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Modeling behavioral intention of using health-related WeChat official accounts through ELM and SCT factors using the PLS-SEM approach

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Health-related WeChat Official Accounts are widely used in China. However, limited research has explored how cognitive processing and psychological beliefs influence user behavior on these platforms. Previous studies have rarely examined the cognitive and psychological mechanisms that underlie users' behavioral intention in this context. To address this gap, this study proposes a psychologically grounded dual-pathway model that integrates the Elaboration Likelihood Model (ELM) and Social Cognitive Theory (SCT) to explain how individual information processing and self-efficacy jointly shape user behavioral intention. Data were collected through an online survey ($n = 434$) conducted from April 11 to May 9, 2024. PLS-SEM was applied using SmartPLS 4.1. The results show that both central and peripheral processing routes significantly influence self-efficacy, which in turn mediates their effects on behavioral intention. Gender moderates the peripheral pathway, with female users more responsive to credibility cues. However, user experience did not have a significant moderating effect. This study extends the application of ELM and SCT in digital health communication by clarifying how different processing routes influence user behavior via self-efficacy. It offers practical insights for healthcare institutions, government health departments, and nonprofit organizations seeking to improve user engagement and satisfaction with WOAs.

Keywords Elaboration likelihood model, Social cognitive theory, Behavioral intention, Self-Efficacy, WeChat official accounts, Health information

As digital health platforms gain popularity in high- and middle-income countries, it is becoming increasingly important to understand how users process and respond to health information in a closed, app-based platform. Through these platforms, users can easily access personalized health knowledge, raising their awareness about disease prevention and encouraging healthier behaviors¹. While studies from Western countries often focus on platforms like Facebook and Twitter² in Asia, particularly in China, WeChat has emerged as a key social media platform for health communication³. By 2023, WeChat had over 1.2 billion monthly active users, making it one of the largest and most influential social media platforms globally⁴. WeChat Official Accounts (WOAs) are widely used by hospitals, public health departments, media, non-profit groups, and individuals to share health information⁵.

Despite the wide use of health-related WOAs, there is still a clear gap between what users expect and the actual benefits they experience. A survey across 32 provinces in China found that although 63.26% of users preferred WeChat for health information, only about 14.43% believed that such information truly improved their health⁶. This gap shows the need for better content design and communication strategies⁷. Therefore, understanding how to enhance users' engagement and encourage continued use of health-related WOAs has become important⁸.

Existing research on WOAs has mainly covered three areas: First, studies have categorized WOAs based on the type of accounts, such as those run by government agencies, hospitals, or specialized health topics^{5,9}. Second, researchers have examined how the characteristics of the content (e.g., format, multimedia, article types) affect users' behaviors^{5,8}. Third, some studies have looked at psychological factors and motivations, such as performance expectancy, entertainment, and social influence, to explain why users keep using these accounts^{8,10}.

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Although these studies offer useful insights, they rarely explore deeply how users cognitively process the diverse health information and form internal beliefs, leaving important questions unanswered.

Specifically, four main research gaps exist. **First**, existing studies on WeChat official accounts mostly focus on basic descriptions or single perspectives like technology acceptance or user satisfaction. Few studies examine carefully how users process and evaluate health information and how this leads to internal beliefs and intentions¹¹. In particular, there is little detailed exploration of how users develop trust and confidence, such as self-efficacy, based on varied content features (e.g., information quality, source credibility, and communication skills). **Second**, most research has used single theories such as the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Theory of Planned Behavior (TPB), or Uses and Gratifications Theory (UGT). These theories partly explain user behavior but rarely capture how users simultaneously process external information and form internal beliefs^{3,12}. Thus, there is a need to combine cognitive and psychological theories to more fully explain user behaviors. **Third**, previous studies have paid little attention to differences among users. Although factors like gender or experience likely influence how users evaluate health information on WOAs, these individual differences have rarely been systematically studied in this context¹³. Ignoring these differences may limit the effectiveness of personalized health communication. **Fourth**, from a methodological viewpoint, most current research on WOAs uses interviews¹⁴, correlation analysis, or traditional covariance-based structural equation modeling (CB-SEM) methods¹². Although CB-SEM is good for testing established theories, it has limitations for exploratory research, complex relationships, mediation and moderation effects, or smaller sample sizes¹⁵. The use of Partial Least Squares Structural Equation Modeling (PLS-SEM), which is more flexible and suitable for predictive models, remains rare in digital health studies¹⁶.

To address these gaps, this study aims to build a psychologically grounded dual-route persuasion model based on the ELM and SCT. Specifically, this research explores how individual information processing factors and self-efficacy influence users' intentions to use health-related WOAs. It also examines how gender and user experience may moderate these pathways. The research questions guiding this study are as follows:

RQ1 What is the effect of individual information processing factors on users' self-efficacy in using health-related WeChat official accounts?

RQ2 What is the mediating role of self-efficacy between information processing routes and users' behavioral intention to use health-related WeChat official accounts?

RQ3 Do gender and user experience moderate the relationships among information processing factors, self-efficacy, and behavioral intention of using WeChat official accounts?

This study offers several contributions. **Theoretically**, it integrates individual information processing factors from ELM with self-efficacy from SCT, offering a dual-path framework that explains how cognitive and psychological mechanisms jointly shape users' behavioral intention to use health-related WeChat official accounts. It extends previous research by identifying self-efficacy as a key mediator between external information cues and behavioral outcomes. Furthermore, the result highlights the moderating roles of gender, adding depth to our understanding of user diversity in digital health engagement. **Practically**, the findings emphasize the importance of both peripheral and central information routes in strengthening users' self-efficacy, and provide actionable insights for enhancing content credibility, tailoring communication strategies. In addition, these implications are relevant for healthcare institutions, public health agencies, and nonprofit health organizations seeking to improve the effectiveness of WeChat-based health communication. The insights generated from this study may also inform the design of targeted communication strategies and user-centered digital health content, particularly for female users or those with low confidence in health information processing. **Methodologically**, the use of PLS-SEM allows for a more flexible and predictive analysis of complex mediating and moderating relationships, offering an alternative to traditional CB-SEM approaches commonly used in this area.

Theoretical foundation

The elaboration likelihood model

The ELM, developed by Petty and Cacioppo in the early 1980s, aims to explain the distinct cognitive processing routes involved in persuasion¹⁷. ELM addressed the limitations of traditional models in explaining the diversity of attitude change¹⁸. Of the two routes, the central route applies to high-involvement scenarios, where individuals engage in deep analysis of the message content, leading to more enduring attitudes¹⁹. In contrast, the peripheral route relies on external cues (e.g., source credibility) to form attitudes in low-involvement scenarios²⁰.

The factors involved in the peripheral and central routes largely depend on an individual's motivation and ability¹⁸. Peripheral route factors typically include source credibility and authority (e.g., medical experts or celebrity endorsements), reliability of the source (e.g., well-known institutions or brands), sensory appeal (e.g., images, colors, and layout), emotional content (e.g., storytelling that evokes emotional resonance), simple persuasive cues, social proof, concise and memorable information, message repetition for enhanced recall and acceptance, and the influence of communication channels^{19–22}. Central route factors, on the other hand, include logical consistency and message quality¹⁸, message relevance²¹, comprehensive information¹⁹, complexity matched to users' capabilities²³, data and scientific evidence²¹, and clear organizational structure¹⁹. For this study, the core factors of the peripheral and central routes were selected and operationalized into measurable items grouped under three main categories. Peripheral route factors are represented by Source Credibility and Communication Skills, while the central route factor is represented by Information Selection and Processing Quality.

ELM has been widely applied in the health domain. In chronic disease management (e.g., diabetes), the central route is used to enhance deep understanding of disease management strategies, while the peripheral

route increases the appeal of the information²¹. In health crisis management, during the early stages of the COVID-19 pandemic, combining detailed information provided through credible government platforms (central route) with concise, visual announcements (peripheral route) effectively disseminated preventive measures¹¹. In patient education, ELM helps design communication strategies that meet the needs of patients with varying health literacy levels. For instance, patients with high health literacy benefit from detailed disease knowledge through the central route, while those with lower health literacy rely on simple peripheral cues, such as icons or endorsements from physicians²³. Therefore, it is reasonable to adopt ELM to study health-related WeChat official accounts in this research.

Social cognitive theory

According to Albert Bandura's SCT, individuals play an active role in shaping their own behavior by setting goals, evaluating outcomes, and adjusting their actions based on personal beliefs²⁴. A core concept of SCT is self-efficacy (SE), which refers to an individual's belief in their ability to successfully execute specific behaviors in a given context²⁵. Self-efficacy is shaped by four key sources: mastery experiences, vicarious experiences, verbal persuasion, and physiological states²⁴. SCT has been widely applied in educational, therapeutic, occupational, and health behavior settings, providing a practical and evidence-based framework²⁴. Previous research on health information on WeChat also has drawn on the SCT factor and proved its robustness^{5,8,12}. Based on the above review of the literature, self-efficacy is appropriate to study health-related WeChat official accounts. In this study, the key variable of the SCT, self-efficacy, was used.

The combination study of SCT and ELM

This study develops a theoretical framework that integrates ELM and SCT. These two theories offer complementary perspectives—ELM explains how users cognitively process health messages, while SCT focuses on internal beliefs, particularly self-efficacy, that guide behavioral decision-making.

In previous public health communication studies, the integration of SCT and ELM has proven to be effective. For example, combining ELM and SCT to design health campaigns aimed at promoting safer sexual behaviors significantly enhanced self-efficacy and improved behavioral outcomes²⁶. Guo et al. found that integrating ELM with health awareness variables from SCT improved patients' intention to use mobile health services²⁷. Zhou further showed that in online health communities, self-efficacy moderated the influence of both central (argument quality) and peripheral (source credibility, emotional support) cues on information adoption²⁸. However, research that applies this dual-theoretical framework specifically in the context of health-related WOAs remains limited. This highlights the need to examine how cognitive and psychological mechanisms jointly shape user behavior on platforms like WeChat.

Unlike prior studies that mention both ELM and SCT conceptually, this research operationalizes their intersection by treating self-efficacy not merely as an outcome, but as a conduit that translates perceived message quality and source characteristics into behavioral motivation. This process model offers an explanatory mechanism for how persuasive cues are internalized as psychological readiness, which then leads to intention formation—a pathway seldom tested empirically in prior WOA studies.

Behavioral intention of using Health-related WeChat official accounts

Behavioral intention refers to an individual's conscious willingness to engage in a particular action. In the context of this study, it represents a user's intention to use WOAs to access health information. Previous traditional model studies have shown that behavioral intention is a reliable predictor of actual usage behavior in both general social media and health communication settings^{29–31}. Studies have also confirmed the critical role of intention in determining user behavior in WeChat-based health platforms^{7,8}. Therefore, understanding the factors that shape users' behavioral intentions toward WOAs is essential for promoting meaningful engagement with health content.

Research framework

This study proposes a psychologically grounded dual-pathway model based on ELM and SCT to examine the factors influencing WeChat users' behavioral intentions to engage with health-related WOAs. The research model, as illustrated in Fig. 1, outlines the hypothesized relationships. This integrative model proposes a novel conversion mechanism between communication cues and internal efficacy beliefs.

Source credibility

In social media contexts, Source Credibility typically refers to the expertise and reliability of the communicator. Expertise encompasses the communicator's knowledge and experience in the relevant field³² while reliability pertains to whether the communicator is perceived as providing accurate and trustworthy information³³. In this study, Source Credibility, a well-established construct in social media research, is selected as the representative variable for both expertise and reliability³⁴. Previous research on health information within the WeChat platform has demonstrated a significant correlation between the Source Credibility of health information and users' self-efficacy, particularly among elderly users. Experienced older users are more adept at recognizing and processing credible health information, which enhances their self-efficacy and promotes information-seeking behavior³⁵. Moreover, within the WeChat platform, Source Credibility has been shown to boost users' willingness to utilize health knowledge by enhancing their self-efficacy³⁴. Indirect evidence further highlights that the reliability of health information significantly predicts users' health information-seeking behaviors, with self-efficacy playing a mediating role in this process³⁶.

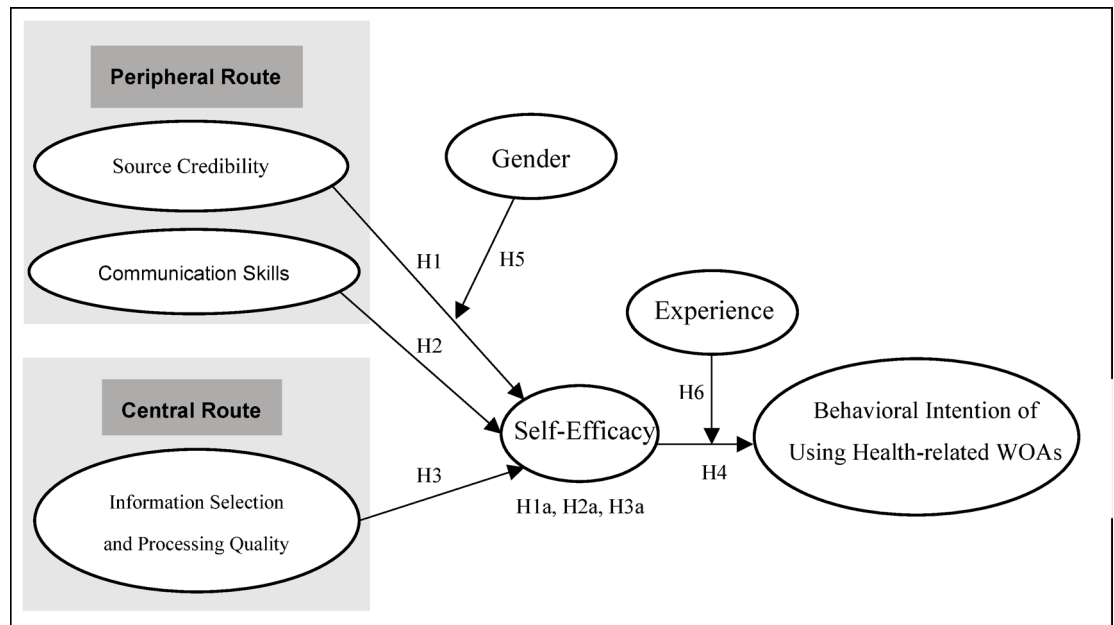


Fig. 1. Research Framework.

Therefore, in this study, Source Credibility is considered a factor predicting self-efficacy. Additionally, self-efficacy is hypothesized as a mediator between Source Credibility and users' behavioral intentions to engage with health-related WOAs. The following hypotheses are proposed:

H1 Source Credibility of Health-related WOAs will positively affect Self-efficacy among WeChat users.

H1a Self-efficacy mediates the relationship between Source Credibility of Health-related WOAs and the Behavioral Intention of Using Health-related WOAs among WeChat users.

Communication skills

Communication Skills refer primarily to the clarity and persuasiveness of information as well as its interactivity^{37,38}. In this study, Communication Skills encompass key peripheral route factors from ELM, including social popularity, information simplicity, visual design, and background music. Social popularity has been shown to have a significant positive effect on consumers' perceptions of efficacy³⁹. Also, research on the motivation and engagement of WeChat users in health information exchanges has demonstrated that the simplicity of the communicator's message significantly influences users' self-efficacy⁴⁰. Similar findings were reported by Wu and Kuang, who found that clear and concise information on WeChat significantly enhances users' self-efficacy, thereby increasing their intention to share information¹². Additionally, Sontag highlighted that visual information, such as images depicting recovery states, can improve participants' positive emotions and self-efficacy, effectively promoting health behavior changes⁴¹. Furthermore, background music can indirectly enhance the acceptance and impact of health information by improving emotional responses. Moderate-tempo music is particularly effective in fostering positive emotions and self-efficacy⁴².

Accordingly, Communication Skills are considered a predictor of users' self-efficacy. Furthermore, self-efficacy is hypothesized to mediate the relationship between Communication Skills and users' intentions to engage with health-related WOAs. The following hypotheses are proposed:

H2 Communication Skills of Health-related WOAs will positively affect Self-efficacy among WeChat users.

H2a Self-efficacy mediates the relationship between Communication Skills of Health-related WOAs and the Behavioral Intention of Using Health-related WOAs among WeChat users.

Information selection and processing quality

Information Selection refers to the process by which individuals prioritize specific information based on criteria such as relevance and trustworthiness, while Processing Quality reflects an individual's ability to logically analyze, integrate, and deeply comprehend information⁴³. Basnyat et al. highlighted the role of information selection and processing quality in health communication behaviors, noting that efficient information selection and processing significantly enhance self-efficacy and the likelihood of successful health behaviors⁴⁴. Improving information selection and processing quality is crucial for audiences to access reliable health information and take action, particularly when supported by data⁴⁵.

In this study, drawing from the central route of ELM, Information Selection and Processing Quality includes four dimensions: logical consistency and quality, information relevance, comprehensiveness, and data or

scientific evidence. Previous studies have provided empirical support for these dimensions. Block and Keller⁴⁶ demonstrated that logically coherent information significantly enhances self-efficacy. Basnyat et al. explored the role of information relevance in health communication, finding that information closely aligned with audience needs markedly improves self-efficacy⁴⁵. Similarly, Lo et al. emphasized that relevance and information appeal play a critical role in boosting self-efficacy, particularly when the information resonates with the audience's interests and prompts deeper processing⁴⁴. Ren et al., in a study on WeChat-based health education for dialysis patients, found that comprehensive information significantly enhanced patients' self-management skills and self-efficacy⁴⁷. Furthermore, information supported by scientific data has been shown to promote health behaviors through improved self-efficacy⁴⁶. Based on these findings, the following hypotheses are proposed:

H3 Information Selection and Processing Quality of Health-related WOAs will positively affect Self-efficacy among WeChat users.

H3a Self-efficacy mediates the relationship between Information Selection and Processing Quality of Health-related WOAs and the Behavioral Intention of Using Health-related WOAs among WeChat users.

Self-efficacy

Previous research has found a positive effect of self-efficacy (SE) on the intention to use information^{12,48}. In the context of health communication via WOAs, SE may play a crucial role in influencing users' intentions to engage with health information. For instance, individuals with high SE regarding their ability to understand and apply health information may be more motivated to use health-related information on WeChat¹². A study investigating factors affecting the continuous use of health-maintenance WOAs among middle-aged and elderly users found that SE significantly influences their intention to use these accounts⁸. Additionally, research on factors affecting users' continuous use behavior in online health communities also found that SE significantly impacts users' continuous use intentions⁴⁹. Thus, self-efficacy is hypothesized to predict behavioral intention to use WOAs. The following hypothesis is proposed:

H4 Self-efficacy will positively affect the Behavioral Intention of Using Health-related WOAs among WeChat users.

The moderating role of gender and experience

Gender

Previous research has shown that users' perceptions of Source Credibility and information quality on social media influence their psychological evaluation of shared content, with gender playing a moderating role in this relationship⁵⁰. Additionally, gender significantly moderates the process of seeking and evaluating online health information, with men and women having different standards and preferences for judging information credibility⁵¹. An analysis of demographic differences and tobacco use in Oklahoma also found that women trust media information more than men, indicating that men and women perceive information from different sources differently, which may further affect their psychological processes of judgment and decision-making⁵². Similar results have been observed in the context of WOAs, where SC significantly impacts the intention to adopt health knowledge, and demographic variables such as gender may moderate this process⁵³.

Therefore, based on the above research, we hypothesize that gender can act as a moderating variable, influencing the relationship between Source Credibility and self-efficacy within communicator factors. The hypothesis is as follows:

H5 Users' gender plays a moderating role between Source Credibility of Health-related WOAs and self-efficacy.

Experience

Experience generally refers to the frequency, depth, and familiarity gained by users from the first time they interact with and use a system or technology up to the present³¹. The moderating role of experience between self-efficacy and behavioral intention has been explored in numerous studies within the health domain. Research on exercise health has indicated that different types of experience (e.g., skiing-related experience versus non-skiing-related experience) differentially impact SE and behavioral intention. For instance, skiing-related experience significantly enhances SE and behavioral intention in skiing activities⁵⁴. Moreover, a meta-analysis on the influence of attitude, norms, and SE on health-related intentions and behaviors found that the impact of SE on health behavior is moderated by experience and context⁴⁶. SE can moderate the relationship between intention and behavior, and individuals with more experience perform better in planning and executing behavior⁵⁵. Based on the above discussion, we will examine the moderating role of experience between self-efficacy and behavioral intention to use health-related WOAs. The following hypothesis is proposed:

H6 Users' experiences with Health-related WOAs play a moderating role between self-efficacy and behavioral intention of using Health-related WOAs.

Method

The methodological approach followed a structured sequence: beginning with model conceptualization and survey design, followed by expert validation and a pilot test to refine items. Data were then collected online from a target population of digitally active users, and analyzed using a component-based PLS-SEM framework tailored to predictive model evaluation.

Sample and data collection

The data for this study were collected on all working days from April 11 to May 9, 2024, using an online questionnaire collection platform (www.sojump.com). The target population consisted of individuals in mainland China who have experience with or potential interest in using WOAs. The survey link was distributed through social media WeChat groups, Tencent QQ, and the questionnaire assistance community on the online survey platform (www.sojump.com). The sampling method used was Voluntary Response Sampling, which is easy to implement, cost-effective, and more likely to attract participants interested in the research topic. All participants participated anonymously and voluntarily. Before participating, participants were informed of the study's purpose and the relevant participation methods. The data collected did not include any information that could identify individuals, and it was confirmed that informed consent had been obtained from all participants and/or their legal guardians. According to the *Guidelines for Life Sciences and Medical Research Involving Humans* issued by the National Health Commission of China, ethical review is exempted when the research involves the use of human information or biological samples without causing harm to individuals, does not involve sensitive personal information, and is unrelated to commercial interests⁵⁶. As this study meets these criteria, ethical review was not required.

Given that the study was conducted in China, the original questionnaire was first translated from English into Chinese following standard cross-cultural translation procedures⁵⁷. Subsequently, English language experts were invited to perform a back-translation to ensure semantic equivalence. Prior to formal data collection, two scholars specializing in health communication and five experienced WOAs users participated in a content validity assessment. They evaluated the relevance and clarity of each item, offering detailed feedback that informed a preliminary revision of the questionnaire to better align with the intended constructs. The Item-level Content Validity Index (I-CVI) reached an acceptable threshold of 0.75, indicating satisfactory content validity. A total of 443 questionnaires were collected, with 9 deemed invalid and excluded, resulting in 434 valid responses and a high response rate of 97.97%. The effective sample size was more than ten times the total number of measurement items, thus meeting the recommended criteria for sample adequacy in PLS-SEM analysis⁵⁸.

Data analysis technique

For demographic information and user usage characteristics, the researchers used SPSS 25.0. The main constructs of the study were analyzed using the PLS-SEM method, which is component-based and suitable for validating small samples, non-normal distributions, and exploratory theoretical model research⁵⁹. The software used was SmartPLS 4.1. The model analysis was divided into measurement model analysis and structural model analysis⁶⁰. To improve model transparency, the structural paths tested via PLS-SEM are formalized as the following equations (β_i = Path coefficients, ϵ_i = Error terms).

Equation (1):

$$SE = \beta_1 \times CS + \beta_2 \times SC + \beta_3 \times ISP + \epsilon_1$$

Equation (2):

$$BI = \beta_4 \times SE + \epsilon_2$$

Equation (3):

$$SE_{female} - SE_{male} = \Delta\beta \times SC$$

Measurement instruments

This study employed a cross-sectional design and collected data through an online survey to investigate the factors influencing users' Behavioral Intention of Using Health-related WOAs (BI). The survey was divided into two parts: Part A and Part B. Part A gathered demographic and user usage information, such as gender, age, income, education level, types of health-related WOAs known or used, purposes of using health-related WOAs, and the frequency of social media platform usage within the past 12 months. Part B focused on the research constructs and used a five-point Likert scale ranging from "strongly disagree" to "strongly agree" to explore the factors influencing WeChat users' BI. The constructs involved included Source Credibility (SC), Communication Skills (CS), Information Selection and Processing Quality (ISP), Self-Efficacy (SE), Behavioral Intention (BI) of Using Health-related WOAs, and Experience. To enhance the validity of the study, the survey items were adapted from previous research. The specific items are detailed in Appendix A.

Behavioral intention of using Health-related WOAs

Behavioral Intention of Using Health-related WOAs was adapted from the studies of Zhang, Xu, and Cheng⁶¹ Chen, Sun, Wu, and Song⁶² and Wu and Kuang¹². It measures BI from three aspects: information acquisition motivation, interactivity and engagement, and social norms and cognition. A five-point Likert scale was used, ranging from "strongly disagree" to "strongly agree."

Self-Efficacy

Self-Efficacy (SE) was assessed using items adapted from validated scales on health information acquisition efficacy, self-management efficacy, and interaction efficacy^{6,63,64}. A five-point Likert scale was used, ranging from "strongly disagree" to "strongly agree."

ELM factors

Source Credibility is measured based on the reputation and authority of the source as well as the consistency and accuracy of the content^{65,66}. Communication Skills are assessed using indicators such as social popularity, information simplicity, visual design, and background music^{18–20,22}. Information Selection and Processing Quality is evaluated based on logical consistency and quality, information relevance, comprehensiveness, and the presence of data and scientific evidence^{17,18,20}. A five-point Likert scale, ranging from “strongly disagree” to “strongly agree,” was used for measurement.

Experience

Experience was measured by the duration from the user’s initial use of WOAs to the time of completing the questionnaire, adapted from Venkatesh et al.³⁰. The questionnaire provided five options, each corresponding to a specific time range with assigned scores for quantitative analysis. The measurement method is as follows: Never (1 point), Less than 3 months (2 points), 3–6 months (3 points), 6–12 months (4 points), and more than 12 months (5 points). In the PLS-SEM analysis, this was used as a measurement indicator to reflect the latent variable as a continuous variable.

Demographics

In addition to gender, other demographic variables, including age, monthly income, and education level, were used as control variables.

Results

Demographic characteristics

Table 1 presents the demographic profile of the respondents. Females slightly outnumber males (56.7% vs. 43.3%). Most participants are aged between 19 and 38, with the largest group aged 26–30 (29.3%), followed by 31–38 (25.1%) and 19–25 (24.4%). Respondents under 18 or over 55 are minimal (<2.5%). In terms of education, the majority hold tertiary qualifications, with 47.9% holding undergraduate degrees and 30.4% from vocational colleges. Only a small fraction reported middle school (3.5%) or primary education (0.9%). Monthly income is primarily concentrated in the 5001–8000 RMB range (44.9%), followed by 2001–5000 RMB (28.3%) and 8001–11,000 RMB (12.2%). High-income earners (>11001 RMB) constitute less than 10%. Overall, the sample reflects a relatively young, well-educated population with moderate to above-average income levels.

Use characteristics of Health-related WOAs

According to Table 2, users reported diverse types and purposes of engagement with health-related WOAs. The most commonly used types were health information (65.00%), medical purchases (53.20%), and health preservation and nutrition (49.30%), while fewer users reported engaging with services such as women’s health management (24.00%) or fitness and weight loss (14.29%). In terms of purpose, the majority used WOAs to access health information (60.14%) or make inquiries (54.15%), followed by appointment registration (55.76%)

Items	Category	Frequency	Percentage (%)
Gender	Male	188	43.3
	Female	246	56.7
Age	18 years and below	3	0.7
	19–25 years	106	24.4
	26–30 years	127	29.3
	31–38 years	109	25.1
	39–45 years	53	12.2
	46–54 years	29	6.7
	55 years and above	7	1.6
Education Level	Elementary school and below	4	0.9
	Junior High School	15	3.5
	High School	51	11.8
	Vocational College	132	30.4
	Bachelor	208	47.9
	Master and above	24	5.5
Monthly Income	2000 RMB and below	33	7.6
	2001–5000 RMB	123	28.3
	5001–8000 RMB	195	44.9
	8001–11,000 RMB	53	12.2
	11,001–14,000 RMB	18	4.1
	14,001–14,999 RMB	6	1.4
	15,000 RMB and above	6	1.4

Table 1. Demographic information (n = 434).

Characteristics	Category	Frequency (n)	Percentage (%)
Health-related WOAs known and used	Medical Purchase	198	65.00
	Health Information	282	53.20
	Health Preservation & Nutrition	231	43.50
	Intelligent Diagnosis	189	49.30
	Online Consultation	214	33.20
	Women's Health Management	144	24.00
	Fitness & Weight Loss	104	65.00
Purpose of Using Health-related WOAs	Health Information Inquiry	235	54.15
	Health Information Access	261	60.14
	Appointment Registration	242	55.76
	Outpatient Payment	175	40.32
	Online Diagnosis	216	49.77
	Report Query	140	32.26
	Finding Interest Groups	62	14.29
Experience of Using Health-related WOAs	Never	0	0.00
	Less than 3 months	21	4.84
	3–6 months	112	25.81
	6–12 months	162	37.33
	More than 12 months	139	32.02
Frequency of Using Health-related WOAs within 12 months	At least once a day	37	8.53
	3–5 times a week	158	36.41
	1–2 times a week	172	39.63
	Once every few weeks	61	14.06
	Followed but not used	6	1.38

Table 2. Use characteristics of Health-related WOAs ($n = 434$). Note. Types and Purposes of Use are Multiple Choice.

and online diagnosis (49.77%). Regarding user experience, most respondents had used WOAs for 6–12 months (37.33%) or more than 12 months (32.02%), while only 4.84% had used them for less than 3 months. In terms of frequency, the largest groups reported usage 1–2 times per week (39.63%) or 3–5 times per week (36.41%), with 8.53% using them daily. Only 1.38% of users reported following but not using WOAs.

Measurement model evaluation

The PLS-SEM reliability and validity assessment (Table 3) confirms that the measurement model is robust across all constructs. Outer loadings exceed 0.7, demonstrating strong explanatory power for each latent variable⁶⁰. Cronbach's Alpha and Composite Reliability (CR) values are above 0.7, indicating good internal consistency^{67,68}. Additionally, Average Variance Extracted (AVE) values surpass 0.5, confirming satisfactory convergent validity⁶⁸.

Regarding the assessment of discriminant validity (Table 4), the analysis of cross loadings shows that each measurement item has a higher loading on its corresponding construct than on other constructs. This indicates that each construct exhibits good discriminant validity, meaning that each measurement item explains its corresponding construct better than it does other constructs. This further validates the effectiveness of the measurement model⁶⁰.

Structural model evaluation

To address RQ1, this section analyzes how individual information processing factors (source credibility, communication skills, and information selection and processing quality) influence users' self-efficacy.

Evaluating the structural model requires assessing multicollinearity, which arises from high correlations among independent variables. The Variance Inflation Factor (VIF) is used for this purpose, with values between 3 and 5 considered acceptable⁶⁰. Table 5 shows that all VIF values in the model fall within this range, indicating no multicollinearity issues. Additionally, in PLS-SEM, path coefficients are used to measure the strength of relationships between latent variables, and the significance of path coefficients is usually assessed using T-values and P-values. If the path coefficients are significant (P-value less than 0.05, T-value greater than 1.645), it indicates that the relationships between latent variables are statistically significant^{60,69}. Table 5 presents the significance results of some hypotheses' paths.

First, CS have a significant positive impact on SE. The path coefficient is 0.38, indicating a strong explanatory power of CS on SE. The T-value is 6.76, and the P-value is 0.000 (less than 0.05), showing that this path coefficient is statistically significant. This means that improving CS can effectively enhance individuals' SE. Therefore, H2 is supported. Second, ISP also have a significant positive impact on SE. The path coefficient is 0.31, with a T-value of 6.42 and a P-value of 0.000, indicating that this relationship is statistically significant. This suggests that the

Construct	Items	Outer Loadings	Cronbach's α	CR (rho_a)	CR (rho_c)	AVE
Behavioral intention of Using Health-related WOAs	BI1	0.817	0.815	0.818	0.879	0.645
	BI2	0.782				
	BI3	0.76				
	BI4	0.85				
Communication Skills	CS1	0.8	0.785	0.785	0.861	0.608
	CS2	0.734				
	CS3	0.798				
	CS4	0.786				
Information Selection and Processing Quality	ISP1	0.769	0.782	0.783	0.86	0.605
	ISP2	0.773				
	ISP3	0.778				
	ISP4	0.79				
Source Credibility	SC1	0.809	0.794	0.795	0.866	0.619
	SC2	0.786				
	SC3	0.777				
	SC4	0.774				
Self-Efficacy	SE2	0.785	0.709	0.709	0.837	0.632
	SE3	0.803				
	SE4	0.797				

Table 3. Construct reliability and validity Analysis.

Items	BI	CS	ISP	SC	SE
BI1	0.817	0.702	0.676	0.714	0.652
BI2	0.782	0.677	0.707	0.679	0.682
BI3	0.76	0.731	0.672	0.659	0.659
BI4	0.85	0.693	0.701	0.73	0.73
CS1	0.692	0.8	0.674	0.666	0.664
CS2	0.675	0.734	0.665	0.668	0.667
CS3	0.677	0.798	0.664	0.658	0.658
CS4	0.674	0.786	0.652	0.682	0.681
ISP1	0.643	0.626	0.769	0.603	0.598
ISP2	0.711	0.701	0.773	0.707	0.687
ISP3	0.669	0.652	0.778	0.664	0.665
ISP4	0.642	0.666	0.79	0.607	0.654
SC1	0.688	0.701	0.64	0.809	0.654
SC2	0.696	0.682	0.653	0.786	0.674
SC3	0.693	0.664	0.68	0.777	0.655
SC4	0.649	0.652	0.643	0.774	0.634
SE2	0.683	0.666	0.67	0.694	0.785
SE3	0.685	0.708	0.685	0.664	0.803
SE4	0.656	0.668	0.644	0.625	0.797

Table 4. Cross loading of Model.

Paths	Standardized path coefficients	T value	P values	VIF
CS → SE	0.38	6.76	0.000	4.96
ISP → SE	0.31	6.42	0.000	4.24
SC → SE	0.25	3.75	0.000	4.42
SE → BI	0.84	35.83	0.000	1.02
Experience → BI	-0.02	0.806	0.420	/
Experience*SE → BI	0.02	1.002	0.317	/

Table 5. Path coefficient Analysis.

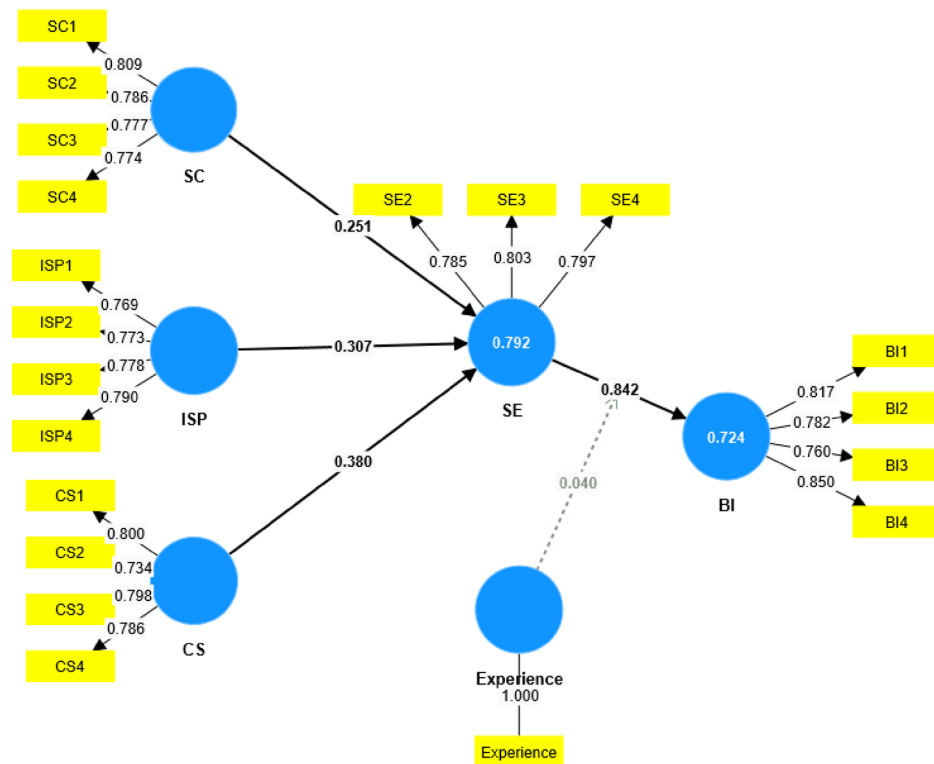


Fig. 2. Results of structural modeling generated from SmartPLS 4.1.

Paths or Constructs	f^2	R^2	Q^2
CS $\rightarrow$ SE	0.14		
ISP $\rightarrow$ SE	0.11		
SC $\rightarrow$ SE	0.07		
SE $\rightarrow$ BI	2.53		
BI	/	0.72	0.46
SE	/	0.79	0.49

Table 6. Analysis of R^2 , f^2 and Q^2 .

stronger the individual's ability in selecting and processing information, the higher their SE. Therefore, H3 is supported.

Additionally, SC has a significant impact on SE as well. The path coefficient is 0.25, the T-value is 3.75, and the P-value is 0.000, showing that this path coefficient is statistically significant. This means that the higher the SC, the stronger the individual's SE. Therefore, H1 is supported. Lastly, SE has a very strong significant positive impact on BI. The path coefficient is 0.84, the T-value is 35.83, and the P-value is 0.000, indicating that this path is extremely significant statistically. The relatively high standardized path coefficient from self-efficacy to behavioral intention ($\beta=0.84$) demonstrates not just statistical significance, but a substantive effect size indicating that perceived personal capability is the most decisive predictor in shaping WeChat users' willingness to engage with health information. This suggests that beyond content quality, users need to feel psychologically equipped to interpret and act on health content. Therefore, H4 is supported. The final structural equation model is shown in Fig. 2.

Explanation of R^2 , f^2 and Q^2

As shown in Table 6, the PLS-SEM results indicate that the model has strong explanatory and predictive power. According to Cohen, f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively⁷⁰. In this study, communication skills (CS) showed a near-medium effect on self-efficacy (SE) ($f^2 = 0.14$), while information selection and processing (ISP) and source credibility (SC) had smaller but notable effects ($f^2 = 0.11$ and 0.07, respectively). The effect of SE on behavioral intention (BI) was very large ($f^2 = 2.53$), indicating a strong influence.

Regarding explanatory power, the R^2 value for BI was 0.72, suggesting that SE explained 72% of its variance—a moderate level according to Hair et al.⁵⁹. The R^2 for SE was 0.79, indicating that CS, ISP, and SC

Paths	Indirect Effect	Direct Effect	T value	P values	Bootstrapping 95% CI (Bias-corrected)	
CS→SE→BI	0.066	0.269	5.586	0.000	0.03	0.115
ISP→SE→BI	0.053	0.243	5.32	0.000	0.022	0.095
SC→SE→BI	0.044	0.29	5.476	0.000	0.017	0.087

Table 7. Results of the mediation effect Test.

Path	Male	Female	Difference	Permutation mean difference	p value
SC -> SE	0.035	0.364	-0.33	-0.001	0.012

Table 8. Results of the moderation effect Test.

jointly explained 79% of the variance in SE, which exceeds the threshold for strong explanatory power⁶⁰. In addition, predictive power, assessed via the blindfolding procedure, was also strong. The Q² values were 0.46 for BI and 0.49 for SE, both exceeding the 0.35 threshold for high predictive relevance⁶⁰. The high Q² values for both endogenous constructs (0.46 for BI and 0.49 for SE) confirm that the model possesses strong out-of-sample predictive relevance. Taken together with R² values, these indicators suggest the theoretical framework not only explains but accurately forecasts user behavior, which addresses potential concerns regarding model robustness and external validity.

Overall, CS had the greatest effect among the predictors of SE, while SE strongly influenced BI. The high R² and Q² values confirm the model's robustness in explaining and predicting user behavior. Compared to prior studies using traditional health beliefs or technical models (e.g., TAM, HBM, or UTAUT) in WeChat or mHealth contexts, which often report R² values for behavioral intention in the range of 0.40–0.60 (Xu et al., 2021; Min et al., 2024), the current study's R² of 0.72 suggests that the integrated model provides enhanced explanatory power.

Mediation effects testing

To address **RQ2**, this section examines whether self-efficacy mediates the relationship between information processing factors and behavioral intention to use health-related WOAs.

The PLS-SEM model analysis results (Table 7) indicate that CS have an indirect effect on BI through SE of 0.066 and a direct effect of 0.269. The T-value is 5.586, and the P-value is 0.000, indicating that this path is statistically significant. The Bootstrap 95% confidence interval (bias-corrected) ranges from 0.03 to 0.115, not including 0, further confirming the significance of the indirect effect. This suggests that SE partially mediates the relationship between CS and BI⁶⁰. Therefore, H2a is supported.

Secondly, the indirect effect of ISP on BI through SE is 0.053, with a direct effect of 0.243. The T-value is 5.32, and the P-value is 0.000, indicating that this path is statistically significant. The Bootstrap 95% confidence interval ranges from 0.022 to 0.095, not including 0, further confirming the significance of the indirect effect. SE also partially mediates the relationship between ISP and BI⁷¹. Therefore, H3a is supported.

Lastly, the indirect effect of SC on BI through SE is 0.044, with a direct effect of 0.29. The T-value is 5.476, and the P-value is 0.000, indicating that this path is statistically significant. The Bootstrap 95% confidence interval ranges from 0.017 to 0.087, not including 0, further confirming the significance of the indirect effect. SE also partially mediates the relationship between SC and BI⁶⁰. Therefore, H1a is supported.

Moderation effects testing

To address **RQ3**, this section explores whether gender and user experience moderate the relationships among information processing factors, self-efficacy, and behavioral intention.

Experience

According to the path analysis results of the PLS-SEM model (Table 5), the standardized path coefficient of Experience on BI is -0.02, with a T-value of 0.806 and a P-value of 0.420. Since the P-value is greater than 0.05, it indicates that the direct effect of Experience on BI is not statistically significant. This means that an individual's level of experience does not directly influence their BI. Furthermore, regarding the moderating effect of Experience, the interaction term of Experience and Self-Efficacy (Experience*SE) on BI has a standardized path coefficient of 0.02, with a T-value of 1.002 and a P-value of 0.317, it indicates that the moderating effect of Experience on the relationship between SE and BI is also not statistically significant⁶⁰. This suggests that an individual's level of Experience does not significantly moderate the impact of SE on BI. Therefore, hypothesis H6 is rejected.

Gender

Since gender is a categorical variable, multi-group analysis (MGA) was used to examine the moderating effect. According to the results of the multi-group analysis (Table 8), gender significantly moderates the impact of SC on SE. Specifically, in the female group, the path coefficient of SC on SE is 0.364, indicating a strong positive impact of SC on SE among females. In contrast, in the male group, this path coefficient is only 0.035, indicating

a minimal impact of SC on SE among males. The difference in path coefficients is -0.33, with a P-value of 0.012 (less than 0.05), further confirming the statistical significance of this difference⁶⁰. This indicates that females rely more on the credibility of information sources when evaluating and utilizing information, whereas males are less sensitive in this regard. Therefore, hypothesis H5 is supported. The final structural equation model is shown in Fig. 2.

Findings and discussions

The study aims to investigate the factors influencing users' SE and BI to use health-related WOAs. A pathway from ELM factors to the psychological factor was created, and the results were presented based on a sample of 434 respondents from mainland China. The following is a discussion of the research findings according to the results.

Firstly, in the analysis of general usage behavior characteristics, we found that respondents exhibited significant diversity and frequency in their use of health-related WOAs. Among the types of health-related WOAs known and used, health information (64.98%) and health maintenance and nutrition (53.23%) were the most common, followed by online consultations (49.31%) and medical purchases (45.62%). This result aligns with the findings of Li and Chang, indicating that health-related WOAs play an essential role in providing diverse health services and information³⁵. In terms of the purposes for using health-related WOAs, obtaining health information (60.14%) and health information inquiries (54.15%) were the primary uses, with appointment scheduling (55.76%) and online consultations (49.77%) also having substantial proportions. This indicates that users rely on WOAs not only for general health knowledge but also for specific medical services. This phenomenon suggests that health-related WOAs have become a vital tool for users' daily health management, meeting their needs for timely, convenient, and reliable health services.

The user experience data showed that the majority had 6–12 months of usage experience (37.33%), followed by those with more than 12 months (32.02%), and users with 3–6 months of experience accounted for 25.81%, while those with less than 3 months of use were only 4.84%. This indicates that most users have been able to use health-related WOAs consistently over an extended period, further proving the long-term role these platforms play in users' health management. This finding is consistent with previous studies, suggesting that health-related WOAs can maintain long-term user engagement by continuously providing valuable health information and services⁷². In terms of usage frequency, the highest proportions were users who used WOAs 1–2 times per week (39.63%) and 3–5 times per week (36.41%). Users who used WOAs at least once a day accounted for 8.53%, those who used it a few times a month accounted for 14.06%, and users who followed but did not use WOAs accounted for 1.38%. These data indicate a high prevalence of health-related WOAs among users, with a considerable usage frequency and duration, reflecting a strong demand for health information and services.

Secondly, communication skills emerged as the strongest predictor of self-efficacy ($\beta = 0.380$, $p < 0.001$), highlighting the importance of content presentation in health communication. This finding aligns with prior studies in other health domains^{18–20,22,40}. The significant relationship indicates that aesthetic appeal, simplicity, and social recognition (e.g., metrics such as views, likes, and shares) play a crucial role in enhancing users' confidence in processing health information. Additionally, Information Selection and Processing Quality had a significant positive impact on self-efficacy ($\beta = 0.307$, $p < 0.001$). This relationship underscores the importance of comprehensive, well-structured, and evidence-based content in boosting users' confidence in understanding and utilizing health information. The findings suggest that when health content is organized logically and supported by scientific evidence, users feel more capable of making informed health decisions, consistent with previous research¹⁸.

Notably, prior studies have identified Source Credibility as the strongest predictor of perceived efficacy^{35,73}. However, in this study, its predictive power for self-efficacy was lower than that of CS and ISP, although SC still exhibited a significant positive effect on self-efficacy ($\beta = 0.251$, $p < 0.001$). This finding indicates that health information originating from certified professional institutions and authoritative medical experts increases users' confidence in their ability to understand and act on health information. This result aligns with prior research on the heuristic role of credibility in health communication and extends these findings to the social media context, particularly in the case of health-related WOAs³⁴. Given the prevalence of health misinformation on social platforms, this finding is especially important, emphasizing how institutional authority and professional certification serve as critical trust signals for enhancing users' self-efficacy.

The examination of peripheral and central processing routes suggests that the ELM can be extended to the social media environment. The findings reveal that users engage in both central processing (evaluating evidence and logical structure) and peripheral processing (assessing presentation quality and social approval) when consuming health information on social media. This dual-processing approach is particularly relevant in the WeChat environment, where users are likely to encounter a substantial volume of health-related content.

Thirdly, SE had the strongest positive impact on BI, further validating SCT²⁴ which posits that SE is a crucial factor driving health behavior intention^{8,12}. The mediation analysis results also showed that SE significantly mediates the relationship between CS, ISP, SC, and BI. This indicates that enhancing users' confidence is the most effective way to promote their adoption of health behaviors. Health-related WOAs should continuously enhance users' SE by providing more interactive activities with medical experts and actionable health information to encourage them to adopt positive health behaviors.

Fourthly, gender significantly moderated the impact of SC on SE. Female respondents relied significantly more on SC than male respondents. This finding aligns with the studies of Dedeoglu⁵⁰ and Rowley et al.⁵¹ indicating that females are more sensitive to the authority of information sources when evaluating health information. This may be because females emphasize the reliability and authority of information more when acquiring and utilizing health information, whereas males may focus more on the practicality and direct effects

of the information. Therefore, health-related WOAs should prioritize the authority and accuracy of information to enhance trust among female users.

Unlike previous studies, the moderating effect of Experience on the relationship between SE and BI was not significant. This differs from the findings of Han⁵⁴ and Sheeran et al.⁴⁵ possibly reflecting the specific dynamics of digital health information use. The results of this study suggest that the level of experience does not significantly influence the relationship between SE and BI. This may be because, on the WeChat platform, even users with little experience can quickly enhance their SE through the platform's user-friendliness and high-quality information. Developers should ensure the platform's user-friendliness and ease of use to help new users quickly become proficient and confident.

Implications, limitations and future research

Theoretical implications

This study offers several theoretical contributions to the field of digital health communication. **First**, it combines ELM and SCT to explain users' behavioral intention in the context of WeChat health-related accounts. This psychologically grounded dual-route persuasion model addresses a major theoretical gap by linking external message features (e.g., credibility, communication skills) with internal beliefs (e.g., self-efficacy), offering a more comprehensive understanding of user decision-making. **Second**, the study highlights self-efficacy as a key mediating mechanism between information processing routes and behavioral intention. While self-efficacy is central to SCT, few studies have positioned it as a bridge within ELM-based health models. This research reinforces its role in connecting cognitive evaluation with behavioral outcomes, extending its application to social media health contexts. **Third**, the inclusion of gender as a moderator contributes to individualizing dual-process theories. The finding that female users respond more strongly to credibility cues suggests that user characteristics should be considered in evaluating how information is processed. This advances current ELM theory by incorporating demographic variation into information processing pathways. **Fourth**, although user experience did not show a significant moderating effect, this result suggests that internal psychological factors like self-efficacy may outweigh prior experience in shaping user behavior—particularly in low-barrier platforms like WeChat. This offers new insights into when experience matters in digital health models.

Overall, this study presents a theoretically replicable structure that integrates communicator cues, psychological mechanisms, and user characteristics. It lays a foundation for future research applying this framework to other platforms, technologies, and health behaviors. Furthermore, this psychologically grounded dual-pathway framework responds to recent calls in digital health communication research for integrative models that bridge cognitive message processing and internal belief formation. While prior studies often examine these dimensions separately, our model empirically demonstrates how they interact to shape behavioral intentions in app-based health environments, particularly within mobile-first platforms like WeChat.

Practical implications

The practical relevance of this study lies in its insights for optimizing the design, communication, and delivery of health-related WOAs, with implications extending beyond China to other digital health platforms globally. **First**, the results affirm the importance of enhancing self-efficacy through high-quality content. Platforms should focus on clear, accurate, and actionable information to support users' confidence in applying health knowledge. This is particularly valuable for public health agencies and organizations like the WHO and CDC in leveraging social media to promote health literacy. **Second**, the study emphasizes the strategic value of multimedia communication, such as short videos, infographics, and interactive elements, which support both peripheral engagement and cognitive processing. These formats are effective across platforms and cultures, helping to overcome literacy or language barriers while boosting message retention. In practical terms, this study offers a framework for health organizations and digital developers to design more user-responsive mHealth services. For example, integrating peripheral route features (e.g., visual cues, credibility indicators) with central route content (e.g., evidence-based explanations) may be especially effective in public health campaigns aimed at improving digital health literacy and sustained platform engagement.

Third, the role of source credibility underscores the need for formal collaborations with certified health professionals and institutions. Incorporating professional endorsements, verification badges, and institutional affiliations can improve trust and counteract misinformation. **Fourth**, the observed gender differences suggest that health content should be tailored to user characteristics. For audiences with a higher proportion of female users, communication should emphasize expertise, clarity, and authority, whereas content for male users may benefit from a focus on utility and applicability. **Also**, the finding that experience does not significantly moderate behavioral intention indicates that even novice users can benefit from thoughtfully designed content. This supports the adoption of universal usability principles, particularly important for populations with limited digital literacy. Finally, the model developed in this study provides a potential framework for real-time optimization of health content delivery. For instance, the identified predictors, such as source credibility and communication design, can be embedded into recommendation algorithms within WeChat or similar platforms to dynamically tailor content based on user characteristics (e.g., gender, prior engagement behavior). This implies that the behavioral insights generated through PLS-SEM analysis may inform real-time personalization strategies for improving user engagement and health outcomes, especially when integrated with backend data analytics.

Although WeChat is regionally dominant, the behavioral mechanisms identified here—namely how users respond to source credibility and communication design—are transferable across app ecosystems. Similar features exist in LINE (Japan), KakaoTalk (South Korea), and WhatsApp Business Channels (India, Brazil). The psychologically grounded dual-route persuasion engine we propose may serve as a foundational structure for adapting health communication strategies in these fast-evolving, app-centric environments.

Methodological implications

This study also contributes to the advancement of digital health research through its methodological innovations. First, by employing PLS-SEM, the study is able to simultaneously examine complex mediating and moderating effects, offering both predictive power and robustness in handling latent variables and small-to-medium sample sizes. This approach complements the traditionally theory-driven CB-SEM models by enabling greater model flexibility and sensitivity to exploratory contexts.

Although this study did not directly compare PLS-SEM results with alternative modeling techniques such as CB-SEM within the same dataset, previous studies in similar contexts have shown that PLS-SEM tends to outperform CB-SEM in terms of handling small-to-medium sample sizes and complex mediation/moderation effects (Hair et al., 2019). For example, in examining user behavior on mobile health platforms, Guo et al. (2020) also adopted PLS-SEM and reported stronger model fit and predictive relevance compared to traditional SEM. In this study, the high R^2 ($BI=0.72$) and Q^2 ($BI=0.46$) values further suggest strong explanatory and predictive power. Future research may empirically compare these techniques within the same modeling framework to validate the added value of PLS-SEM in similar settings.

Limitations and future research

This study offers valuable insights into the psychological and cognitive mechanisms influencing users' behavioral intention to use health-related WeChat WOAs, but several limitations should be noted.

First, the use of voluntary response sampling may have led to self-selection bias, as participants were likely those with greater interest or motivation, thereby limiting the generalizability of the findings. Future studies could adopt more rigorous sampling strategies, such as stratified or systematic sampling, to enhance representativeness. **Second**, the study employed a cross-sectional design, capturing user perceptions at a single point in time. To better understand how attitudes and behaviors evolve, longitudinal studies are recommended to reveal temporal dynamics and potential causal pathways. **Third**, this study focused exclusively on users in mainland China, and its findings may be shaped by culturally specific norms, platform usage habits, and communication patterns. Comparative studies across different cultures and platforms could assess whether the observed mechanisms generalize across settings. **Fourth**, although this study explored behavioral intentions, it did not examine actual usage behavior. Bridging the gap between intention and real-world behavior remains a critical task for future research. **Also**, the current model focused on self-efficacy as the sole psychological factor. Expanding the framework to include other constructs, such as health anxiety, cognitive load, social support, or subjective norms, may provide a more comprehensive understanding of health information use in digital environments. Future studies may also incorporate creative psychological moderators such as health anxiety or digital fatigue, which are increasingly relevant in mobile health environments and may enrich the explanatory power of the model.

Finally, Moreover, while PLS-SEM offers flexibility and predictive strength for exploring complex relationships, it also presents certain methodological drawbacks. Unlike covariance-based SEM (CB-SEM), PLS-SEM does not provide global goodness-of-fit indices, which limits the ability to assess overall model fit in a confirmatory framework. Additionally, PLS-SEM is more sensitive to measurement errors and may inflate path coefficients in some conditions. As such, the findings should be interpreted with caution and complemented by confirmatory testing in future studies. Furthermore, the integration of ELM and SCT, though theoretically robust, does not exhaust all possible explanatory constructs in health information behavior. Other psychosocial or emotional variables, such as trust, perceived risk, or health anxiety, were not included and may represent important missing components.

Conclusion

This study proposed and validated a dual-pathway model integrating ELM and SCT to explain users' behavioral intentions to engage with health-related WeChat Official Accounts. By incorporating both message-level cues (e.g., source credibility, communication design, and information quality) and individual psychological factors (self-efficacy), the model offers a comprehensive explanation of how users cognitively and affectively process health information in a mobile platform context. The findings revealed that self-efficacy plays a key mediating role in translating both central and peripheral message features into behavioral intention, with communication skills exerting the strongest indirect influence. Additionally, gender was found to moderate the impact of source credibility, indicating that female users are more responsive to trustworthy sources when forming beliefs. These results underscore the necessity of designing tailored health communication strategies that consider both message structure and user diversity.

Theoretically, this research contributes to the digital health communication literature by bridging two established models (ELM and SCT) in a mobile app environment and by empirically operationalizing self-efficacy as a mediating mechanism. Practically, the model provides actionable insights for improving user engagement with WOAs, offering a foundation for content personalization and interface design in mobile health services.

Future research should extend this framework to explore actual usage behavior and test its applicability across different platforms, cultural settings, and user populations. Incorporating additional constructs, such as perceived risk, health anxiety, or information overload, may further enhance explanatory power and real-world relevance. Overall, the proposed model offers a scalable and adaptable structure for guiding both academic inquiry and practical interventions in digital health promotion.

Data availability

The data that support the findings of this study are available on request from the corresponding author.

Received: 20 December 2024; Accepted: 15 July 2025

Published online: 28 July 2025

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Acknowledgements

We are very grateful to Dr. Shuhui Li for her valuable comments and to every team member who took the time to participate in this research.

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Conceptualization, Xin Zhang; Data curation, Xin Zhang; Formal analysis, Xin Zhang; Investigation, Xin Zhang; Methodology, Xin Zhang; Project administration, Xin Zhang, Qingqing Tang and Shuhui Li; Resources, Xin

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Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Declarations

Competing interests

The authors declare no competing interests.

Ethical statement

Participants in this study were invited to complete an online survey, and all collected information was handled with strict confidentiality. Responses were entirely anonymous, and no personal identifying information was linked to the data. As a result, the dataset contains no information that could identify individual participants, making formal ethical approval unnecessary. Furthermore, it was ensured that informed consent was obtained from all participants and/or their legal guardians prior to their participation in the study.

Additional information

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1038/s41598-025-12138-9>.

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