown in .

Table 3. Elements of Elderly TCM Information Processing Behavior

Basic Elements	Specific Elements
Information Processing Target Orientation	Credibility, authenticity, safety, theoretical soundness, practicality, applicability, comprehensibility
Information Processing Basis Selection	Source professionalism, source reputation, others' experiences, traditional transmission, existing knowledge, personal practice, intuitive feeling, personal beliefs
Information Processing Means Selection	Self-perception, comparison, verification, reasoning

3.1 Information Processing Target Orientation Analysis revealed that elderly individuals evaluate and screen TCM information across multiple dimensions, termed “target orientation.” These include:

- **Credibility:** The degree to which information is considered believable. Some TCM information is deemed trustworthy while other information is not.
- **Authenticity:** Judgment of whether information reflects actual circumstances. Many elderly perceive mobile and online information as difficult to verify, while television health programs are sometimes viewed as exaggerated or performative.
- **Theoretical Soundness:** Assessment of whether information contains valid TCM principles. As one participant noted, “When experts describe a medicine as miraculous, it must have its rationale, its origin, its theoretical foundation.”
- **Safety:** Evaluation of whether information content poses health risks.
- **Applicability:** Determination of whether information is suitable for oneself or important others. For example, one elderly person paid special attention to hypertension-related information because their son had the condition.
- **Practicality:** Assessment of whether information is relevant to daily life, convenient to use, and affordable. Given the effort invested in obtaining information, elderly individuals naturally hope to apply it practically.
- **Comprehensibility:** Evaluation of whether information can be easily understood and accepted. Traditional TCM information often uses classical Chinese, which is difficult for most people. Information presented through

demonstrations or patient testimonials is more accessible. As one participant explained, “I think that X health program is excellent because after explaining, they demonstrate 实际操作, making it intuitive and immediately clear how to do it.”

Consistent with previous research [6, 23, 24], this study shows that elderly TCM information processing occurs at both formal and content levels. Notably, **theoretical soundness** and **practicality** are particularly important for elderly processing TCM information. The profound theoretical system of TCM requires information services to be both practical and grounded while maintaining theoretical integrity.

3.2 Information Processing Basis Elderly individuals employ various criteria to evaluate TCM information:

- **Source Professionalism:** Judgment based on whether the source possesses professional TCM knowledge and skills. Hospitals and doctors are generally considered professional sources.
- **Source Reputation:** Assessment based on the source’s standing. Television programs organized by CCTV or major satellite channels are often assumed credible. Books are trusted because “if it’s written in a book, there must be a reason.” Reputation can also be conferred by service recipients—“many patients means good service” is a common belief.
- **Others’ Experiences:** Judgment based on other individuals’ experiences. One participant noted, “My sister-in-law learned about vinegar-soaked soybeans from TV. Now all my sisters-in-law and their families use it, so it must be harmless.”
- **Traditional Transmission:** Acceptance of TCM information passed down through generations. Many elderly believe ancestral remedies must have merit.
- **Existing Knowledge:** Evaluation based on prior TCM knowledge.
- **Personal Practice:** Judgment based on trial-and-error experience. As one participant stated, “When I feel cold in my back and it improves after meditation, I know my qi and blood have circulated. This practical experience convinces me.”
- **Intuitive Feeling:** Assessment based on gut instinct. For example, “Someone said sitting in a certain chair lowers blood pressure. I tried it, but who knows if it actually works?”
- **Personal Beliefs:** Judgment based on personal values and religious beliefs. Many elderly reject information linked to commerce or advertising. Those with religious faiths may trust information from sources sharing their beliefs.

Unlike general health information processing research [9, 11-12] that emphasizes information timeliness, elderly TCM information processing prioritizes **historical tradition**. As a treasure of Chinese culture refined through millennia of practice, traditionally transmitted information is more readily accepted. Ad-

ditionally, intuitive feeling, personal beliefs, and traditional transmission are particularly important bases for elderly TCM information processing.

Social psychology explains that people conform because majority opinion offers higher probability of correctness, especially in ambiguous situations where others' behavior provides reference information [27]. This explains why elderly individuals often rely on others' experiences, reflecting their difficulties and helplessness in information processing.

3.3 Information Processing Means Elderly individuals employ several methods to process TCM information:

3.3.1 Self-Perception This involves evaluating information based on personal feelings. For instance, seeing a TCM health program featuring the wife of a Tongrentang executive discussing benefits of goji berries prompted one participant to use them for over 20 years.

3.3.2 Comparison This involves contrasting different information sources, comparing with fellow patients, or with personal experience. One participant explained, "If I hear something from multiple sources—previously from acquaintances, now on TV and mobile—it seems more credible and worth trying."

3.3.3 Verification This involves seeking confirmation from authoritative figures, not necessarily professionals but anyone in their social network perceived as knowledgeable. One participant noted, "I initially believed online information, but family members warned me. So sometimes I ask my husband or daughter, who know more than I do."

3.3.4 Reasoning This involves evaluating information based on TCM theoretical knowledge. One participant demonstrated sophisticated reasoning: "This relates to my TCM theory knowledge. The kidney is the innate foundation, declining after age 30, requiring support from the acquired foundation—the spleen and stomach. *Achyranthes* root has three benefits: first, it tonifies the kidney; second, it guides blood downward (when qi and blood flow, there's no pain); third, it balances blood pressure. Based on these three points, I chose it."

Among these means, perception, comparison, and reasoning are self-reliant, while verification requires social support. Self-perception demands less cognitive effort, whereas comparison and reasoning require more. Different elderly individuals select different means, and the same individual's approach may evolve with time and experience.

4. Typical Behavioral Paths of Elderly TCM Information Processing

Current models of individual information processing include the Elaboration Likelihood Model (ELM) [28] and the Heuristic-Systematic Model (HSM) [30].

ELM distinguishes between central path (systematic, logical analysis) and peripheral path (heuristic analysis based on cues like source credibility). HSM similarly differentiates between heuristic processing (using simple cognitive rules) and systematic processing (requiring extensive cognitive resources). Both models primarily differ in the degree of cognitive effort involved.

Therefore, this study uses cognitive effort as the key variable to classify elderly TCM information processing target orientation into three categories.

4.1 Target Orientation Based on Cognitive Effort

4.1.1 Low Cognitive Effort Target Orientation Corresponding to the peripheral path or heuristic processing, this involves superficial, intuitive processing based on external features or shallow physiological needs. It primarily includes: - **Practicality judgment**: Whether information is relevant to daily life and convenient to use - **Comprehensibility judgment**: Whether information is easily understood

Overly professional, abstract information that doesn't match cognitive abilities creates processing pressure and is often abandoned [31]. Making profound TCM knowledge practical, accessible, and understandable is a critical challenge for information providers.

4.1.2 High Cognitive Effort Target Orientation Corresponding to the central path or systematic processing, this involves elderly with strong cognitive abilities who invest substantial effort to evaluate the medical and theoretical principles of TCM information. Some participants particularly focused on the theoretical soundness of information, requiring strong cognitive capacity and TCM knowledge. Not all elderly can engage in this level of processing.

4.1.3 General Cognitive Effort Target Orientation Most elderly TCM information processing falls between the two extremes, dynamically shifting based on health conditions, social support, and contextual factors. This includes judgments of credibility, authenticity, safety, and applicability.

4.2 Central and Peripheral Paths of Elderly TCM Information Processing Integrating ELM, HSM, and the cognitive effort classification, this study proposes two fundamental paths: central path (high cognitive effort—systematic processing) and peripheral path (low cognitive effort—heuristic processing), as illustrated in [Figure 1: see original paper].

4.2.1 Central Path Elderly taking the central path possess good cognitive abilities and motivation to carefully examine TCM information. They form attitudes toward health practices through detailed cognitive processing, investing substantial effort to evaluate theoretical principles, authenticity, and scientific validity. The primary means is **reasoning**, which requires TCM knowledge, self-treatment experience, and high cognitive capacity. Without such foundations, reasoning can lead to distorted judgments. External interventions can help develop information processing awareness and capabilities [32], while improving information quality at the source reduces processing burdens.

4.2.2 Peripheral Path When motivation and ability are limited, elderly invest less cognitive effort and follow the peripheral path. They rely on source professionalism, reputation, personal beliefs, others' experiences, traditional transmission, intuitive feeling, existing knowledge, and personal practice to evaluate authenticity, comprehensibility, practicality, and applicability. The primary means are **perception, verification, and comparison**.

Self-perception is frequently used for initial evaluation. Elderly assess information based on external attributes like source, commercial associations, and familiarity. However, this reflects helplessness—many express confusion about whom to trust and how to verify authenticity, making them vulnerable to misinformation.

Verification involves consulting professionals or family members. Effective and accessible social support is crucial for elderly with declining cognitive abilities. Making professional TCM information resources readily available is essential.

5. Characteristics of Elderly TCM Information Processing

5.1 Phasing Elderly TCM information processing occurs in three phases: 1. **Initial judgment:** Relying on external attributes to determine whether to engage further with information 2. **Process judgment:** Using verification, comparison, and reasoning to evaluate content if initial judgment is positive 3. **Verification judgment:** Post-use evaluation of credibility, safety, and theoretical soundness based on practical experience

5.2 Spatiotemporal Differences in Processing Targets **Spatial differences** manifest across contexts. For information from acquaintances or traditional sources, elderly 弱化 (weaken) judgments of credibility and safety, focusing mainly on applicability. For unfamiliar or non-traditional sources, they emphasize safety and credibility. Under intense pain or when conventional treatment fails, they prioritize disease relevance over other dimensions.

Temporal differences appear across processing stages. Initially, elderly focus on practicality and safety, often using practicality to infer safety. Common, everyday remedies are assumed safe, while applicability and authenticity are judged through post-use outcomes.

5.3 Difficulties in Processing Many elderly experience confusion and helplessness when processing TCM information. Inconsistent information from different doctors or media sources creates uncertainty. For instance, when one doctor dismisses another's prescription, or when television promotions conflict with expert warnings, elderly individuals feel lost and unsure whom to trust. Further research is needed to identify factors causing these difficulties and develop targeted assistance measures.

5.4 Development and Change Elderly TCM information processing is dynamic rather than static. Within a single interaction, processing content and means evolve—from initial perception to deeper inference, comparison, and verification. Over time, processing capabilities develop. Many begin with self-perception and gradually learn reasoning and comparison strategies through accumulated experience [32]. This developmental pattern aligns with research on diabetic patients' health information behavior.

6. Conclusion

Elderly TCM information processing behavior is closely related to daily life, influenced by cultural beliefs and social environments. Existing research models offer limited explanatory power for this specific context. This study used grounded theory to construct a framework of behavioral elements and paths, providing theoretical understanding and a foundation for quantitative research.

Future research should design integrated TCM information service frameworks for elderly across “full scenarios and full chains,” developing targeted strategies for central and peripheral processing paths based on different cognitive effort levels. Considering the phasing, spatiotemporal differences, and dynamic development characteristics, new technologies like data mining could enable real-time monitoring and feedback mechanisms, creating dynamically optimized intelligent TCM health service systems.

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Author Contributions

Hou Xiaoni: Conceptualized the research, collected and transcribed interview data, conducted data analysis, and wrote the manuscript.

Chen Jianlong: Participated in data analysis and revised the manuscript.

Wang Jiandong: Participated in data analysis.

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

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