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Influenza Prevention in the Digital Era: Examining the Relationship between Information-Seeking Behaviors and Vaccination Intentions among College Students in Guangzhou

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ABSTRACT

This study investigates the determinants of influenza vaccination intentions among college students in China within the context of concurrent outbreaks of respiratory infectious diseases, including COVID-19 and influenza, during the early 2024 influenza epidemic season dominated by the H1N1 subtype. College students are particularly vulnerable to influenza outbreaks, which impose substantial economic and psychological burdens. Despite these risks, influenza vaccination rates in this population remain consistently low. In the digital era, the Internet has become a primary source of influenza-related information for college students, making it critical to understand the behavioral effects of online information-seeking. However, limited research has examined the influence of information-seeking behaviors on vaccination intentions among this population. Guided by the stimulus-organism-response (SOR) model, this study constructs and evaluates a conceptual framework to explore the relationships between influenza information-seeking behaviors, salience, perceived information credibility and utility, and vaccination intentions. Data was collected through an online survey of 647 college students in Guangzhou. Structural equation modeling results revealed that influenza-related health information-seeking behaviors directly promote vaccination intentions. Moreover, influenza salience mediated the relationship between information-seeking behaviors and vaccination intentions. Perceived information credibility and utility further served as mediators, either sequentially or in parallel, reinforcing these relationships. This study contributes to the theoretical understanding of influenza vaccination intentions in the digital era and provides practical recommendations for government agencies and health communication practitioners to enhance vaccination uptake among college students.

Keywords: *Influenza vaccination intention, online influenza information seeking, stimulus-organism-response (SOR) framework, college students, Guangzhou.*

INTRODUCTION

Influenza, a seasonal virus-induced acute respiratory infectious disease, remains a significant global public health concern, contributing to annual morbidity and mortality. Each year, it is estimated to cause 3 to 5 million cases of severe illness and 290,000 to 650,000 respiratory-related deaths globally (Iuliano et al., 2018). The emergence of the COVID-19 pandemic in 2020 has further exacerbated the prevalence of influenza, particularly in China, where co-occurring outbreaks have intensified the strain on public health systems (Lei et al., 2023).

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Vaccination is widely recognized as the most effective preventive measure against influenza and its associated complications. Nevertheless, influenza vaccines are not included in China's National Expanded Program on Immunization (NEPI) and are only available on a self-funded, voluntary basis. While some provinces and municipalities have introduced free vaccination programs targeting priority groups—including preschool children, school-age students, and older adults aged 60 years and above—these initiatives have yielded limited success. National influenza vaccination coverage rate for the 2021–2022 season remained below 3%, a figure substantially lower than the rates exceeding 50% observed in developed countries, such as Europe and the United States (Zhao et al., 2022).

Despite the overall low influenza vaccination rate, college students have received relatively little attention as a target population for vaccination programs (Li et al., 2023). Prior research has primarily focused on older adults, young children, individuals with chronic illnesses, and healthcare workers (Jiang et al., 2022; Jung et al., 2013; Muhammad Azami et al., 2023). However, college students have been identified as a high-risk group for influenza infection, particularly the H1N1 subtype, due to their residence in enclosed spaces and the high population density of university environments (Yang, 2015). Acknowledging this vulnerability, the *Technical Guidelines for Influenza Vaccination in China (2023–2024)*, issued by the National Immunization Advisory Committee (NIAC), explicitly identify college students as a high-priority group for influenza vaccination in high-risk settings (NIAC, 2023). Influenza outbreaks among college students can result in class absences, significant economic and psychological burdens, and an increased risk of transmission in group settings. Despite these risks, this demographic often underestimates both their susceptibility to influenza and the severity of its consequences, which contributes to persistently low vaccination rates (Zou et al., 2023).

The rapid advancement of Internet technologies has facilitated unprecedented access to health information, including influenza-related topics. Since mid-January 2024, facing the situation of a co-epidemic of COVID-19 and influenza, universities in Guangzhou were going to launch mass influenza vaccination programs, prompting college students to actively seek influenza-related health information online. Information-seeking behavior is generally conceptualized as a deliberate, goal-oriented strategy to address informational needs (Lewis et al., 2024). Within the public health domain, health information-seeking behavior has been associated with positive outcomes, including increased knowledge, strengthened health beliefs, and improved health behavior intentions (Lewis & Martinez, 2020; Samal et al., 2011; Wang et al., 2023). However, conflicting findings in the literature suggest that information-seeking behavior does not always predict health behavior intentions (Lee & Kim, 2015) and, in some cases, may even trigger negative psychological responses (Song et al., 2021; Soroya et al., 2021). Notably, patterns of general health information-seeking behavior differ from those of disease-specific information-seeking. Extant studies on disease-specific information-seeking have predominantly focused on conditions such as HPV and COVID-19, with research largely conducted in Western contexts. In contrast, few studies have examined influenza-specific information-seeking behaviors among Chinese college students, and even fewer have scrutinized the relationship between this behavior and vaccination intentions. Consequently, the mechanisms through which online influenza information seeking influences vaccination intentions remain unclear.

To address these gaps, this study adopts the Stimulus-Organism-Response (SOR) framework to: (a) examine the mechanism underlying the influence of influenza information-seeking behavior on vaccination intentions among college students in Guangzhou, and (b) validate the applicability of the SOR framework in explaining the relationship between information seeking and vaccination intentions. The findings extend theoretical understanding of health information-seeking behaviors and provide practical insights for communication professionals and public health practitioners. These insights are expected to inform the development of targeted interventions to improve influenza vaccination rates among college students.

Beyond its applied significance, this study also contributes to communication theory by extending the SOR framework to influenza vaccination behavior. While previous studies have examined health information-seeking, their connections to broader communication theories, such as media effects models, persuasion theories, and the comprehensive model of information seeking (CMIS), have often remained implicit. By analyzing how online influenza information-seeking shapes perceptions of credibility and utility, which in turn influence vaccination intentions, this research demonstrates how information-seeking operates as both a cognitive and affective mechanism of persuasion. This perspective not only broadens the explanatory power of the SOR framework but also situates disease-specific information-seeking within wider debates in communication studies, integrating public health concerns with core theoretical discussions in media effects and information management.

THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

Theoretical Background

The SOR theory provides the foundational theoretical lens for this study, elucidating how environmental stimuli influence individuals' internal states and subsequent behavioral responses (Wang et al., 2024). Specifically, the SOR model posits that the environment is a stimulus (S) that affects an individual's internal state (O), encompassing psychological and cognitive processes, which in turn shape behavioral responses (R) (Mehrabian & Russell, 1974). By delineating the relationships between external stimuli, internal processes, and behavioral outcomes, the SOR model has been widely applied in studies of human information behavior (Liu et al., 2024). Within the domain of health communication, the SOR model has provided theoretical grounding for investigations into the effects of information-seeking behaviors on COVID-19 vaccination uptake (Wu et al., 2022), healthcare assistance-seeking patterns (Peng, 2022), and engagement in online and offline political participation (Li & Chan, 2017).

The CMIS highlights the influence of health belief factors (e.g., salience, perceived risk) and personal characteristics (e.g., age, sex) on information-seeking behavior through media-related factors, such as perceived credibility and utility (Lewis et al., 2024). Emphasizing the central role of media-related factors, CMIS underscores their impact on shaping health information-seeking patterns. However, emerging research has challenged CMIS assumptions, suggesting that these antecedent variables may not only act as predictors of information-seeking behavior but also function as outcomes influenced by such behaviors (Wang et al., 2023; Zheng et al., 2022). For example, Zhuang and Cobb (2022) demonstrated that COVID-19 information-seeking behaviors influenced psychological factors, such as salience and self-efficacy, that subsequently shaped vaccination intentions. These findings align with broader theoretical frameworks, including the Extended Parallel Process Model

(EPPM), Protection Motivation Theory (PMT), Information-Response Model (IRM), and behavior and Risk Information Engagement Model (BRIE), which similarly emphasize the reciprocal relationship between information-seeking behaviors and attitudinal or behavioral outcomes.

Building upon these theoretical perspectives, this study integrates focal variables from CMIS within the SOR framework to develop a nuanced conceptual model. The proposed model positions college students' influenza information-seeking behavior as the stimulus (S), reflecting the broader socio-contextual environment. Health-belief and media-related factors (i.e., salience, perceived utility, perceived credibility) serve as organism (O) variables, mediating the relationship between information-seeking behaviors and vaccination intentions. Influenza vaccination intentions are conceptualized as the response (R). The theoretical model, depicted in Figure 1, hypothesizes that influenza-related information-seeking behaviors influence college students' salience of influenza, and perceptions of information credibility and utility, which, in turn, affect their vaccination intentions. The following section elaborates on these hypothesized relationships, grounded in the theoretical constructs and empirical evidence.

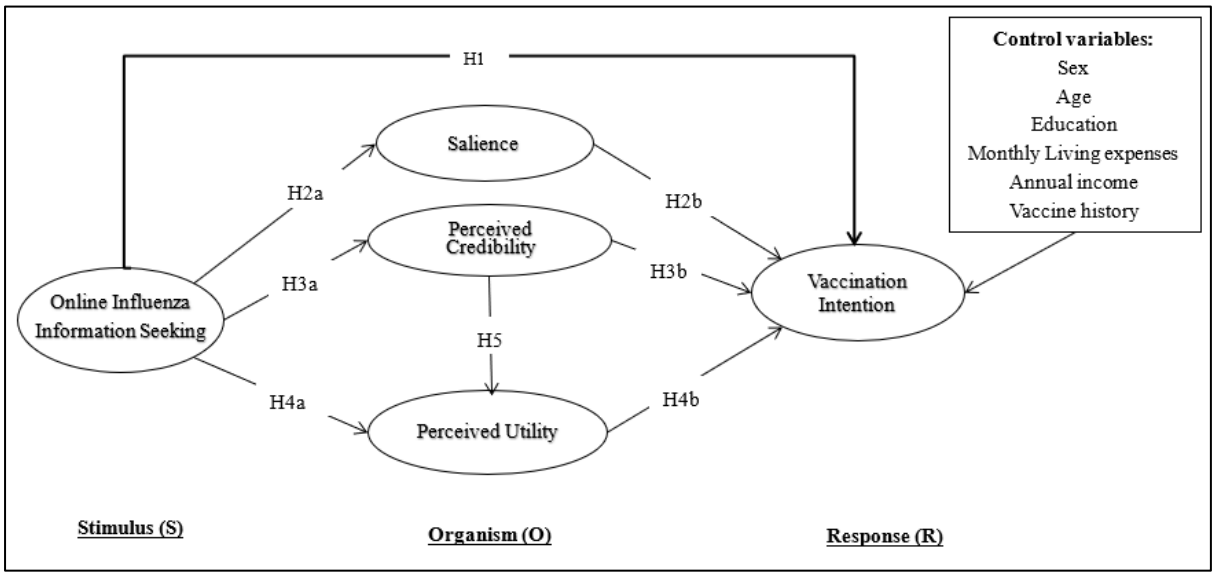

Figure 1: Conceptual framework based on SOR

Hypotheses Development

a. Direct Effect: Online Influenza information Seeking (S) and Vaccination Intention (R)

Online influenza information seeking refers to the active and deliberate process of acquiring information about influenza prevention and management (Lewis et al., 2024). Vaccination intention is conceptualized as an individual's subjective assessment of the likelihood of receiving an influenza vaccine, reflecting their preparedness to adopt preventive vaccination behavior (Li & Li, 2020). Previous research has consistently demonstrated a positive association between active information-seeking behaviors and the adoption of health recommendations, including mammography screening (Lee et al., 2016), COVID-19 preventive measures (Li & Zheng, 2022), cervical cancer prevention strategies (S.-W. Yoo et al., 2018), and food risk management practices (You et al., 2023). Specific to vaccination intentions, studies have highlighted the influence of information-seeking behaviors on decisions to receive vaccines for COVID-19 (Zhuang & Cobb, 2022), influenza (Gargano et al.,

2015), and HPV (Yoo et al., 2018). In the context of influenza, individuals frequently turn to online platforms to evaluate their health risks and assess the necessity of vaccination. This proactive engagement with health information not only increases knowledge but also shapes favorable attitudes and intentions toward vaccination. Based on this rationale, we propose the following hypothesis:

H1: Online Influenza information seeking is positively related to influenza vaccination intention.

b. Mediating Effects: Salience (O), Perceived Credibility, and Utility (O).

Derived from the comprehensive model of information seeking (CMIS), salience refers to an individual's perception of susceptibility, severity, and worry about contracting influenza (Chang et al., 2024). PMT posits that disseminating health information via digital platforms influences disease prevention intentions by activating cognitive processes such as salience (Acar & Kıcali, 2022). Empirical studies rooted in PMT have shown that information-seeking behaviors predict perceived health threats, which subsequently influence intentions to engage in disease prevention behaviors (Haque et al., 2020). For example, one study found that perceived threat of MERS mediated the relationship between seeking MERS-related information and intentions to practice cough etiquette (Yoo et al., 2016). Similarly, the social amplification of risk framework (SARF) suggests that the media serve as a "simulated environment" that amplifies or attenuates risk perceptions (Kasperson et al., 1988). Through media channels, individuals not only learn about influenza risks but also construct cognitive frameworks to evaluate these risks (Oh et al., 2021). Based on these theoretical and empirical findings, we propose the following hypotheses:

H2: Salience mediates the relationship between online influenza information seeking and influenza vaccination intention.

H2a: Online influenza information seeking is positively associated with salience.

H2b: Salience is positively associated with influenza vaccination intention.

c. Mediating Effects: Perceived Credibility and Utility (O)

Grounded in the CMIS framework, perceived credibility is defined as an individual's trust in online influenza information, while perceived utility reflects judgments on its usefulness and applicability. Although CMIS originally conceptualized credibility and utility as drivers of information-seeking behavior, literature suggests these variables may also operate as outcomes of information-seeking processes (Wang et al., 2023). For instance, studies have shown that increased exposure to online health information fosters trust and enhances perceptions of utility over time (Basnyat et al., 2018). These patterns extend across media platforms, including traditional media (Johnson & Kaye, 2009) and social media (Shang et al., 2020). Research also suggests that frequent engagement with health information strengthens perceived credibility and utility through cumulative exposure, as individuals develop familiarity and confidence in information sources (Tsfati & Ariely, 2014).

The Information Adoption Model (IAM) further posits that individuals' behavioral intentions are influenced by their assessments of information credibility and utility (Han et al., 2021). For instance, perceived information credibility has been shown to predict protective behaviors, such as hand hygiene and surface sanitization during the COVID-19 pandemic (Sun et al., 2021). Moreover, credibility has been identified as a mediator between COVID-19 information-seeking and preventive behaviors (Acar & Kıcali, 2022). Meanwhile,

the perceived usefulness of mobile health has a strong positive impact on patients' willingness to adopt it (Miao et al., 2017). Building on this literature, we hypothesize that frequent online information seekers are more likely to perceive the information as credible and useful, thereby influencing their vaccination intentions. Based on this reasoning, we propose the following hypotheses:

H3: Perceived credibility mediates the relationship between online influenza information seeking and influenza vaccination intention.
H3a: Online influenza information seeking is positively associated with perceived credibility.
H3b: Perceived credibility is positively associated with influenza vaccination intention.
H4: Perceived utility mediates the relationship between online influenza information seeking and influenza vaccination intention.
H4a: Online influenza information seeking is positively associated with perceived utility.
H4b: Perceived credibility is positively associated with influenza vaccination intention.

A substantial body of studies supports the notion that perceived credibility is positively related to perceived utility. For example, a study of 290 older Chinese WeChat users found that higher credibility ratings of online health information predicted greater perceptions of usefulness (Shang et al., 2020). Without trust in health information, individuals are unlikely to perceive its utility. The greater the credibility attributed to online health information, the more useful it is believed to be (Hartoonian et al., 2014). Similarly, a study found that information credibility influences perceived usefulness of electronic word of mouth, thereby influencing purchase intention (Rahaman et al., 2022). Based on this evidence, we propose the following hypothesis:

H5: Perceived credibility is positively associated with perceived utility.

Building upon H3, H4, and H5, we formulate the following research question to explore the potential chain mediation effects of perceived credibility and utility:

RQ: Do perceived credibility and utility function as sequential mediators between online influenza information seeking and influenza vaccination intention?

METHOD

Data Collection Procedures

This study was conducted during the peak of influenza infections in early spring 2024, coinciding with the planned launch of influenza vaccination campaigns across higher education institutions in Guangzhou. This timing provided an ideal context for conducting the survey. A cross-sectional online survey was administered between March 1 and March 5, 2024, to assess participants' influenza-related information-seeking behaviors, salience, perceived credibility, utility, and vaccination intentions. Participants in this study were required to meet the following criteria: (1) aged 18 years or older; (2) enrolled in a higher education institution in Guangzhou, including college, undergraduate, master's, and doctoral programs; and (3) had not received an influenza vaccine in 2024.

The study protocol was reviewed and approved by the Ethics Committee at Nanfang College, Guangzhou. The Chinese version of the questionnaire was entered into the Wenjuan Star platform, and an exclusive link was generated. This platform can monitor the IP address and track the time spent on the survey. This link was distributed by the researcher's colleagues and friends to WeChat groups across higher education institutions in Guangzhou.

Before accessing the survey items, participants were required to read the informed consent statement and click "Agree" to indicate their voluntary participation. They could withdraw at any time by choosing not to proceed. Convenience sampling and snowball sampling were employed to recruit survey participants. Participants were encouraged to share the survey link with eligible respondents within their networks. Respondents whose questionnaires were deemed valid received a 5 CNY (Chinese yuan, 1 CNY ≈ 0.14 USD) incentive. A total of 653 responses were collected. Following data quality screening, six responses were excluded due to either excessively short or unusually long completion times, resulting in 647 valid responses retained for subsequent data analyses.

Measurements and Scale Design

All variables were measured using a 6-point Likert scale, ranging from 1 ("strongly disagree") to 6 ("strongly agree"). The operationalization of each variable was informed by prior validated scales, ensuring theoretical consistency and measurement reliability.

Online influenza information-seeking behaviors scale was measured using a four-item scale adapted from Zhang et al. (2019). Items included: (1) "I seek information and descriptions of influenza disease diagnosis and treatment on the Internet.", (2) "I learn how to manage influenza on the Internet.", (3) "I seek information on influenza prevention (e.g., vaccination, hygiene, avoiding crowded places) on the Internet.", and (4) "I seek information about influenza medication and treatment options on the Internet." These items were added up and then averaged (M = 4.532, SD = 1.108, α = .875).

Salience, conceptualized as the perceived susceptibility, perceived severity, and worry about influenza, was assessed using a three-item scale adapted from Chang et al. (2024). Items included: "I think I will be diagnosed with influenza at some point in my life."; "I think being diagnosed with influenza is serious."; and, "I am worried about getting influenza." The average of the three items was created for data analysis (M = 4.514, SD = 1.202, α = .848).

Perceived credibility was measured using a three-dimensional scale adapted from Li et al. (2018). Respondents evaluated online influenza information based on believability, accuracy, and completeness. The responses were averaged for analysis (M = 4.504, SD = 1.186, α = .850)

Perceived utility was measured using a four-item scale adapted from Li et al. (2018). Respondents rated whether online influenza information is (1) useful, (2) important, (3) helpful for understanding influenza, and (4) beneficial for making wiser and more accurate decisions. The items were averaged to create one scale (Mean = 4.631, SD = 1.164, α = .884).

Influenza vaccination intentions were assessed using a three-item scale adapted from Zheng et al. (2022). Sample items included: "If an influenza vaccine is available" and "I will get influenza vaccinated." The average of the three items was used in subsequent analyses (M = 4.554, SD = 1.247, α = .860).

To reduce the potential confounding effects, we controlled for several demographic variables, including sex, age, education level, monthly living expenses, annual income (including scholarships, financial aid, work-study programs, part-time jobs), and influenza vaccination history in the past five years (between 2018 and 2023).

Statistical Analysis

Covariance-based structural equation modeling (CB-SEM) was conducted using AMOS software to examine and validate the proposed model. Subsequently, the mediating effects within the model were tested using the PROCESS Macro.

RESULTS

The Profiles of Respondents

The demographic characteristics of the sample are summarized in Table 1. The sex distribution was nearly equal, with slightly more females (n = 339, 52.4%) than males. The majority of respondents were aged between 18 and 22 years, representing 69.2% of the sample. Most participants were undergraduate students (n = 371, 57.3%). Monthly living expenses were primarily between 1,000 and 2,000 CNY, accounting for 39.4% of the participants. Additionally, 20.9% of respondents had no other source of income, while 18.4% had an annual income exceeding 10,000 CNY. Furthermore, 10.7% of respondents were vaccinated with the influenza vaccine in the past five years.

Table 1: Distribution of respondents profiling (N= 647)

Variables	Items	Frequency	Percentage （%）
Sex	male	308	47.6
	female	339	52.4
Age	18 - 22	448	69.2
	Above 22	199	30.8
Education	Junior college students	77	11.9
	Undergraduate students	371	57.3
	Master and PhD students	199	30.8
Monthly living expenses	Below CNY 1000	105	16.2
	CNY 1000-2000	255	39.4
	CNY 2001-3000	209	32.3
	Above CNY 3000	78	12.1
Annual income	No income	135	20.9
	Below CNY 1000	52	8
	CNY 1000-3000	107	16.5
	CNY 3001-5000	99	15.3
	CNY 5001-8000	93	14.4
	CNY 8001-10000	42	6.5
	CNY Above 10000	119	18.4
Influenza vaccination history	YES	69	10.7
	NO	578	89.3
TOTAL		647	100

Note: CNY = Chinese Yuan, 1 CNY ≈ 0.14 USD

Measurement Model Test

In this study, all key variables were treated as continuous variables, with their values summed and averaged to create summated scores for all constructs. Tests for normality indicated skewness values ranged from −1 to −2, while kurtosis values ranged from 0 to 2, meeting the thresholds of Skewness < 3 and Kurtosis < 8 (Kline, 2018). These results confirmed that the

data approximated a normal distribution, rendering it appropriate for parametric statistical analysis. Multicollinearity was assessed using the variance inflation factor (VIF) values. Based on established criteria (VIF < 10), all VIF values were below 2, ruling out the presence of multicollinearity and satisfying the assumptions required for regression analysis. Internal consistency reliability was assessed through Cronbach's alpha coefficients, all of which exceeded 0.70, demonstrating good internal reliability.

Construct validity was assessed through confirmatory factor analysis (CFA) using maximum likelihood estimation in AMOS. The overall model fit indices demonstrated a good fit: χ^2/df = 1.456, goodness of fit index (GFI) = 0.973, adjust goodness-of-fit index (AGFI) =0.962, comparative fit index (CFI) = 0.992, Tucker-Lewis index (TLI) = 0.990, root mean square error of approximation (RMSEA) = 0.027, and standardized root mean square residual (SRMR) = 0.024. As presented in Table 2, the factor loadings of all constructs were above 0.70, indicating strong indicator reliability. Furthermore, composite reliability (CR) values were above 0.80, and average variance extracted (AVE) values exceeded 0.60, both surpassing the recommended thresholds (CR > 0.6 and AVE > 0.5). These results indicated good convergent validity.

Table 2: Factor loading, CR and AVE (N= 647)

Variable	Items	Factor loading	S.E.	t-value	CR	AVE
SA	SA1	0.813			0.848	0.651
	SA2	0.831	0.049	21.340		
	SA3	0.776	0.046	20.277		
UT	UT1	0.841			0.884	0.656
	UT2	0.791	0.040	23.045		
	UT3	0.803	0.039	23.404		
	UT4	0.805	0.038	23.522		
ISE	ISE4	0.817			0.875	0.636
	ISE3	0.784	0.043	21.852		
	ISE2	0.785	0.044	21.757		
	ISE1	0.804	0.044	22.519		
PC	PC1	0.817			0.851	0.655
	PC2	0.818	0.046	21.640		
	PC3	0.793	0.047	20.803		
IV	IV1	0.801			0.862	0.675
	IV2	0.827	0.046	21.905		
	IV3	0.836	0.052	22.032		

Note: CR = composite reliability, AVE = average variance extracted value. SA = salience, UT = perceived utility, ISE = influenza information seeking, PC = perceived credibility, IV = vaccination intention.

Discriminant validity was evaluated using the method recommended by Fornell and Larcker (1981). The results showed that the square roots of AVE values surpassed the inter-construct correlations (Table 3), confirming discriminant validity.

Table 3: Discriminant validity method by Fornell and Larcker (N= 647)

Variable	Mean (SD)	AVE	IV	PC	ISE	UT	SA
IV	4.554 (1. 247)	0.675	**0.821**				
PC	4.504 (1.186)	0.655	0.59	**0.809**			
ISE	4.532 (1.108)	0.636	0.642	0.598	**0.798**		
UT	4.631 (1. 164)	0.656	0.618	0.593	0.677	**0.81**	
SA	4.514 (1. 202)	0.651	0.58	0.507	0.602	0.585	**0.807**

Note: Square-root of the AVE on the diagonals (in bold). SD = standard deviation, AVE = average variance extracted value, IV = vaccination intention, PC = perceived credibility, ISE = influenza information seeking, UT = perceived utility, SA = salience.

Structural Model Test and Hypothesis Testing

The structural model was tested in AMOS, including control variables (sex, age, education, monthly living expenses, income, and vaccination history) within the conceptual framework. The structural model exhibited a good model fit: $\chi^2/df = 1.656$, GFI = 0.959, AGFI = 0.944, CFI = 0.980, TLI = 0.975, RMSEA = 0.032, and SRMR = 0.037.

The structural model accounted for 43.7% of the variance in influenza vaccination intentions. Results from Structural Equation Modeling (SEM) supported all hypothesized relationships (Table 4). Specifically, online influenza information seeking positively predicted influenza vaccination intention (β = 0.253, SE = 0.066, p < 0.001), salience (β = 0.635, SE = 0.048, p < 0.001), perceived credibility (β = 0.615, SE = 0.047, p < 0.001), and perceived utility (β = 0.536, SE = 0.056, p < 0.001). Thus, H1, H2a, H3a, and H4a were supported. Additionally, salience (β = 0.223, SE = 0.05, p < 0.001), perceived credibility (β = 0.211, SE = 0.051, p < 0.001), and perceived utility (β = 0.198, SE = 0.052, p < 0.001) were positively associated with influenza vaccination intentions, thus, H2b, H3b, H4b were supported. Lastly, perceived credibility (β = 0.263, SE = 0.051, p < 0.001) significantly predicted perceived utility, supporting H5. Finally, control variables, including sex, age, education level, monthly living expenses, annual income, and vaccine history, did not significantly predict influenza vaccination intentions.

Table 4: Standardized structural model paths (N = 647)

Hypotheses	path	β	S.E.	C.R.	P	Result
H1	ISE→IV	0.253	0.066	3.952	***	supported
H2a	ISE→SA	0.635	0.048	13.759	***	supported
H2b	SA→IV	0.223	0.05	4.408	***	supported
H3a	ISE→PC	0.615	0.047	13.596	***	supported
H3b	PC→IV	0.211	0.051	4.111	***	supported
H4a	ISE→UT	0.536	0.056	10.624	***	supported
H4b	UT→IV	0.198	0.052	3.532	***	supported
H5	PC→UT	0.263	0.051	5.423	***	supported

Note: Structural equation model with standardized coefficients. Control variables are included in the model but are not presented for simplicity. S.E.= standard error, ISE = influenza information seeking, SA = salience, PC = perceived credibility, UT = perceived utility, IV = vaccination intention. *p < .05, **p < .01, ***p < .001.

Mediating Effects Test

The mediation effects were tested using Hayes's PROCESS macro with a bootstrapping estimation approach (5000 samples). Results are summarized in Table 5. The results indicated that salience (β = 0.164, SE = 0.027, 95% CI [0.114, 0.217]) mediated the relationship between online influenza information seeking and influenza vaccination intention, thus supporting H2. Additionally, perceived credibility (β = 0.175, SE = 0.028, 95% CI [0.123, 0.232]) and perceived utility (β = 0.217, SE = 0.036, 95% CI [0.152, 0.290]) individually mediated the relationship between online influenza information-seeking behavior and vaccination intention. Thus, H3 and H4 were supported. Finally, the results revealed that perceived credibility and perceived utility sequentially mediated the relationship between online influenza information seeking and vaccination intention (β = 0.04, SE = 0.01, 95% CI [0.023, 0.064]), answering RQ.

Table 5: Mediation effect (N= 647)

Hypotheses	Path	β	SE	LLCI	ULCI	Result
H2	ISE→SA→IV(Total)	0.630	0.037	0.557	0.702	Support
	ISE→SA→IV(Direct)	0.465	0.041	0.385	0.546	
	ISE→SA→IV(Indirect)	0.164	0.027	0.114	0.217	
H3	ISE→PC→IV(Total)	0.630	0.037	0.557	0.702	Support
	ISE→PC→IV(Direct)	0.455	0.041	0.375	0.535	
	ISE→PC→IV(Indirect)	0.175	0.028	0.123	0.232	
H4	ISE→UT→IV(Total)	0.630	0.037	0.557	0.702	Support
	ISE→UT→IV(Direct)	0.412	0.044	0.327	0.498	
	ISE→UT→IV(Indirect)	0.217	0.036	0.152	0.290	
RQ	Total Effect	0.63	0.037	0.557	0.702	Answered
	Direct Effect	0.327	0.045	0.239	0.414	
	Indirect Effect	0.303	0.034	0.238	0.371	
	ISE→PC→IV	0.135	0.025	0.089	0.187	
	ISE→UT→IV	0.128	0.025	0.084	0.18	
	ISE→PC→UT→IV	0.04	0.01	0.023	0.064	

Note: SE = standard error, ISE = influenza information seeking, SA = salience, PC = perceived credibility, UT = perceived utility, IV = vaccination intention.

DISCUSSION

Major Findings

This study investigated the mechanisms underlying the relationship between online influenza information-seeking behavior and vaccination intentions among Chinese college students, employing the SOR framework as the theoretical foundation. The findings underscore the SOR framework's explanatory power in elucidating how online influenza information seeking influences vaccination intentions both directly and indirectly through salience, perceived credibility, and perceived utility.

First, aligning with previous studies, this study revealed that online influenza-related information seeking directly influences influenza vaccination intentions (Wang et al., 2023; Zheng et al., 2022). Information seeking, often regarded as a health-promoting behavior, facilitates preventive measures by increasing awareness of health risks (Ramírez et al., 2013). Seeking information about health risks increases the likelihood of adopting preventive measures (Lewis & Martinez, 2020). In the Chinese context, where digital platforms are vital

for health communication, college students are likely to rely on online sources to understand influenza risks and preventive measures. In this context, college students use the Internet to acquire knowledge about influenza, including how it occurs and its potential impact on their health, which fosters their motivation to get vaccinated. This process shapes their cognition and attitudes toward influenza and influences their preventive behaviors (Shen et al., 2022; Zhao & Basnyat, 2022). These results suggest that public health authorities and communication practitioners should design targeted campaigns to encourage health information-seeking behaviors on the Internet.

Second, this study revealed that salience mediates the relationship between online influenza-related information seeking and vaccination intentions, supporting earlier findings (Lewis & Martinez, 2020). While numerous previous studies have framed salience as an antecedent to information-seeking behavior (Chang et al., 2024), this study extends the conceptualization of salience by identifying it as an outcome of information-seeking processes. For college students who may lack firsthand experience with influenza, online health information amplifies perceived susceptibility and severity, creating urgency for preventive action. By amplifying perceptions of susceptibility and severity, online information reinforces the perceived need for preventive measures such as vaccination (You et al., 2023). These findings emphasize the importance of balanced health communication strategies that avoid over-amplification of fear while promoting accurate risk assessments. Visual infographics, real-life testimonials, and interactive tools could be leveraged to increase salience effectively.

Third, the results highlighted the mediation effects of perceived credibility and perceived utility between online information seeking and vaccination intention, which aligns with prior studies (Wang et al., 2023). On the one hand, the study found that information-seeking behavior positively influenced perceived credibility of online health information. In China's collectivist culture, authority-directed communication is highly valued (Tang & Zou, 2021), and official sources enjoy greater trust (Li & Zhang, 2018). By increasing trustworthiness, credible sources are more likely to encourage behavioral responses such as vaccination adoption (Zheng et al., 2022). As a result, students are more likely to perceive influenza-related content as credible, thus increasing their intentions to act on the information. On the other hand, information-seeking behavior was positively associated with perceived utility, reflecting students' recognition of the relevance and usefulness of health information in addressing their informational and preventive needs. This cognitive appraisal further enhances their vaccination intentions by strengthening their confidence in decision-making strategies.

Lastly, this study also observed that online influenza information-seeking behavior influences perceived credibility, thereby positively influencing perceived utility, which, in turn, enhances vaccination intentions, aligning with previous studies (Liu et al., 2024a). The finding also aligns with the IAM, which posits that credibility assessments directly influence perceptions of utility and subsequent behaviors (Han et al., 2021). Strengthening information credibility not only builds trust but also enhances perceptions of relevance and applicability, ultimately shaping behavioral intentions (Tsai, 2014). Health communicators should leverage this insight by ensuring the accuracy, consistency, and accessibility of online influenza-related information to promote informed health decisions.

Theoretical and Practical Implications

This study advances theoretical understanding in several ways. First, it extends the SOR framework by illustrating its applicability in explaining health information-seeking behaviors and their impact on vaccination intentions. While prior studies have examined the direct effects of information-seeking behaviors, this study highlights mediating mechanisms—salience, perceived credibility, and utility—offering a process-oriented perspective on how online health information influences behavior. Second, this study provides empirical evidence supporting the dual role of information-seeking behaviors—both as a predictor of salience, perceived credibility, utility and as a driver of online influenza information seeking. This nuanced understanding helps reconcile inconsistencies in prior research and expands the conceptual utility of CMIS in health communication contexts. Third, by focusing on Chinese college students, this study enriches the limited body of research on influenza information-seeking behaviors in collectivist cultural settings, offering insights into cultural variations in information processing and decision-making.

The findings provide actionable insights for public health authorities, educators, and communication practitioners. Government agencies should disseminate accurate and consistent influenza-related content across diverse online platforms to encourage information-seeking behaviors and reinforce positive risk perceptions. Communication strategies should prioritize building trustworthy and relevant content to increase perceived credibility and utility, fostering informed vaccination decisions. Health information campaigns must balance risk portrayal to avoid creating fear or complacency, ensuring messages emphasize both risks and preventive measures. Given China's media regulation environment, official platforms should be utilized to reinforce authoritative messaging and address misinformation.

Limitations and Future Research Directions

Although this study offers valuable insights, it is important to acknowledge several limitations. First, the samples were limited to college students in Guangdong Province, which restricts the generalizability of the findings to the broader population. Future studies should consider multi-regional samples and cross-cultural comparisons to enhance external validity. Second, the model assumes a unidirectional path from information-seeking to salience and vaccination intention. Pre-existing perceived threat may also drive information-seeking, but due to the cross-sectional design, bidirectional effects could not be tested. Future research could explore these potential reciprocal relationships. Third, this study investigated vaccination intentions rather than actual vaccination behaviors. Given the well-documented discrepancy between intention and behavior (Lu et al., 2021), future research could measure actual vaccination uptake to provide a more accurate assessment of health outcomes. Fourth, this study examined online information seeking across a broad range of channels. Future research could adopt a channel-specific approach to better understand the effects of different information sources (e.g., social media vs. official websites) on credibility and utility perceptions. Finally, while this study focused on the positive impact of information seeking, some studies have highlighted potential negative effects, such as information overload (Soroya et al., 2021). Future research could explore the potential drawbacks of information seeking.

CONCLUSION

This study applied the SOR model to examine the determinants of influenza vaccination intentions among college students in Guangzhou during the early 2024 influenza season. The results demonstrate that information-seeking behavior shapes college students' health beliefs about influenza and their evaluations of information credibility and utility, influencing their vaccination intentions. This study contributes to the limited body of research on influenza information-seeking behaviors in China, specifically focusing on college students, thereby enriching the literature on vaccination intentions among this demographic. Moreover, the findings provide practical insights for governments and health communication professionals in designing and disseminating influenza-related information. Providing consistent and accurate information can help create a more realistic risk environment that enhances individuals' understanding of influenza. Additionally, improving the credibility and utility of influenza-related information can further strengthen vaccination intentions among the target population.

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