

# Investigating the Influence of Empowerment on Patients' Satisfaction: How to Empower Patients in Online Health Consultation Platform

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## Abstract

*Online health consultation platform becomes a significant channel for health consumers to seek online support and health consultation. As the health consultation moves from offline to online, it significantly changes the communication circumstance between patients and physicians. It is crucial to understand the empowerment process embedded in online physician-patient interaction, in turn to improve patients' satisfaction online health services. This study examined how social-structural empowerment and psychological empowerment affect patients' satisfaction, as an empowerment outcome, in the online health consultation platform using text mining techniques and econometric analysis. Our results indicate that informational and emotional support can extrinsically empower patients and thereby increase their satisfaction. Psychological empowerment is also found that has two roles in the empowerment process, a partial mediating effect and a moderating effect on the relationship between social-structural empowerment and patients' satisfaction. This study enriches the empowerment theory from a text mining perspective and extends the empowerment theory in the organizational context to the context of digital health.*

connects physicians and patients, enabling medical information exchange by diversifying into online health consultation services [3, 4, 5]. As an alternative source of face-to-face consultations, online health consultation platform can alleviate the pressure of the offline healthcare system, facilitate the communication between physicians and patients, as well as empower patients to manage their health, especially for patients with chronic diseases [6].

Compared to offline health consultation, online health consultation may lack of media richness. Physician-patient interaction through the format of online question and answer (i.e., online Q&A) becomes the primary way for patients to consult, in which physicians may easily have the main control over the decision-making of the treatment [7, 8]. The physician-dominant relationship will gradually disempower patients, leading to low patient participation and satisfaction in the online health community [9]. Thus, it is crucial to understand how to empower patients through the physician-patient interaction in the emerging online health community, online health consultation platform, in which physician-patient interaction is the main way to enable social exchange. To our best knowledge, this underlying empowerment mechanism in the context of OHCP is still unclear.

## 1. Introduction

With the development of information and communication technologies, online health community has become increasingly prevalent these days. Broadly, online health community refers to a virtual place that enables health-related information and knowledge exchange among patients or between patients and physicians [1]. Thus, an online health community can be an online discussion group in social media, an web discussion forum, or a dedicated virtual platform that allows patients with similar conditions to connect [2]. The online health consultation platform (OHCP) is a type of emerging online health community (OHC) that

To understand the underlying empowerment mechanism embedded in the online health consultation process, we aim to examine the relationships among empowerment process, empowerment outcome, and patient satisfaction from perspectives of social-structural empowerment and psychological empowerment. Social-structural empowerment posits that the support, opportunity, resources, and other social factors provided by the contextual environment will remove one's powerlessness and improve one's satisfaction [10]. While psychological empowerment posits that four psychological dimensions can intrinsically eliminate one's powerlessness: meaning, self-determination, self-efficacy, and

impact [11], thereby improving one's working performance or behavior. In the context of online health consultation platform, we argue that the social structural empowerment (i.e., the social support exchange) can create a sense of psychological empowerment of patients and thereby impact patients' satisfaction. We aim to examine the relationship between social-structural empowerment and patient satisfaction as well as how psychological empowerment influence the relationship between social-structural empowerment and patient satisfaction in OHCP.

To test our hypothesis, we collect data from a leading online health consultation platform in China by conducting text mining and multiple linear regression to examine the empowerment mechanism embedded in physician-patient interaction.

The paper is organized as follows. We first conduct a literature review and propose our research models and corresponding hypotheses. Then we introduce the research methodology and present the result of the data analysis of the study. We conclude the study by discussing the key findings, theoretical and managerial implications for the online health community, and limitations will also be presented in the last section.

## **2. Literature review**

### **2.1. Social-structural empowerment**

Patient empowerment is an emerging paradigm in healthcare to promote patients' quality of life and improve health outcomes [12]. To date, there is still no consensus about the definitions of patient empowerment. Aujoulat et al. scoped 55 articles and found that empowerment is defined as either outcomes or as a process. For the former, they ignore the nature of the empowerment itself. That is, empower someone is more a process or sum of actions than a final result [13]. Empowerment was initially studied in the organizational management context. Two classic perspectives were often applied to examine the empowerment process and outcome: social-structural and psychological empowerment [14]. Social-structural empowerment examines the empowerment process from a macro perspective: how work environment, processes, policies, and other management practices can empower employees [14]. Kanter initially developed a social-structural empowerment framework [10] and proposed three important organizational structures that impact employees' feeling of power and behaviors: opportunity, power, and proportion. Power refers to how employees can get things done, which related to the position. Opportunity is an organizational structure

related to job condition. When the job conditions is better, the employees can have more prospective advance in the organization. Proportion indicates the social composition in the organization (e.g. sex). Based on the structure that Kanter proposed, Miller et al. validated that higher social-structural empowerment is related to increased job satisfaction and employee work effectiveness, leading to clients' satisfaction [15].

Unlike the organizational management context, each patient who has needs to seek help from health professionals has equal opportunities to access these services. For this reason, the opportunity and proportion structure maybe not as important as in the context of an organization, while the power structure in OHCP should be paid more attention, since information, resources are embedded in the process of social support exchange during the interaction between physician and patients. To our knowledge, existing studies examined patient empowerment mainly from a perspective of psychological empowerment, such as self-efficacy, control, meaning, etc. [9, 16, 17, 18]. In contrast, few studies examined patient empowerment from a perspective of social-structural empowerment.

### **2.2. Psychological empowerment**

Psychological empowerment focuses more on how psychological and cognitive factors intrinsically motivate individuals to empower themselves, leading to behavior changes and interaction with the environment [19]. Drawing from the study of Spreitzer [11], empowerment is a multifaceted concept and psychological empowerment is comprised of four dimensions: meaning, competence, self-determination and impact. Adapted from the psychological empowerment of Spreitzer and Zimmerman [11, 19], in an OHCP context, competence is defined as patients' belief in their capacities to manage their health and finish the treatment. Impact refers to what extent patients make a difference in health-related outcomes. Self-determination refers to "a sense of choice" that patients have in the activities or experience, especially in decision-making in the online health consultation service of OHCP [11, 17]. Meaning refers to the meaningfulness that patients gain from the treatment and health management process. Psychological empowerment can directly impact effectiveness and satisfaction. Spreitzer [11] found that all four dimensions embedded in psychological empowerment are proven to be statistically significant to managerial effectiveness and innovation. In addition to innovation, psychological empowerment can also enhance employees' creativity [20], job satisfaction [21]

and reduces employees' burnout [22]. In the context of OHCP, the same result was validated in the study [23] that patient empowerment positively impacts patients' satisfaction with their physicians. However, Petrič, Atanasova, and Kamin also pointed out that excessive psychological empowerment may make patients exert excessive authority to decide the treatment they want regardless of suggestions from physician [9].

Psychological empowerment has been examined as a moderator or mediator on the effect of structural empowerment and empowerment outcomes in previous studies, but only a mediated relationship was verified [24, 25]. However, the online health community literature seldom links structural empowerment with psychological empowerment to examine the empowerment process and outcomes. Hence, to fill this gap, this study will examine the effect of patient empowerment on patient satisfaction with service from two perspectives, linking social-structural empowerment with psychological empowerment.

### 3. Research model and hypotheses

Figure 1 shows the research model of our study. We mainly focus on the power structure embedded in physician-patient interaction in OHCPs to explore how physicians share their power to patients and increase patient satisfaction.

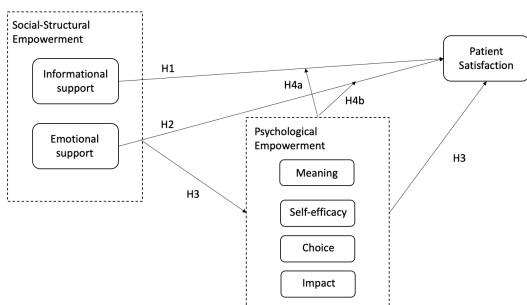


Figure 1: Research model

Social support exchange is defined as resource exchange within a social network involving at least two parties, recipient and provider, to satisfy recipients' social needs, such as information, affection, etc. [26, 27]. Hence, the sources of power in an OHCP mainly come from this exchange process, where physicians provide information, resources, and even affection to engage patients in the decision-making process during the consultation.

Informational support refers to exchanging information, including advice, referral, situation appraisal, and teaching [26]. Physicians' informational

support enables patients access to information, which is one of the critical resources of power identified by researchers [10, 28]. Information asymmetry is one of the main reasons that patients feel powerless and uncertain. Provision of informational support can reduce patients' uncertainty about their health conditions. The situation appraisal helps patients to gain a better understanding of their status and health conditions. At the same time, the advice, referral, and teaching enable patients to improve the skill and competence to manage their health [29]. Therefore we argue that more information support provided by physicians, better understanding patients can gain to involve in a sharing decision making, thereby increasing their satisfaction.

*H1: Informational support as a type of structural empowerment can positively affect patient satisfaction.*

Emotional support is defined as an expression of caring, encouragement, concern, sympathy, and other affection [26, 30, 31]. Emotional support has a more substantial effect than informational support on patient satisfaction [32]. When patients get ill or feel uncomfortable, the negative emotions, such as fear, worry, and even panic, will invade their minds. At this time, in addition to accurate and high-quality information provision, physician's positive emotional reaction also becomes essential to free them from negative emotions, especially for those who have severe disease or chronic disease. Hence, we argue that emotional support provided by physicians improves patients' emotional well-being, helping patients participate in treatment and sharing decision-making with more stable emotions, and thereby improving their satisfaction.

*H2: Emotional support as a type of structural empowerment can positively affect patient satisfaction.*

Structural empowerment has been found to directly and positively impact employees' satisfaction in an organizational context [25]. However, in many cases, even though all beneficial conditions are created by the organizational structure, employees still feel disempowered due to the lack of intrinsic motivations. In this case, psychological empowerment may work as a mediator to explain how contextual conditions extrinsically affect the intrinsic motivations and thereby lead to improved satisfaction. Accessing to more information enables patients to gain deeper understanding about benefits of their medicine, helping them feel meaningful and confident to comply with the treatment plan made by physicians [33]. Uden-Kraan et al. pointed out that positive emotion in an online health community can help them to have more control and can better cope with their negative emotion caused

by the bad health conditions [33]. Hence, we argue that structural empowerment can increase psychological empowerment, and together these two empowerment mechanisms can better improve patient satisfaction in an OHCP.

*H3: Psychological empowerment mediates the relationship between social-structure empowerment and patient satisfaction.*

In the organizational context, the study has argued that psychological empowerment can also work as a moderator to affect the strength and direction of the effect of structural empowerment on employee burnout [24]. We adopted the moderating effect of psychological empowerment into the context of online health consultation platform. Patients with a higher level of psychological empowerment are willing to seek information and emotional support from other sources. They may have more information and emotional support relative to patient with lower level of psychological empowerment. With the rich information and emotional support, the effect of social support (i.e., information support and emotional support) from physician on satisfaction may be diluted. That means, patients with a higher level of psychological empowerment are less likely to seek social support in physician-patient interaction compared with a lower level of psychological empowerment. Hence, we have the following hypotheses

*H4a: The relationship between informational support and patient satisfaction will be negatively moderated by psychological empowerment.*

*H4b: The relationship between emotional support and patient satisfaction will be negatively moderated by psychological empowerment.*

## 4. Research methodology

### 4.1. Research context

Our study mainly focuses on one of the leading online health communities in China: Haodf.com, established in 2006. To date, there are a total of 821,048 physicians from 9,699 hospitals registering on this platform. As a leading online health consultation platform, Haodf.com provides online health consultation services that enable knowledge and information exchange among physicians and patients. For telephone or video consultation Haodf.com provides, physicians will interact with patients through telephone or internal video conference system of the community. For text and picture consultation, patients can leave questions in text and picture and physicians will answer them in text. The interaction records can be

public and transparent based on patients' willingness, allowing patients with similar conditions to refer to and learn. Our study mainly focus on the text and picture consultation. Examples of the text and picture consultation are shown in Figure 2 and 3. We collected 541,815 records of dialogues from two developed areas, Beijing City and Shanghai City, and two developing areas, Liaoning Province and Chongqing City, among which 280,769 records are from physicians, and 261,046 records are patients' replies. After excluding the voice message records from haodf.com and matching the records to the corresponding consultation, we got a total of 36,880 consultations ranging from 2019 to 2020 in Haodf.com.

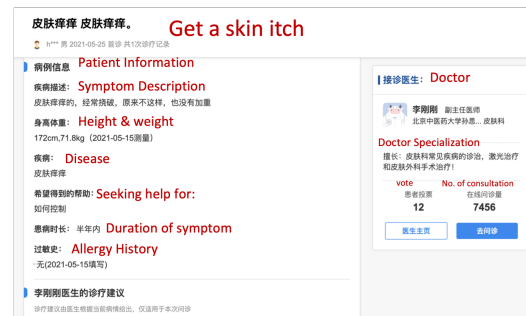


Figure 2: Example of patient's inquiry



Figure 3: Example of physician's answer

### 4.2. Operationalization of variables

Table 1 presents the definition of variables measured in the proposed model and the measurement of each variable. Our study adopts the measurement used in Yang et al. [8], using the positive rating of a physician as proxy to measure patient satisfaction. In terms of social support, we measure four types of informational support and six types of emotional support based on the categories proposed by Cutrona and Suhr [26].

Table 1: Operationalization of constructs

<b>Social Support</b>	<b>Definition</b>	<b>Measurement</b>
<b>Informational support (Adapted from Cutrona and Suhr [26])</b>		
Advice	Provide suggestion or advice	Number of advice that physicians provide
Referral	Refer patients to other doctors or face-to-face consultation	Number of referral that physicians provide
Appraisal	Assess patients' situation or symptoms	Number of appraisal that physicians provide
Teaching	Provide guideline to patients how to deal with the situation	Number of teaching that physicians provide
<b>Emotional Support (Adapted from Cutrona and Suhr [26])</b>		
Caring	Give comfort to patients	Number of physicians' expression of caring
Concern	Express concern about patients' situation	Number of physicians' expression of concern
Sympathy	Express sorrow and attention for patients' situation	Number of physicians' expression of sympathy
Understanding	Express understanding of patients' situation or worry.	Number of physicians' expression of understanding
Encouragement	Give patients hope and confidence	Number of physicians' expression of encouragement
Esteem	Show respect to patients' opinion	Number of physicians' expression of esteem
Compliment	Emphasize patients' ability	Number of physicians' expression of compliment
Prayer	Prays with patients	Number of physicians' expression of prayer
<b>Psychological Empowerment (Adapted from G. M. Spreitzer [11])</b>		
Meaning	patients think the interaction in consultation is meaningful to his or her lives	Number of patients' expression of meaningfulness of the treatment
Self-determination	Patients think they have choices in deciding treatment or they have discussion about the different choices in treatment with physicians	Number of patients' expression of self-determination
Self-efficacy	Patients have confidence with their ability to participate in a sharing decision making and health management process.	Number of patients' expression of self-efficacy
Impact	Patient emphasize their behaviors make a difference during or after the consultation.	Number of patients' expression of impact
<b>Patient Satisfaction (Adapted from Yang et al. [8])</b>		
Recommendation Rating	Express patients' satisfaction with services and physicians' attitude.	Satisfaction rating from 1 to 5.

We adapted Spreitzer's psychological empowerment scale (PES)[11] in this study to measure psychological empowerment, because PES is well-validated in organizational context.

### 4.3. Data analysis

Text mining and econometrics analysis were used to conduct the data analysis. Text mining is an important technique to transform unstructured text data into structured data. The common application of text mining in prior OHC studies includes text classification and sentiment analysis[32, 8, 34]. Text classification is the method we adopted in this study. We build binary classifiers to classify each subtype of informational support, emotional support, and psychological empowerment, using a random forest algorithm, a popular classifier to deal with short text classification [32, 8]. Then the manually-coded 3658 records for social support classification, 2895 records for psychological empowerment are used to train and test the classifier. The overall accuracy for informational support, emotional support, and psychological empowerment classification are 72%, 85% and 82%.

Based on the main constructs (Table1) and our research model, we use multiple linear regression to test twelve test models in our study to carefully examine the effect of each dimension of constructs. First, we examine informational and emotional support, and psychological empowerment to verify their respective effects on patient satisfaction (Model 1 & 3 & 5). Then we further examine the effect of informational support and emotional support subtypes on patient satisfaction (Model 2 & 4) and the effect of each dimension of psychological empowerment (Model 6) on patient satisfaction. Then we put the constructs of psychological empowerment and social structural empowerment together to examine their overall effect on patient satisfaction (Model 7). To test the moderating role of psychological empowerment on the effect of informational support and emotional support on patient satisfaction respectively, we specify model 8 and 9. Finally, to test the mediating role of psychological empowerment, we specify models to test the effect of informational support and emotional support on psychological empowerment (Model 10) and we also test their respective effects on psychological empowerment (Model 11 & 12).

### 4.4. Results

Table 2 shows the regression result. We examine the effect of informational support and emotional support on

patient satisfaction. The results of model 1 and model 3 indicate that both informational support ( $\beta = 0.027$ ,  $p < 0.001$ ) and emotional support ( $\beta = 0.046$ ,  $p < 0.001$ ) have a positive effect on patient satisfaction. Therefore, **H1** and **H2** is supported.

We also examine the effect of each subtype of informational support and emotional support on patient satisfaction in model 2 and 4. Based on the result of model 2, besides advice, other three types of informational support: teaching ( $\beta = 0.032$ ,  $p < 0.001$ ), appraisal ( $\beta = 0.015$ ,  $p < 0.001$ ), and referral ( $\beta = 0.012$ ,  $p < 0.001$ ) are significant and positively affect patient satisfaction. Among these types, teaching ( $\beta = 0.032$ ,  $p < 0.001$ ), contributes most to increase patient satisfaction. Based on model 4, among the eight types of emotional support, only encouragement ( $\beta = 0.017$ ,  $p < 0.001$ ), compliment ( $\beta = 0.062$ ,  $p < 0.001$ ) and esteem ( $\beta = 0.046$ ,  $p < 0.001$ ) have positive effects on patient satisfaction, while concern ( $\beta = -0.017$ ,  $p < 0.001$ ) has negative effects on patient satisfaction.

Based on the results of model 5 in Table 2, psychological empowerment ( $\beta = 0.144$ ,  $p < 0.001$ ) has a positive effect on patient satisfaction. Then based on the result of the model 10, we can conclude that informational support ( $\beta = 0.046$ ,  $p < 0.001$ ) and emotional support ( $\beta = 0.160$ ,  $p < 0.001$ ) have a positive effect on psychological empowerment. Furthermore, emotional support has a stronger effect than informational support on psychological empowerment. Based on the result of full model(model 7), the psychological empowerment and social structural empowerment together have positive impact on patient satisfaction. Given that social structural empowerment also directly affects patient satisfaction, we can conclude that psychological empowerment has a partial mediating effect on the relationship between social-structural empowerment and patient satisfaction. Hence, **H3** is partially supported.

We also examine the effect of subtypes of informational support and emotional support on psychological empowerment in model 11 and model 12. All four subtypes of informational support have a positive and significant effect on patients' psychological empowerment. Appraisal contributes most to psychological empowerment. In terms of emotional support, all eight types of emotional support are significant to psychological empowerment, except sympathy. Similar to the effect of concern ( $\beta = -0.017$ ,  $p < 0.001$ ) on patient satisfaction, concern negatively affect psychological empowerment.

Model 8 and 9 present the result of the effect

Table 2: Regression Result

	Dependent variable:											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>informational support</i>	0.027*** (0.002)											
advice		0.002 (0.001)					-0.002 (0.001)	0.024*** (0.002)		0.046*** (0.002)	0.017*** (0.001)	
referral		0.012*** (0.004)					0.009* (0.004)				0.024*** (0.002)	
appraisal		0.015*** (0.003)					0.008* (0.003)				0.043*** (0.002)	
teaching		0.032*** (0.006)					0.030*** (0.006)				0.019*** (0.004)	
<i>emotional support</i>			0.046*** (0.008)						0.025** (0.009)	0.159*** (0.007)		
caring			0.001 (0.002)				-0.009*** (0.002)					0.017*** (0.001)
concern			-0.017* (0.009)				-0.027** (0.009)					-0.034*** (0.004)
sympathy			0.019 (0.028)				0.002 (0.028)					0.025 (0.015)
empathy			0.001 (0.004)				-0.010* (0.005)					0.014*** (0.002)
encouragement			0.017*** (0.002)				0.012 (0.002)					0.091*** (0.001)
compliment			0.062*** (0.012)				0.061*** (0.012)					0.289*** (0.006)
esteem			0.046*** (0.008)				0.043*** (0.008)					0.270*** (0.004)
prayer			0.007 (0.005)				0.001 (0.005)					0.075*** (0.003)
<i>psychological empowerment</i>					0.144*** (0.008)			0.161*** (0.010)	0.167*** (0.009)			
meaning						0.007*** (0.001)	0.009*** (0.001)					
impact						0.031*** (0.004)	0.029*** (0.005)					
choice						0.006 (0.003)	0.005 (0.003)					
efficacy						0.0001 (0.003)	0.003 (0.003)					
IS * PE								-0.022*** (0.003)				
ES * PE									-0.058*** (0.011)			
tenure	0.00005*** (0.00000)	0.00005*** (0.00000)	0.00005*** (0.00000)	0.00005*** (0.00000)	0.00005*** (0.00000)	0.00005*** (0.00000)	0.00005*** (0.00000)	0.00005*** (0.00000)	0.00005*** (0.00000)	0.00001*** (0.00000)	0.00001*** (0.00000)	0.00001*** (0.00000)
Constant	2.967*** (0.005)	2.967*** (0.005)	2.976*** (0.005)	2.971*** (0.005)	2.975*** (0.005)	2.978*** (0.005)	2.967*** (0.005)	2.963*** (0.005)	2.972*** (0.005)	0.002 (0.003)	-0.002 (0.003)	-0.018*** (0.002)
Observations	36,880	36,880	36,880	36,880	36,880	36,880	36,880	36,880	36,880	36,880	36,880	36,880
Adjusted R <sup>2</sup>	0.218	0.217	0.215	0.219	0.222	0.218	0.222	0.224	0.222	0.095	0.052	0.385

Note: Standard error in parentheses \* p<0.05; \*\* p<0.01; \*\*\* p<0.001  
 We have included city and professional seniority as dummy variables in data analysis, due to space limitation, we didn't include them in the results.  
 (1) – (12) in the table indicates to 12 different models.

of psychological empowerment on the relationship between social-structural empowerment and patient satisfaction. The results indicate that psychological empowerment has a negative impact on the relationship between informational support ( $\beta = -0.022$ ,  $p < 0.001$ ) and patient satisfaction and on the effect of emotional support on patient satisfaction ( $\beta = -0.058$ ,  $p < 0.001$ ). That is, the effect of informational support and emotional support on patient satisfaction is weakened by psychological empowerment. Hence, **H4a** and **H4b** is supported.

## 5. Discussion

### 5.1. Key findings

Based on the results of the data analysis, we conclude three key findings in this study. First, informational support and emotional can empower patients to improve patients' satisfaction. Some interesting insights were found. Among eight types of emotional support, caring, sympathy, empathy, prayer is insignificant. It is reasonable that when patients get into the panic of the disease, words such as "Good Luck" (prayer) and "Are you OK" (caring) may be vague for them. Additionally, concern is negatively related to patient satisfaction. It is likely that the concern from physicians can only increase patients' psychological burden instead of alleviating their fear and anxiety.

Second, psychological empowerment has a partial mediating effect on the relationship between social-structural empowerment and patient satisfaction. Informational support and emotional support first positively affect psychological empowerment. Then psychological empowerment positively impacts patient satisfaction. More specifically, teaching, appraisal, advice and referral provided by physicians can help patients to gain a better understanding, knowing more about the value of their treatment, the perceived impact that they can make to change the current situation and even their confidence[33]. All eight types of emotional support except sympathy and concern can positively impact psychological empowerment. Among the four dimensions of psychological empowerment, self-efficacy and self-determination are found to be insignificant to patient satisfaction in this study. It is likely that at this stage, the level of patient psychological empowerment may be not high as expected. Patients still depend on physicians to make choices and they feel more confidence with physicians' ability instead the capabilities of themselves.

Third, we found that psychological empowerment will mitigate the effect of social-structural

empowerment on patient satisfaction. Without intrinsic motivations, even individuals have access to various supports and resources, they can still feel disempowered [14]. However, when patients present a higher level of psychological empowerment, they depend less on social contextual factors to extrinsically empower themselves to manage their health, given that the intrinsic motivations sustain their energy and intention of self-management, according to self-determination theory [35].

### 5.2. Theoretical implications

Our study contributes to theory from three aspects. First, this study is one of the first examines to explore empowerment process in an online health consultation platform, extending the empowerment in organizational context to the OHC context. Although previous literature has examined the relationship between empowerment and satisfaction, those studies mainly focus on organizational management. To our best knowledge, our study is one of the first links social-structural empowerment and psychological empowerment in an online health consultation platform context and verified the moderating and partially mediating effect of psychological empowerment on the relationship between patient satisfaction and social-structural empowerment.

Second, to our best knowledge, our study is one of the first to use text mining to examine empowerment mechanisms, enriching the literature on the empowerment theory from a text mining perspective. In the OHC context, a large amount of unstructured text generated from the patient-physician dialogues contains patients' opinions, attitudes, and emotions, which is valuable to mining. The automatic text classification increases the effectiveness of text analysis.

Third, our findings also enrich the literature on social support in the online health community. Our findings in OHCP are consistent with the previous studies in other types of OHC [32, 36], validating that emotional support and informational support in OHCP positively impact patients' satisfaction with services. Additionally, we also examine the effect of subtypes of informational support and emotional support on patient satisfaction, enriching the existing literature of social support in the OHC context from the perspective of online health consultation platform in a smaller granularity.

### 5.3. Practical implications

This study also provides practical implications to the online health community. First, based on the findings, online health consultation platform can



develop more effective measures to motivate physicians to provide informational support and emotional support during the consultation. Physicians can focus more on teaching patients how to cope with the current situation can greatly reduce their uncertainty about their situation, increasing their understanding, because teaching contributes most to patient satisfaction. Regarding emotional support, compliment can shorten the psychological distance between patients and physicians, encouragement can give patients hope to alleviate their anxiety, esteem can make patients feel respected. However, the results of this study suggest that physicians can avoid express their concern about patients' health conditions, which may burden patients.

Second, based on our findings, patients present a higher level of psychological empowerment, social support from the online health consultation platform becomes less effective in increasing patient satisfaction. Moreover, psychological empowerment has also been found that have a partial mediating effect on patient satisfaction. From these perspectives, physicians can provide more informational support and emotional support to those patients with a low level of psychological empowerment to increase their self-efficacy and self-determination to manage their health.

#### 5.4. Limitations

This study presents limitations from several aspects. First, the accuracy of the classifier can still be improved. A more effective algorithm can be used to filter and select the key features of each type of empowerment. Second, given that the platform protects patients' privacy, we cannot match patients' satisfaction to the corresponding consultation. The current dependent variable selected in this study is a proxy variable of patient satisfaction, using the average ratings that physicians received to represent the patient satisfaction with the consultation. Future studies could track the satisfaction of each patient in the consultation if conditions permit. Third, we examine the empowerment mechanism from physicians' and patients' expressions during the interaction. The empowerment process is not only psychological status change but also behavior changes. Future studies could measure empowerment from a psychological perspective and behavioral perspective (e.g., the frequency of engagement in the online health community).

#### 6. Conclusion

This study mainly examined the empowerment mechanism and patient empowerment outcome in

an online health consultation platform. Using text mining techniques, we explore the relationship of social support and patient satisfaction, the role of psychological empowerment on the relationship of social support and patient satisfaction. The results indicate that both informational support and emotional support can empower patients and thereby improve patients satisfaction. Psychological empowerment has a moderating and partially mediating effect on the relationship between social support and patient satisfaction. We also examined in a smaller granularity the effectiveness of each type of informational support and emotional support on patients' psychological empowerment and patient satisfaction. Our findings extend the empowerment theory in an organizational context to the context of the online health community from the perspective of online health consultation platform. The study also contributes to empowerment literature from a text mining perspective. Based on the findings of the effectiveness of each subtype of informational support and emotional supports, we provide a better guideline to the online health consultation platform to create a more empowering environment for patients.

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