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Seeking Health Information Online: The Moderating Effects of Problematic Situations on User Intention

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Abstract

Purpose: This study investigates how online user intention in searching health information is affected by problematic situations.

Design/methodology/approach: Based on the Theory of Reasoned Action, the Technology Acceptance Model, and Sense-making theory, we propose two dimensions of problematic situations: urgency and severity of health issues being searched online. Data were collected through a questionnaire survey among 214 Wuhan University students and analyzed using hierarchical regression analysis.

Findings: Perceived usefulness, perceived ease of use, and subjective norm can influence user intention to seek health information online. The urgency of problematic situations has a negative moderating effect on the relationship between perceived ease of use and user intention and the relationship between subjective norm and user intention. The severity of problematic situations has a negative moderating effect on the relationship between subjective norm and user intention.

Research limitations: The respondents of the survey are limited to students in one Chinese university, so whether this study's results can be applied to another population or not remains to be verified. In addition, only two dimensions of problematic situations are considered in this study.

Practical implications: The paper puts forward the moderating effect of problematic situations and verifies it, which is the compensation for online health information-seeking behavior research. Besides, our analyses have implications for professional design of health care systems and related consumer information searches, and improve their performance.

Originality/value: Previous work has reported the effects of problematic situation on user intention to seek health information online, ignoring its influence on other factors. This empirical study extends that work to identify the influence of problematic situation when seeking intention-behavior data in two dimensions, urgency and severity.

Keywords Health information seeking; Situation; Moderating effect; Urgency; Severity

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1 Introduction

The Internet has now become one of the most important information sources for people seeking health information. Recent developments of online health knowledge bases and social media have also opened up a wide range of channels for health information seeking and sharing. According to *China's Online Medical Industry Research Report* (iResearch, 2015), there are about 140 million active users of online medical searches between January and June 2015. As the Internet and social media have become increasingly popular among health information seekers, a number of studies have been conducted to examine people's online health information seeking behaviors.

At present, user health information-seeking behavior research focuses on population characteristics, individual health differences, and other user perspectives, but generally ignores the influence of problematic situations on information seeker behaviors. This paper therefore examines how situational factors affect people's intention to search health information online. Specifically, we attempt to answer the following research questions:

1) *What factors could affect online health information-seeking intention?*
2) *Can the problematic situation with online information seekers affect their health information-seeking intention, and if so, how?*

Based on the Theory of Reasoned Action, the Technology Acceptance Model, and Sense-making theory, this article introduces the factor problematic situations as a moderating variable and proposes two dimensions of problematic situations: urgency and severity of health issues being searched. This approach is designed to build a model for identifying influencing factors of online health information-seeking intention and testing the hypotheses. Studying these factors can be beneficial not only to health information-seeking behavior research, but also to improving the efficiency and accessibility of health information systems.

2 Literature Review

2.1 Effects of Situation on Information-seeking Behavior

As a purposeful activity of attempting to meet information needs, information-seeking behavior has become a hot issue in the field of library and information science (LIS). Belkin (1980) proposed that information needs arise because the user does not know something, where there is an anomaly in the user's state of knowledge in relation to the problem faced. A summary of the literature (Khazer & Ganaie, 2014) in recent years indicates that research into information-seeking behavior

mainly concentrates on two aspects of online searches: job-related information and daily information (Figure 1). And health information-seeking behavior has become an increasingly important issue in daily information-seeking behavior studies (Ajuwon & Popoola, 2015; Kim, 2015). When it comes to the process of information search, the related studies tend to focus on user information needs, the selection of information channels, and certain influencing factors of information-seeking behaviors (Zhang, Liu & Yang, 2008).

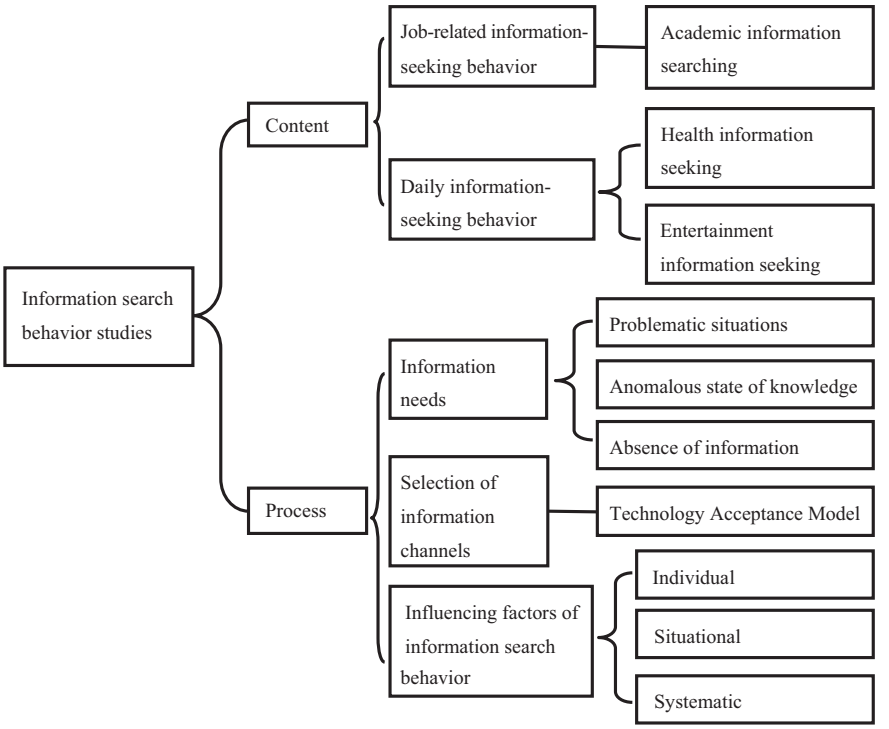

Figure 1. The research focus of information-seeking behavior in recent years.

In the early 1980s, research into information search behavior shifted its attention from an information system perspective to a user perspective, in which individual user differences, including cognitive ability, have become the focus of information behavior studies. Due to the complexity of information search behavior, there are many factors that can influence people's information search behavior. Along with the study of people's cognitive abilities and individual differences in search behavior, the effects of user situation or context should not be ignored (Li & Hu, 2012). At present, the studies on the effects of situational factors on information-seeking

behavior can be mainly classified into two categories: (1) considering the particular situation as the research background, research is conducted to find how users search for information in that situation; (2) considering the situation as the research variable, studies are carried out to find the effects of situational factors on user information behavior (Tang, 2007).

In the field of health information seeking, scholars have investigated the effects of situational factors on information-seeking behavior. For instance, Wallengren, Segesten, and Friberg (2010) investigated the information needs of the relatives of stroke patients and studied the characteristics of their information-seeking processes shortly after the stroke event and six months later from the angle of personal involvement, situational circumstances, and sources of information. They found that the information needs of the relatives change with developments in their own health condition as well as that of the patients: the more stable their health condition is, the less their information need is. Avery (2010) studied the choice of information channels in regular or emergency situation via a public telephone survey. The results show that compared with less urgent situations, television news, radio news, doctors, and health institutions are more important sources of information in a critical situation than the Internet. These studies considered situation as an independent variable and evaluated its direct impact on the dependent variable, but did not consider situation as a precondition of information-seeking behavior, which has an interaction effect on other dependent variables.

2.2 Online Health Information-seeking Behavior Research

Much research has been done on health information-seeking behavior. As the literature reports, from 1993 to 2013 there were 1,157 academic papers published about health information seeking, and 60% of the research was done in the UK and US (Shi & Xu, 2013). As more and more people prefer the Internet for health information, researchers are paying more attention to people's online health information-seeking behavior. At present, online health information-seeking research mainly concentrates on issues such as impact factors, search content, search platform construction, and application of evaluations. The research on impact factors of online health information seeking in the last decade (Table 1) shows that the type of tasks, subjective factors, and information resources have been extensively studied, whereas situational factors are rarely mentioned.

There are a few studies that consider the impact of situational factors, but they either take situational factors as the research background or just investigated the direct impact of situational factors on search intention. For instance, Wu and Li (2015) analyzed the elderly's diversity of emotion and cognition, and their different ways of dealing with information in online information retrieval processes in

Table 1. The impact factors investigated in online health information-seeking research in the last decade.

Type	Overseas researchers		Chinese researchers	
	Influencing factor	Resource	Influencing factor	Resource
Demographic characteristics	Gender	Cotten & Gupta (2004); Yun & Park (2010)	Personal psychological factor and implementation cost	Zhu & Deng (2015)
	Race	Yi, Stvilia, & Mon (2012); Ramanadhan & Viswanath (2006); Rooks et al. (2012)	Cognitive ability, knowledge, and experience	Sun, Wang, & Cao (2015)
	Education	Ramanadhan & Viswanath (2006); Lemire et al. (2008)	Gender	Wang (2013)
			Age	Wang (2013)
			Education	Wang (2013)
			Income	Wang (2013)
	Income	Ramanadhan & Viswanath (2006); Zhao (2009)	Health condition	Zhou & Cai (2014)
	Internet use level	Neumark et al. (2013)		
	Health condition	Shaw et al. (2008)		
	Disability level	Liang, Xue, & Chase (2011)		
Information resources	Perceived usefulness	Kim (2015)	Information demand satisfaction	Mo & Deng (2014)
	Perceived ease of use	Ajuwon & Popoola (2015); Zhang (2011)	Reality satisfaction	Mo & Deng (2014)
			Internet interaction and risk perception	Mo & Deng (2014)
	Trust level of information	Yun & Park (2010)	Ease of use of search tools and health website construction	Zhou & Cai (2014)
	Credibility of website	Lemire et al. (2008)	Information factor	Zhu & Deng (2015)
	Information quality awareness	Xiao et al. (2014)		
Social factors	Subjective norm	Chau & Hu (2002); Zhang (2011)	Social factor	Zhu & Deng (2015)
			Social support	Mo & Deng (2014)
Other factors	Self-efficacy and information anxiety	Lim et al. (2011)	Task type	Zhou & Cai (2014)
	Users' interaction and emotional support	Hether, Murphy, & Valente (2014)	Health self-efficacy and health consciousness	Mo & Deng (2014)

different health situations via user experiment, questionnaire survey, and interview methods. But this study only considered different situations as the research background, and did not investigate the situations' impact on health information retrieval. Zhang (2014) put forward a more complete health information source selection model via the interview method. Her study proposed that five factors including problematic situation can influence the choice of information sources, but did not specify how the problematic situation will affect source selection. Xiao et al. (2014) found that perceived health status could affect both frequency and diversity of online search of health information, but there was no evidence that perceived health status could lead to using the Internet as a preferred source for health information. So when considering information-seeking behavior, along with having a direct impact on search intention, situation is found to have an interactional effect on other factors. Few scholars are addressing this issue, however.

3 Research Model and Hypotheses

3.1 Research Model

In this paper, the core issue we study is user intention to access the Internet to seek health information, which presents a problem in relation to behavior prediction. We conduct a conceptual model based on the Theory of Reasoned Action (TRA) developed by Ajzen and Fishbein (1980), and considered one of three classic models of persuasion. TRA is used to predict how people will behave based on their attitudes and behavioral intentions, and adds the process of persuasion to behavioral intention. The Theory introduces two factors that determine intention: attitudes (about a person's opinion, e.g. positive or negative) and subjective norms (the expectations of others or perceived social pressure to comply with others' opinions) (Figure 2).

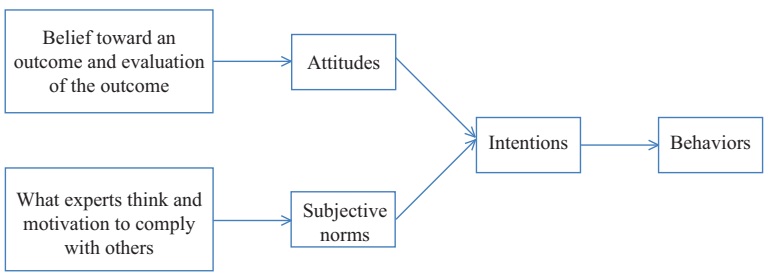

Figure 2. Theory of Reasoned Action.

Based on the TRA, Davis (1989) put forward the Technology Acceptance Model (TAM), which is used for forecasting the possibility of a person accepting and using an information system. TAM is remarkable tool for making such predictions, and

more and more scholars apply its theoretical framework to different fields, such as health information seeking (Lemire et al., 2008; Liang, Xue, & Chase, 2011) and social networking (Al-Ghaith, 2015). The Model (Figure 3) proposes two determinants: perceived usefulness (e.g. a particular system would enhance one's job performance) and perceived ease of use (a particular system would not require extensive effort) and their impact on attitude, intention to use, and actual use. We combine the TRA and TAM as the foundation for our research model.

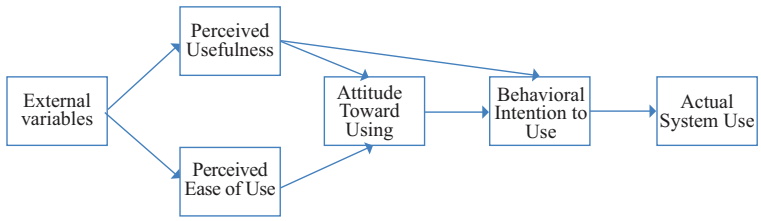

Figure 3. Technology Acceptance Model.

Sense-making is the process people use to give meaning to their experiences. Dervin's (1983) introduction of Sense-making theory to the field of information science has had a profound influence on information behavior research. This approach developed theories on the "cognitive gap" individuals can experience when trying to understand observed data, with the goal to provide measurements for concepts and performance and ways to make theories testable. Applied in many other disciplines, notably human-computer interaction and organizational studies, Devin (1992) developed the theory further into a formal methodology that considers the factors of situation, gap, and outcome, where situation is the precondition of information-seeking behavior. As this methodology emphasizes situation's impact on information channels and content selection, we choose this theory as the theoretical basis of this paper. As online information query and use behavior are applied here in specific situations, such as when facing the same health information system, users in different situations will make different choices. Sense-making and situational awareness are thus viewed as a concept that enables us to investigate and improve our understanding of the interactions between people and information technology. For instance, people's intention of using the Internet for health information will decrease when they face an urgent health problem, where other sources (e.g. doctors and health institutions, television, and radio) are available. In other words, the change of situation will affect other factors' impact on intention to use the Internet for seeking health information. So we believe it is reasonable to introduce the factor of situation as a moderator to conduct our research model.

As the TRA plays an important role in cognitive behavioral research, and the TAM has also been confirmed to be effective in explaining users' information-seeking behaviors, we use the subjective norm of the TRA and perceived usefulness and perceived ease of use of the TAM for our three variables, and use the factor of situation put forth in Devin's (1992) Sense-making methodology to build the online health information-seeking intention model (Figure 4). Considering the various characteristics of health problems, we choose urgency and severity (of health issues) as the two dimensions of problematic situation.

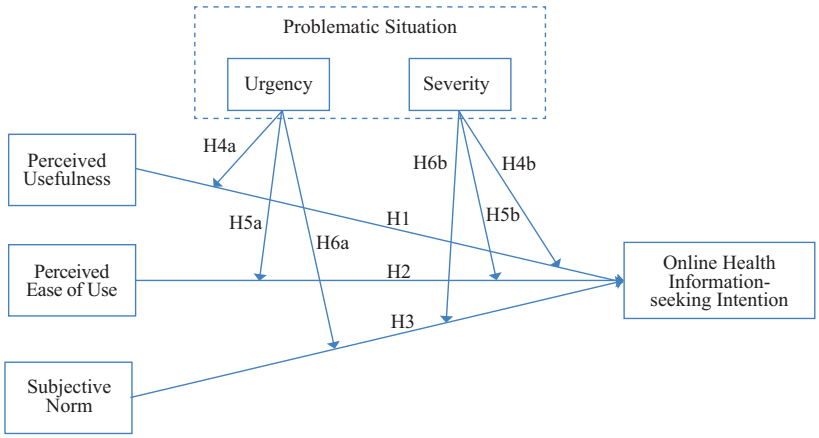

Figure 4. Online health information-seeking intention model.

3.2 Research Hypothesis

Based on the TAM model, this paper puts forward two variables: the perceived usefulness and perceived ease of use. Zhang (2011) found that social networking sites' (SNS) perceived usefulness and perceived ease of use have an impact on college students' user intention of SNS to access health information. Kim (2015) and Ajuwon and Popoola (2015) came to the same conclusion in research on other health information systems. And many researchers have applied the TAM to the field of health information seeking. According to the TAM model and the existing research results, we hypothesize:

H1: Perceived usefulness (PU) has a positive correlation with online health information-seeking intention (UI).
H2: Perceived ease of use (PEU) has a positive correlation with online health information-seeking intention (UI).

There is no doubt that subjective norm has an influence on user intention based on the TRA. For example, research has shown that users who are new to an information system are significantly affected by others' opinions (Luo & Zhu,

2015). Traditional health information channels always refer users to medical institutions for professional support, so users may be confused as to whether they can gain accurate health information on the Internet. Subjective norm is therefore likely to have a significant impact on user intention. So we propose the following hypothesis:

H3: Subjective norm (SN) has a positive correlation with online health information-seeking intention (UI).

Based on Devin's (1992) Sense-making methodology, our model puts forward "problematic situation" as a key variable to better understand the factors of cognitive gap and problematic situations. As users seek information in order to reduce their uncertainty about a topic (Belkin, Oddy & Brooks, 1982), the problematic situation influences users' information needs and motivates their processes. When users face different health problems, however, they will have different reactions to the same information channel. Using interviews, Zhang (2014) found that participants experiencing chronic diseases are more inclined to use the Internet as a source of information. As the Internet cannot directly solve the health problem, when users are in urgent problematic situation, they are inclined to choose more direct and accurate information channels, such as consulting doctors or health institutions. At this time of health urgency or severity, the intention to seek health information on the Internet is generally weak. The urgency of problematic situations may moderate the relationship between other factors and user intention, in that the more urgent the problematic situation is, the weaker other factors' influence on user intention to search information online.

Liang, Xue, and Chase (2011) found via a questionnaire survey that the disability level of users has a positive moderating effect on the relationship between perceived ease of use and online health information-seeking intention, and a negative moderating effect on the relationship between perceived usefulness and online health information-seeking intention. By investigating 114 breast cancer patients, Shaw et al. (2008) found that patients who feel worse tend to seek information on the Internet. In addition, users in severe problematic situations will have stronger information demand, in that they are more anxious to obtain additional health information. These studies therefore confirm that the severity of problematic situations may influence the relationship between other factors and user intention. Based on the above research results and analysis, this paper divides problematic situation into two dimensions: urgency and severity of health issues being searched, and makes the following hypotheses:

H4a: The urgency of problematic situation (UPS) moderates the relationship between the perceived usefulness and online health information-seeking intention (UI).

H4b: The severity of problematic situation (SPS) moderates the relationship between the perceived usefulness and online health information-seeking intention (UI).
H5a: The urgency of problematic situation (UPS) moderates the relationship between the perceived ease of use and online health information-seeking intention (UI).
H5b: The severity of problematic situation (SPS) moderates the relationship between the perceived ease of use and online health information-seeking intention (UI).
H6a: The urgency of problematic situation (UPS) moderates the relationship between the subjective norm and online health information-seeking intention (UI).
H6b: The severity of problematic situation (SPS) moderates the relationship between the subjective norm and online health information-seeking intention (UI).

4 Research Methods

To validate the research model, a questionnaire survey was conducted. The questionnaire is divided into two parts. The first part is the demographic characteristics, Internet usage, and physical health, and the second part is the measurement items of variables in the model, graded by the 5-point Likert scale (1 = definitely does not agree with this proposal, 5 = definitely agrees). In order to guarantee the validity of measurement items, we use the scale found in the existing literature. Combined with the characteristics of the health information-seeking behavior, the scale items were designed. At the beginning, each latent variable was designed to represent more than three observed variables. We then did a pretest of 46 samples to test the item validity. Deleting four items of low validity, we obtained the final questionnaire. The measuring scale items and literature sources are shown in Appendix Table A1.

Due to the rise of health apps and the spread of health information on social media, more and more college students are beginning to search information related to their own health status. The Internet has become an indispensable part of college students' life, where they tend to learn emerging technologies quickly. As their use of the Internet is frequent and longer online health information-seeking behavior is common, we choose college students as our survey respondents. This survey uses an offline investigation via questionnaires at Wuhan University Library.

5 Results

The data analysis has three parts. The first part is demographic description. The second part is evaluation of measures that explains the reliability and validity of measurement items. The third part is the hypotheses testing and model analysis.

5.1 Sample Demographics

The survey collected a total of 230 questionnaires. Eliminating 16 questionnaires with obvious problematic or default values, we performed descriptive statistics analysis of the remaining 214 questionnaires (Table 2).

Table 2. Demographic description.

Descriptive variable	Item	Frequency	Percentage
Sex	Male	79	36.9%
	Female	135	63.1%
Age	Under age 18	9	4.2%
	18–22 years old	123	57.5%
	23–28 years old	78	36.4%
	More than 28 years old	4	1.9%
Education	Bachelor degree	147	68.7%
	Master degree	58	27.1%
	Ph.D.	9	4.2%
Internet time per day	Within 1 hour	14	6.5%
	1–4 hours	124	57.9%
	5–8 hours	57	26.6%
	Above 8 hours	19	8.9%
Physical condition	Good health	66	30.8%
	Occasionally uncomfortable	141	65.9%
	Often feeling unwell	6	2.8%
	Suffering from a chronic disease	1	0.5%

5.2 Evaluation of Measures

First of all we need to evaluate the reliability and validity of measurement items. Researchers usually use Cronbach's alpha to measure internal consistency and reliability, so the paper uses SPSS19.0 for data analysis. The whole measurement item alpha coefficient is 0.858, which indicates the questionnaire has good reliability as a whole. The alpha coefficient of each variable and the average variance extracted (AVE) values are shown in Table 3. As all alpha coefficients were greater than 0.7, this means the measurement of each item has good reliability. AVE reflects the average variance shared between a construct and its measures. All variables' AVE values are greater than 0.50, which means the items have good convergent validity.

Besides convergent validity, the item validity analysis includes discriminant validity. Convergent validity and discriminant validity can be expressed with factor loadings and cross loadings. Table 4 shows that the factor loading of each item of each variable is greater than 0.5, and all factors' own loadings are greater than the cross loadings (bold numbers), which indicates that the questionnaire has good convergent validity and discriminant validity. As the AVE values in Table 3 were greater than the correlation coefficient of this variable with other variables, the item measurement is shown to have good discriminant validity.

Table 3. Reliability and correlation coefficient.

Variable	Mean	SD	alpha	AVE	PU	PEU	SN	UPS	SPS	UI
PU	3.3002	0.68183	0.789	0.610	1					
PEU	3.3879	0.71350	0.796	0.513	0.235**	1				
SN	2.8255	0.76891	0.805	0.636	0.376**	0.287**	1			
UPS	3.2056	0.92425	0.851	0.536	0.231**	– 0.030	0.099	1		
SPS	2.6402	0.88491	0.717	0.830	0.371**	0.080	0.326**	0.338**	1	
UI	3.1511	0.78624	0.814	0.691	0.608**	0.217**	0.472**	0.248**	0.438**	1

Note. SD: standard deviation; alpha: Cronbach's alpha; PU: perceived usefulness; ** $p < 0.01$ testing the null hypothesis of zero correlation.

Table 4. Factor loadings and cross loadings.

	PEU	PU	SN	UI	UPS	SPS
PEU3	**0.864**	0.099	0.021	0.114	– 0.009	0.015
PEU4	**0.828**	0.132	0.187	– 0.023	0.018	– 0.015
PEU1	**0.741**	– 0.161	0.124	0.233	– 0.052	0.014
PEU2	**0.677**	0.206	0.039	– 0.033	0.007	0.049
PU4	0.147	**0.757**	0.313	0.100	– 0.024	0.023
PU3	0.021	**0.743**	0.193	0.141	0.132	0.132
PU2	0.066	**0.726**	– 0.046	0.350	0.180	0.090
PU1	0.139	**0.631**	0.037	0.318	0.016	0.174
SN3	0.067	0.132	**0.860**	0.232	0.051	0.098
SN2	0.048	0.083	**0.855**	0.247	0.056	0.096
SN1	0.312	0.195	**0.662**	– 0.009	– 0.042	0.104
UI2	0.031	0.308	0.198	**0.760**	0.126	0.164
UI3	0.046	0.198	0.339	**0.732**	0.050	0.143
UI1	0.213	0.366	0.075	**0.704**	0.082	0.116
UPS2	– 0.032	0.096	– 0.001	0.041	**0.915**	0.143
UPS1	– 0.002	0.101	0.057	0.135	**0.907**	0.127
SPS1	0.025	0.146	0.055	0.115	0.258	**0.837**
SPS2	0.029	0.156	0.218	0.211	0.055	**0.825**

Note. Principle component analysis (PCA) is used in data analysis.

5.3 Structural Model Analysis

5.3.1 Moderating Effect of Urgency

There are moderating variables in the model, and the independent variables and moderating variables are continuous variables. To verify the moderating effect, we need to use the hierarchical regression analysis. We first focus on the regression analysis of how the independent variables and moderating variables affect the dependent variable, and we determine the coefficient R_1^2. We then calculate the product of the independent variable and the moderating variable and perform the regression analysis of how it affects the dependent variable and determine the coefficient R_2^2. If R_2^2 was significantly higher than R_1^2, it thus shows a strong moderating effect. Using the SPSS to perform hierarchical regression analysis to validate the urgency of problematic situation, we first input independent variables

to the linear regression model, and verify their main effects. Then we input interactive items into the second linear regression model to study the interaction relationship between the variables. The results show that Sig. F in the second regression changes to 0.014, less than 0.05. This means the amount of change in R^2 is significant, confirming that the moderating effect exists.

Hierarchical regression results are shown in Table 5. The regression coefficient of the urgency of problematic situation, perceived usefulness, perceived ease of use, and subjective norm is respectively significant (b = 0.141, p = 0.004; b = 0.486, p < 0.001; b = 0.134, p = 0.042; b = 0.264, p < 0.001, respectively). When adding the interactive items, the regression coefficient of the urgency of problematic situation, perceived ease of use, and subjective norm is respectively significant, but the regression coefficient of perceived usefulness is not significant. The coefficient of the urgency of problematic situation (×) perceived ease of use, and the coefficient of the urgency of problematic situation (×) subjective norm is significant, respectively, indicating that the urgency of problematic situation can moderate the relationship between perceived ease of use and user intention, and the relationship between subjective norm and user intention. From the interaction coefficient (b = – 0.134 and b = – 0.158, respectively), we find that the urgency of problematic situation has a negative moderating effect on the relationship between perceived ease of use and user intention, and the relationship between subjective norm and user intention. Hypotheses H1, H2, H3, H5a and H6a are therefore verified, but H4a is not verified.

Table 5. Hierarchical regression results for user intention.

Variable	Step 1	Step 2
Step 1: Main effects		
UPS	0.141**	0.615*
PU	0.486***	0.065
PEU	0.134*	0.610**
SN	0.264***	0.785*
Step 2: Moderations		
UPS × PU		0.130
UPS × PEU		– 0.134*
UPS × SN		– 0.158*
R^2	0.462	0.491
Adjusted R^2	0.451	0.472
ΔR^2	0.462	0.029
ΔF	40.974***	3.618*

Note. * p < 0.05; ** p < 0.01; *** p < 0.001.

5.3.2 Moderating Effect of Severity

Due to the fact that severity and urgency are the two different dimensions of problematic situation, we need to validate the model separately. Putting in the independent variables, including severity of problematic situation, perceived

usefulness, perceived ease of use, and subjective norm into the first linear regression model, and inputting interactive items, the severity of problematic situation (×) perceived usefulness, the severity of problematic situation (×) perceived ease of use, and the severity of problematic situation (×) subjective norm to the second linear regression model, Sig. F in the second regression changes to 0.007, less than 0.05. This means that the amount of change in R^2 is significant, so the moderating effect exists.

The results of hierarchical regression are shown in Table 6, where the regression coefficient of the severity of problematic situation, perceived usefulness, perceived ease of use, and subjective norm is respectively significant ($b = 0.217$, $p < 0.001$; $b = 0.432$, $p < 0.001$; $b = 0.128$; $p = 0.047$; $b = 0.216$, $p < 0.001$, respectively). And after bringing in the interactive items, the regression coefficient of the severity of problematic situation, perceived ease of use, and subjective norm is respectively significant, but the regression coefficient of perceived usefulness is not significant. The coefficient of the severity of problematic situation (×) subjective norm is significant, indicating that the severity of problematic situation moderates the relationship between subjective norm and user intention. And the interactive items' coefficient ($b = -0.179$) shows that the severity of problematic situation has a negative moderating effect on the relationship between subjective norm and user intention. Hypotheses H1, H2, H3, and H6b are therefore supported, but H4b and H5b are not supported.

Table 6. Hierarchical regression results for user intention.

Variable	Step 1	Step 2
Step 1: Main effects		
SPS	0.217***	0.934***
PU	0.432***	0.388
PEU	0.128*	0.355*
SN	0.216***	0.696***
Step 2: Moderations		
SPS × PU		0.024
SPS × PEU		– 0.083
SPS × SN		– 0.179*
R^2	0.481	0.514
Adjusted R^2	0.471	0.496
ΔR^2	0.481	0.033
ΔF	44.323***	4.195**

Note. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

6 Discussions and Conclusions

This paper studies the factors that influence health information-seeking intention, using the results of 214 college student questionnaires to verify the model by means of regression analysis. We summarize our findings in the following sections.

6.1 The Effects of Independent Variables on User Intention

We verify the direct influence of the independent variables on user intention, and in line with previous studies, we find that perceived usefulness, perceived ease of use, and subjective norm have a positive influence on user intention, respectively, where the stronger the factors of perceived usefulness, perceived ease of use, and subjective norm, the stronger the user intention of online health information seeking.

Seen from the coefficient of three independent variables, perceived usefulness' influence on user intention is the strongest, significantly greater than the influence of perceived ease of use. The results are consistent with Lim et al. (2011), Liang, Xue, and Chase (2011), and others. For health information-seeking behavior, the influence of perceived usefulness on user intention is stronger than that of perceived ease of use on user intention. This shows that the influence of perceived usefulness is more intense for related health information system searches. This paper also finds that the urgency and severity of problematic situation can affect user intention, in that the more urgent and serious the health issues being searched are, the more likely users will use any source including the Internet to find health information. This outcome seems to contradict Zhang's (2014) conclusion that people tend to choose the information channel except the Internet to ensure immediate access to treatment in the urgent problematic situation. But we study the intention to use the Internet for seeking health information, which is different from the user choice of information channels. When health problems occur, depending on specific kinds of information sources, we find that users hope to get as much information as quickly as possible. So with the increased severity or urgency of health issues, users are more likely to search health information online.

6.2 The Moderating Effect of Problematic Situation

From the perspective of the moderating effect of problematic situation, the urgency of problematic situation has a negative effect on the relationship between perceived ease of use and user intention and the relationship between subjective norm and user intention. This suggests that the more urgent the health issues being searched online, the weaker the influence of perceived ease of use and subjective norm on user intention. This result means that when the users are faced with a health problem, the more urgent the problem is, the more they are eager to get health information from any sources to better understand their health problems. They are therefore not concerned with whether the information system is easy to use or how others will evaluate it.

The severity of the problematic situation has a negative moderating effect on the relationship between subjective norm and user intention, in that for the user with a

serious health issue, others' opinions (subjective norm) become a less important influence on user intention. But the severity of the problematic situation does not moderate the relationship between perceived ease of use and user intention. Liang, Xue, and Chase (2011) found that the severity of disabled persons' conditions can moderate the relationship between perceived ease of use and user intention, mainly because the disability level will affect the use of an information system. Our survey respondents are college students who are generally in good health, however. Their health problems seldom affect their use of information systems, so the two conclusions are not in conflict. The urgency and severity of health issues being searched does not generally moderate the relationship between perceived usefulness and user intention, which suggests that the influence of perceived usefulness on user intention is significant, and is thus not overly affected by the problematic situation. The perceived usefulness of an information system is the key factor that determines whether the user intends to use the system or not.

6.3 Implications and Further Study

From the above analysis, we put forward the following suggestions about how to improve health care information systems.

1) For system design, an emphasis should be placed on the construction of information content and the quality ensurance of information, and should include encouragement to use medical institutions and experts in participating in the site's content construction. It is necessary to strengthen the audit of information content to ensure the usefulness and accuracy of the information system. With a better understanding of the user's health information-seeking behavior, we could improve the system functions, as the system needs to meet users' seeking habits to improve system usability;
2) It is important to enhance the publicity for information websites and build up the professional image and branding for websites in the health industry. Online marketers should make full use of opinion leaders' knowledge and influence, and encourage information seekers to share the content of the system to increase its possible use; and
3) In the process of system design, apart from considering user characteristics, the factors of problematic situation should be taken into account. In the meanwhile, it is important to learn users' search contexts, and consider different system processes in different situations of health information seeking.

This study has some limitations. First of all, the investigation respondents of our research are college students who are generally in good health and have high tech

skills and acceptance of Internet use for information seeking. So whether this model can be applied to other populations remains to be verified. Second, while the two dimensions of problematic situation we address in this study contribute to the literature, urgency and severity are not necessarily applied in other contexts. Third, the theoretical limitation of this paper is that our research model is not a complete framework. We focus on the two dimensions of problematic situation, and may ignore other important factors. In a follow-up study, we may consider the investigation of other groups of people (such as patients with certain diseases) or specific health information needs (such as physical or mental health), and extend dimensions that measure problematic situations.

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Author Contributions

L.D. Xia (kexialidan@163.com) put foward the research problems, designed the research framework and the methods, searched literature, analyzed data, and wrote the manuscript. S.L. Deng (victorydc@sina.com, corresponding author) instructed the research team how to carry out research work and revised the manuscript. Y.R. Liu (787955423@qq.com) searched the literature, designed the questionnaire, and collected data.

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Appendix A

Table A1. Variable, measurement item, and source.

Variable	Measurement item	Source
UPS	Most health problems that I am seeking on the Internet need to be solved immediately. Most health problems that I am seeking on the Internet are urgent.	Zhang (2014)
SPS	Most health problems that I am seeking on the Internet are serious. When I meet with serious health problems, I tend to seek health information online.	Zhang (2014)
PU	I think using the Internet to seek health information can ease my anxiety over personal heath. I think using the Internet to seek health information can increase my knowledge of health. I think the health information online can solve my problems. I think the health information online is useful.	Davis (1989); Liang, Xue, & Chase (2011)
PEU	I have no difficulties with the operation of health information websites. I do not need to spend a lot of energy in using the Internet to seek health information. Learning to use health information websites is easy for me. Being familiar with the operation of websites makes it very easy for me to find health information.	Davis (1989); Liang, Xue, & Chase (2011)
SN	Quite a few people around me will use the Internet to seek health information. People who have influence on me think I should use the Internet to seek health information. People who are important to me think I should use the Internet to seek health information.	Ajzen (1985); Chau & Hu (2001); Chau & Hu (2002)
UI	I would like to use the Internet to seek health information. I often seek health information on the Internet. I would recommend people around me to use the Internet to seek health information.	Taylor & Todd (1995a); Taylor & Todd (1995b); Bhattacherjee (2001)