# PROMOTING ONLINE PATIENT-PROVIDER COMMUNICATION IN CHINA:

## AN INTERNET-BASED INTERVENTION

A Dissertation

by

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#### **ABSTRACT**

The Chinese health care system has suffered from severe tension between patients and doctors during the past decade. Violence towards health care providers has become a familiar occurrence in China. Faced with the increasing number of deaths and injuries of health care providers from angry health care consumers, Chinese scholars have made great efforts to explore possible ways to improve doctor-patient relationships. Study 1 of the dissertation conducted a cross-sectional survey among 758 Chinese patients to examine pathways through which patient-centered communication (e.g., degree to which doctors are perceived as informative, supportive, and helpful making medical decisions) could influence patient satisfaction and patient trust, variables that could then contribute to better patient-reported health outcomes. The findings showed that patient-centered communication significantly increased patient satisfaction and patient trust. Patient satisfaction in turn significantly improved three types of health outcomes (general, emotional, and physical), and patient trust significantly enhanced emotional health. Bootstrap analyses provided support for the mediation effects of satisfaction and trust.

While improving patient satisfaction and patient trust holds enormous potential to mitigate the conflicting doctor-patient relationship in China, another important contributing factor to the crises in the health care system is the difficulties many Chinese patients are facing in receiving affordable health care. Online patient-provider communication may bring a new option for the delivery of affordable health services in

a timely way. However, online patient-provider communication is still a relatively new concept to Chinese patients. Thus, to promote this new but important practice, study 2 of the dissertation conducted a four-week blog-based intervention among Chinese patients aged 40 or above. With the randomized control trial design and a general basis of the Social Cognitive Theory, this intervention was effective in promoting online patient-provider communication. Specifically, the findings indicated that this intervention resulted in improvements in the frequency of participants' online patient-provider communication and related psychosocial constructs from Social Cognitive Theory (e.g., self-efficacy, outcome expectations, and awareness).

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# TABLE OF CONTENTS

	Page
ABSTRACT	ii
ACKNOWLEDGEMENTS	iv
CONTRIBUTORS AND FUNDING SOURCES	v
TABLE OF CONTENTS	vi
LIST OF FIGURES	ix
LIST OF TABLES	X
CHAPTER I INTRODUCTION	
Background  Overview of the Dissertation	1 5
CHAPTER II LITERATURE REVIEW OF STUDY 1	6
Functions of Patient-centered Communication  Pathway Linking Patient-centered Communication to Health  Patient-centered Communication in China  Patient Satisfaction and Patient Trust in China  The Important Role of Patient-centered Communication in China  Effects of Patient Satisfaction and Patient Trust on Health Outcomes  Effects of Patient-centered Communication on Health Outcomes	6 13 16 21 22 24 26
CHAPTER III METHODOLOGY OF STUDY 1	28
Participants	28 28 34
CHAPTER IV RESULTS OF STUDY 1	37
Descriptive Statistics	37 37

	Page
CHAPTER V DISCUSSION OF STUDY 1	40
Implications for Health Care Providers	45
Implications for Health Interventions	46
Implications for Theories	47
Limitations and Future Directions	48
Conclusion	50
CHAPTER VI LITERATURE REVIEW OF STUDY 2	51
Internet-based Interventions to Improve Online Patient-provider	
Communication	51
Internet-based Interventions Targeting Health-related Technology Use	52
Internet-based Interventions to Targeting Communication with Health Care	
Providers	55
Factors Influencing Online Communication with Doctors	58
Application of Social Cognitive Theory to Internet-based Interventions	63
Description of the Internet-based Intervention in the Current Study	68
CHAPTER VII METHODOLOGY OF STUDY 2	74
Study Design and Participants	74
Measurement	76
Analytic Procedure	81
CHAPTER VIII RESULTS OF STUDY 2	82
Descriptive Statistics	82
Completers versus Non-completers	83
Intervention Effects on Online Patient-provider Communication	83
Intervention Effects on SCT Outcomes	85
CHAPTER IX DISCUSSION OF STUDY 2	88
Strengths	97
Limitations	98
Future Directions	99
Summary	101
CHAPTER X CONCLUSION	103

	Page
REFERENCES	105
APPENDIX A	131
APPENDIX B	135
APPENDIX C	139

# LIST OF FIGURES

FIGURE		Page
1	Conceptual Framework for Study 1	36

# LIST OF TABLES

TABLE		Page
1	Summary of Principal Component Analysis Results for Study 1	30
2	Reliability and Validity Statistics for Measures in Study 1	31
3	Descriptive Statistics for Study 1	31
4	Predictors of Endogenous Variables in SEM for Study 1	37
5	Summary of Principal Component Analysis Results for Study 2	77
6	Descriptive Statistics for Study 2	78
7	Comparison of Intervention Group and Control Group at Baseline	82
8	Comparison of Time 1 and Time 2 in the Intervention Group	84
9	Comparison of Time 1 and Time 2 in the Control Group	85

#### **CHAPTER I**

#### INTRODUCTION

### **Background**

On February 17, 2014, at Bei Gang Hospital in Qiqihar city of Heilongjiang province, a patient was not happy with the surgical outcome, and attacked the head of his doctor with an iron pipe and murdered him. On February 18, 2014, at Yi County Hospital of Hebei province, when Dr. Li, a general surgeon, was consulting a patient, his throat was slashed suddenly by his former patient. On October 25, 2013, at No. 1 People's Hospital of Wenling, Zhejiang province, a patient who was dissatisfied with the result of an operation on his nose stabbed a doctor to death and wondered another two (Yao et al., 2014).

The tension between patients and doctors has become a serious social problem in China. The Ministry of Health reported that in 2006 there were 9,831 medical disputes in Chinese hospitals, resulting in 5,519 health care professionals injured and property damage of 200 million Chinese dollars, and this number doubled in 2008 (Liebman, 2013). Another national survey conducted by China Hospital Association among 8,000 patients and 8,000 medical professionals in 316 hospitals from 30 provinces found that in 2008, 48% of hospitals reported experiences of patient or family member assaults on doctors, and this percentage escalated to 73% in 2012. The average number of violent attacks on medical staff per hospital increased from 20.6 in 2008 to 27.3 in 2012 (Pan et al., 2015).

The doctor-patient relationship has sharply deteriorated over the past decade in China. Chinese scholars have identified several reasons for this deterioration, such as defects in health policy and regulation to tackle the violence in hospitals, biased media coverage on medical disputes, unfair judicial system to evaluate medical disputes, low salary of medical doctors, and deficient health insurance system (Yao et al., 2014). However, most of prior research explored contributing factors at the organizational, media, and political/legal levels. Very few has examined the causes of doctor-patient conflicts from the personal and interpersonal perspectives. Given the severity of the conflict between doctors and patients, improving doctor-patient relationships is one of main communication objectives of China's health care reform (Xu, 2013).

The present study focuses on two reasons that may contribute to poorer doctorpatient relationships, including (1) low patient satisfaction, and (2) patient mistrust.

China's Ministry of Health conducted a survey in 2008 to investigate possible solutions to dysfunctional doctor-patient relationships. In that national survey among 4,863 clinicians, the most frequently mentioned solution is facilitating good doctor-patient communication during medical encounters, and more than 70% of doctors indicated that the inadequate communication with patients prevented the improvement in doctor-patient relationships (Zhang & Sleeboom-Faulkner, 2011). In the United States, Institute of Medicine (2001) highlighted the importance of communication in health care, stating that patient-centered communication is a quality that relates not only to individual patients and clinicians, but also to the health care system, and defined patient-centered care as providing care that respects and responds to patient needs, preferences and

values. Although research to date has widely acknowledged the positive impacts of patient-centered communication (Street, Makoul, Arora, & Epstein, 2009), most studies were conducted in the western context, while this research topic has not yet been adequately examined in different cultures, such as China.

China has long faced the problem of having health care service that is expensive and difficult to access. The 2008 National Urban Resident Household Survey demonstrated that the quality of medical services patients received was unsatisfactory due to the long waiting time, short consultation time, and high medical cost (Shen, Tang, Feng, & Tang, 2010). This reflects a reality in the Chinese healthcare system where the demand for health services is greater than the capacity to deliver those services in a timely way (Yu et al., 2015). Such gap between demand and supply is further enlarged with the increasing aging population in China. According to the China National Committee on Aging (CNCA), in 2013, 14.8% of the Chinese population was 60 years old or above (Deng, Mo, & Liu, 2014). The United Nation (2013) adds that this percentage will grow to 20% by 2025, and to 30% by 2050. As the number of middleaged and older population grows, there is also an increasing need for healthcare services. Prior research has indicated that older people have noticeably limited regenerative abilities and are more prone to chronic diseases. For example, a previous study that evaluated health status of Chinese people who aged 60 or above, and showed that about 80% had at least one chronic disease, 50% had two, and over 25% had three or more. Similarly, middle-aged people in China are acquiring chronic diseases earlier due to

issues such as intensive social pressure and exacerbating environment pollution (Hui, 2002).

Given the huge demands for health care services, hospitals and doctors are facing tremendous pressure. In China, the ratio of doctors to general population is 1:735, lower than that in western countries ranging from 1:280 to 1:640 (Li, 2007). Therefore, Chinese doctors frequently experience work overload and extra shifts. According to a survey among doctors in Zhejiang province of China, 60% of them normally worked over 60 hours per week, and 23% worked over 90 hours per week. With the heavy workload, not surprisingly, consultation time for each patient is short. Nearly 38% of doctors in provincial hospitals spent only 4 minutes on average for each outpatient (Wu, Wang, Lam, & Hesketh, 2014). Considering the shortage of healthcare resources, and the high demand for healthcare services, seeking alternative channels to increase access to care becomes particularly important to China. The Internet may bring a new option for the delivery of health services. However, prior research mainly focused on Internet health information seeking that provides opportunities to self-diagnosis, understand health conditions and treatment options, and obtain social support (Kuehn, 2013). Very few of previous studies focused on the increasing use of the Internet as an important platform to directly communicate with doctors. In fact, online patient-provider communication may offer more opportunities to obtain quick response and accurate health information to improve patients' understanding of their health status and coping with the illness (Rice & Katz, 2006).

#### **Overview of the Dissertation**

This dissertation has two studies with two-wave panel data. Study 1 aims to investigate how patient-centered communication in the face-to-face interaction could help mitigate the conflicting doctor-patient relationship in China, and ultimately improve people's health outcomes. Specifically, study 1 is a cross-sectional analysis of wave 1 data, which models pathways from patient-centered communication to health outcomes, mediated by patient trust and patient satisfaction. Study 2 proposes a four-week Internet-based intervention to enhance Chinese people's knowledge and skills to use the Internet to communicate with doctors. Based on the Social Cognitive Theory, study 2 analyzes two-wave panel data to examine changes, if any, in people's self-efficacy, behavioral capability, outcome expectation, awareness, and the actual Internet use to communicate with doctors.

#### **CHAPTER II**

#### LITERATURE REVIEW OF STUDY 1

#### **Functions of Patient-centered Communication**

Doctor-patient communication is a crucial research area in health communication. Different from other communicative contexts, the communication between providers and patients involves interactions between those who are in non-equal positions, but need cooperation and mutual understanding. Doctor-patient communication is complex due to medical issues with substantial consequences, making this process emotionally laden. Doctor-patient communication serves different purposes, such as exchanging information, building relationships, and shared decision-making. The Institute of Medicine (2001) underscored the importance of patient-centered communication, and stated that patients' needs, values, and preferences should be adequately respected and responded, and doctors' clinical decisions should be guided by patients' values. Epstein and Street (2007) further proposed six core functions of patient-centered communication, including fostering healing patient-clinician relationships, exchanging information, responding to emotions, managing uncertainty, making medical decisions, and enabling self-management.

Fostering healing relationships is characterized by trust, rapport, respect, and understanding of each other's roles and responsibilities (Epstein & Street, 2007). The healing relationship is not only providing useful information, but also involves emotional support, care, and mutual understanding. Scott and colleagues (2008)

conducted in-depth interviews with patients and clinicians to explore how healing relationship can be established. They found three critical steps to foster healing relationships, including (1) valuing a non-judgmental emotional connection; (2) managing doctors' powers in ways that could benefit patients most; and (3) showing a commitment to caring for patients. In addition, McCormack and colleagues (2011) systematically reviewed literature and theories on domains and subdomains for patientcentered communication, and suggested that fostering healing relationships should involve (1) discussion about roles and responsibilities, (2) honesty, openness and disclosure, (3) trust in the clinician's technical competence, skills and knowledge, and (4) expression of caring and commitment. Benefits of fostering healing relationships have been documented. For example, when a patient perceives that he or she has good care and feels respected and understood, the patient' emotional states would be improved, particularly during severe illness. Also, the healing relationship can indirectly enhance health outcomes through various mechanisms, such as adherence to treatment plan, satisfaction with clinical decisions, and collaboration with doctors in the course of care (Street et al., 2009).

Exchanging information is achieved when clinicians adequately respond to patients' informational need, understand what patients know and believe about their health, communicate clinical information in ways that are clear and understandable, and share bad news and prognostic information in an appropriate way (Epstein & Street, 2007). In a systematic review of patient-centered communication, McCormack and colleagues (2011) summarized four major domains for the exchanging information

function. First, in order to understand patients' values, preferences, and needs, doctors need to assist patients to define these factors clearly, and then reach a shared understanding during the course of care. Second, medical consultations involve two-way communication between doctors and patients. Thus, to arrive at the shared understanding, patients should share their understanding of health condition and treatment, and doctors also have the responsibility to provide relevant health information in line with patient preferences, featuring the reciprocal information exchange. Third, in addition to providing informational resources, clinicians should also emphasize patients' role and ability to evaluate and use health-related resources offered by doctors, and enable them to correctly use accurate sources on their own. Fourth, medical consultations involve various doctor-patient differences (e.g., regarding types of treatment needed, appropriate diagnostic tests). To help patients better understand important information, and more effectively use the information for self-care, doctors should repeat crucial information to patients, using language that is understandable and not overwhelming patients. In addition, doctors can utilize support materials to facilitate patients' active learning, and activate them during medical encounters (e.g., prepare to ask question, and document conversations). In another systematic review of surgeonpatient communication, researchers found that the information exchanged during medical consultations mainly focused on biomedical issues, with a small amount of discussion on counseling, psychosocial, or lifestyle issues (Levinson, Hudak, & Tricco, 2013). In addition, when exchanging information, doctors should use open-ended questions, which could motivate patients to provide more detailed responses. However, a study found that more than 90% of the questions were closed-ended, suggesting an area for improvement (Roter, Geller, Bernhardt, Larson, & Doksum, 1999). Researchers also contended that information exchange between health care professionals and patients has a positive impact on patients' quality of care. For example, a study of information exchange in oncological inpatient care in Europe reported that the active information exchange and provision during medical encounters had a positive relationship with patient satisfaction and patient participation, and had a negative association with patient safety risk, such as medication errors (Kullberg, Sharp, Johansson, & Bergenmar, 2015).

Responding to emotions is accomplished when doctors can appropriately respond to patients' fear, anger, sadness and even depression and anxiety. If patients fail to resolve their emotional burdens, they will often encounter difficulties in making medical decisions, and meeting the needs of treatment. Thus, doctors should recognize the cues provided by patients regarding their emotional concerns (Epstein & Street, 2007). McCormack and colleagues (2011) in their systematic review summarized five important domains for responding to emotions, including (1) identifying, exploring and expressing emotions, (2) assessing depression, anxiety and psychological distress, (3) validation of emotions, (4) expression of empathy, sympathy, and reassurance, and (5) providing tangible help for dealing with emotions. In addition to verbal communication, Roter and colleagues (2006) emphasized the role of nonverbal communication in medical consultations as well, and suggested that emotion-related communication skills (e.g., nonverbal caring messages and emotional self-awareness) are crucial to quality care. Benefits of responding to emotions have been widely documented, such as helping

patients gain a greater sense of control and become more hopeful, reducing patient anxiety and depression, enhancing patients' sense of worth, confidence, motivation and energy to pursue work or leisure activities, and enjoying greater quality of life (Street et al., 2009). Despite the importance of responding to emotions in the course of care, clinicians at times missed opportunities to adequately do so. In a systematic review of surgeon-patient communication, 7 studies indicated the failure to respond to emotions (Levinson et al., 2013). For example, a study examining malpractice claims among 65 surgeons and 59 general practitioners showed that 62% of doctors failed to acknowledge patients' feelings (Levinson, Gorawara-Bhat, & Lamb, 2000). Even more concerning, another study examined empathic opportunities for interactions between 18 physicians and 20 patients with biopsy-confirmed lung cancer. The results showed that out of the 384 empathic opportunities, physicians only responded empathically to 10% (Morse, Edwardsen, & Gordon, 2008).

Managing uncertainty is important for quality care. Patients with chronic illness inevitably experience uncertainty for a couple of reasons. For example, health symptoms are unpredictable; Patients often have questions about recurrence; and the course of care involves an unknown future. With more patient-centered communication, patients can more effectively manage their uncertainty. In medical encounters, physicians provide explanations about treatment, answer questions in an understandable way, check for questions or concerns, and thus facilitate effective uncertainty management (Epstein & Street, 2007). For example, a study in a cardiology clinic found that doctors' provision of adequate information during medical encounters significantly reduced the post-visit

illness uncertainty (Sheer & Cline, 1995). In another study that interviewed 60 cancer survivors, many participants reported seeking information from physicians as a major means of managing their uncertainty, and specifically patients turn to their health care providers to make sure they understand the treatment correctly, reassure information found from the Internet, and discuss about the right steps for their future healthcare (Miller, 2014).

Making medical decisions is a significant element of high-quality care. In the current health care system, it is difficult for patients to make informed decisions by themselves, due to the lack of equipment and mechanism to timely and accurately inform patients in decision-making. To overcome this limitation, Charles and colleagues (1999) proposed a model for shared decision-making. In their conceptual framework, three stages involve into the shared decision-making process, including (1) information exchanging, (2) deliberation, and (3) making decisions. More specifically, information exchange centers on the sharing of both patient and doctor points of view. For example, doctors provide evidence pertinent to patients' expression of symptoms, and their opinions and expectations. Deliberation emphasizes finding common ground, reconciling doctor-patient differences, dealing with health-related uncertainty, and assisting patient understand their health conditions, and pros and cons of different treatment options. Elwyn and colleagues (2012) later extended the shared treatment decision-making model by proposing a new model, including three stages: (1) introducing different choices to patients, (2) explaining each treatment option, ideally by using the patient decision support system, and (3) addressing patients' preferences and needs before making final decisions.

Enabling self-management aims to activate patients in medical consultations, engage patients in decision making, and facilitate self-care skills that are important for managing health after leaving clinical visits. An important element of self-management communication focuses on navigating and assessing health resources. Doctors should provide useful health resources to patients, and help them navigate the resources, offering easy and affordable care. In addition, when recommending health resources, doctors should understand patients' interests and capability of self-care. With the assessment of patients' motivation, doctors can better provide guidance accordingly. Scholars have identified ways to enable self-management, such as supporting patient autonomy, introducing self-help resources, utilizing social support groups, providing opportunities to answer patients' questions, and navigating complicated care systems (Epstein & Street, 2007). To provide a step-by-step guidance, the US Preventive Services Task Force proposed a 5As model, including assess, advise, agree, assist and arrange, for self-management recommendations during medical encounters (Lafata et al., 2011). Empirical evidences have supported the critical role of physician communication in enabling self-management. For example, a national cross-sectional survey among 1,588 diabetes patients in the U.S. found that doctors' provision of information was positively associated with various patients' self-management domains, including medication adherence, diet, blood glucoses monitoring, foot care and exercise (Heisler, Cole, Weir, Kerr, & Hayward, 2007).

## Pathway Linking Patient-centered Communication to Health

Patient-centered communication is important to improve patients' outcomes of care. Prior research indicated that in some situations, patient-centered communication may have direct effects on people's health. A clinician who encourages, reassures and offers clear and understandable explanations may reduce a patient's anxiety level, sleep better, and have an enhanced appetite immediately after the medical consultation (Street et al., 2009). Doctors' talk to validate patients' concerns could also help improve their psychological well-being as well as physical health. For example, primary care patients who received more patient-centered communication (e.g., finding common ground and exploring patient's concern) reported higher levels of emotional health and fewer diagnostic tests and referrals (Stewart et al., 2000). Another study among lupus patients showed that those more actively participated in medical encounters, had less permanent organ damage, compared to less participatory patients (Ward et al., 2003). A more recent study among HIV/AIDS patients found that doctors' adequate and high-quality information, and affection and respect to patients significantly predicted patients' general health perception, physical functioning and reduced depression (Oetzel et al., 2015).

These findings suggested that across various illnesses and health conditions, patients who are more actively involved in their medical visits, and who have more patient-centered medical visit experiences, often experience better health outcomes (Street, 2013). Despite previous studies reporting positive impacts of patient-centered communication, prior research often produced null or mixed results. For example, in a

study among patients with diabetes, patient-centered communication was not associated with reduced distress (Bridges & Smith, 2016). Patients' active participation in shared decision making also failed to predict the post-visit metabolic control (Rost, Flavin, Cole, & McGill, 1991). Another study that reviewed two cases in the United States showed mixed findings about the relationship between patient-centered communication and patient stress (Bates, Rankin-Hill, & Sanchez-Ayendez, 1997). Even more concerning, in a study among patients with chronic diseases, the results indicated that when doctors gave excessive medical information, patients in turn self-reported more functional limitation and lower levels of perceived health condition (Kaplan, Greenfield, & Ware, 1989).

Considering the inconsistent results on the degree to which doctor-patient communication could influence health outcomes, Street and colleagues (2009) proposed pathways that include both direct and indirect effects of communication on health outcomes, and suggested that in most situations, communication affects health indirectly, mediated by proximal outcomes and intermediate outcomes. The proximal outcome is the immediate effect of doctor-patient communication. Proximal outcomes may include better understanding of medical treatment, satisfaction with care, reaching clinician-patient agreement, increased patient trust in doctors, patient's feeling of being known and cared about, patient's sense of getting involved, and rapport and motivation to adhere to treatment. Proximal outcomes are mediators of the relationships between communication and intermediate and health outcomes. For example, when a doctor clearly explains treatment and expresses support (communication behavior), a patient

might have better understanding of his or her health condition, and feel greater trust toward the doctor (proximal outcomes). The intermediate outcome is the mediator between proximal outcome and health outcome. Intermediate outcomes may include access to care, high-quality medical decision, commitment to treatment, social support, self-care skills, and adherence to medications. For example, when patients have a clear understanding of medical treatment (proximal outcomes), they will follow through the recommended therapy (intermediate outcomes), which in turn, improves a particular health outcome (Street et al., 2009).

Researchers have only started to model pathways through which patient-centered communication contributes to better outcomes during the recent years. A study among colorectal cancer patients found that patient-centered communication was positively associated with the perceived quality of doctor-patient relationship (proximal outcome), which in turn positively influenced adherence to colonoscopy (intermediate outcome), and finally increased the rate of colorectal cancer screening (health outcome) (Underhill & Kiviniemi, 2012). Another study among cancer survivors showed that physicians' decision-making style was associated with two proximal outcomes, patient's self-efficacy and trust in physicians. The increased self-efficacy and patient trust then both significantly predicted two intermediate outcomes, better personal control as well as lower uncertainty, which finally resulted in better health-related quality of life (Arora, Weaver, Clayman, Oakley-Girvan, & Potosky, 2009). A more recent study among hypertensive patients illustrated a similar path from doctor-patient communication to patient trust (proximal outcome), to medical adherence (intermediate outcome), and

finally to blood pressure control. This study also supported that communication could directly enhance adherence to medical treatment (intermediate outcome), without the mediator of proximal outcome (Schoenthaler et al., 2014).

#### **Patient-centered Communication in China**

Patient-centered communication can be achieved when patients actively participate in medical consultations (e.g., asking questions, expressing concerns, and sharing opinions), and when clinicians provide useful and timely information as well as encourage and facilitate patient involvement within and outside medical encounters. Although most studies agree on the key elements of patient-centered communication that need to be accomplished, the majority of prior research has been conducted in developed countries, and the approach to understanding patient-centered communication may vary across countries (Gordon & Street, 2016). In China, a developing country, patientcentered communication is still a new concept to its health care system. However, it has gained increasing attention as the relationship between patients and doctors has deteriorated sharply during the past decade. Although many medical schools in China have applied some basic interpersonal communication strategies suggested by western scholars to train medical students, the lack of academic research in this line remains an obstacle for improving our understanding of the effects of patient-centered communication in China. Thus, the present study puts forth a patient-centered communication model that is inspired by previous studies in western societies, but adapted to reflect the reality of Chinese society.

Although Epstein and Street (2007) suggested six major functions of patient-centered communication, the current study only includes three functions that are considered most important and urgent in the context of China—exchanging information, responding to emotions, and making medical decisions.

## **Exchanging Information**

Patients need relevant information to understand the cause, diagnosis, treatment, prognosis, and psychosocial aspects of the illness. However, in China, the majority of patients are passive during medical consultations. They do not actively engage in information exchange with doctors. On the other hand, Chinese patients' overall medical knowledge level is relatively low. In 2008, the Ministry of Health first defined health literacy in terms of basic knowledge and belief, health lifestyle and behaviors, and basic self-care skills. According to its 2008 national survey of 79,542 Chinese citizens, only 6.48% of respondents have adequate health literacy. There are also urban-rural and regional differentials, with lower percentage of adequate health literacy among residents in rural and west regions. Another national survey among 12,412 people aimed to determine the knowledge rates for 6 sub-areas of health literacy. Knowledge rate (%) is calculated by the formula: The total number of correct answers/(The number of all the questions for each questionnaire  $\times$  The total number surveyed)  $\times$  100%. This survey had the following findings: science concept of health (60.0%), literacy for preventing acute infectious disease (66.8%), literacy for preventing non-communicable chronic disease (51.9%), safety and first aid (66.8%), obtaining and making use of basic medical care (55.3%), and comprehensive health literacy (52.5%). The low health literacy has become a common phenomenon across generations, ranging from elementary school students to retired elderly people (Yin et al., 2013; Yu, Yang, Wang, & Zhang, 2012; Zhang & Kanbur, 2005). Although the official statistics from the Ministry of Health indicated that the percentage of people with adequate health literacy was on the rise, from 6.48% in 2008 to 8.8% in 2012, and to 9.48% in 2013, compared with western societies, the level of health literacy in China is still much lower (Hernandez, 2013).

Patients' perception of their doctors' informativeness during medical encounters is important not only to have a clearer understanding of the illness, but also to develop harmonious relationships with health care providers. As suggested by Epstein and Street (2007), patients would feel more informative when doctors ask patients about their informational needs, provide clear explanations, avoid medical jargon, and check for understanding.

## **Responding to Emotions**

In China, levels of emotional stress remain high. In the 2012 Regus-Commissioned Global Survey, 75% of Chinese people polled said that their stress levels had risen in the past year, well over the global average of 48% (Chen & Shi, 2012). According to another national survey among 16,866 Chinese citizens in 2014, 22.5% of respondents reported the median level of stress, while 26.2% had the severe mental stress (Wang et al., 2015). Patients, in the course of care may face greater emotional burdens, and thus need doctors to sufficiently respond to their emotions. However, Chinese patients' emotional needs have been largely ignored by clinicians. Doctors in China seldom inquire into psychosocial issues as they relate to illness. For example,

Chinese doctors treat headaches, sleeplessness, and fatigue as if they are physiological problems only, and considered these illness curable by simply using the right medicine (Bennett, Smith, & Irwin, 1999). During the recent years, some doctors have realized the importance of responding to patients' emotions, but they do not have the relevant knowledge on how to appropriately recognize and respond to patients' emotional states. For example, compared with western countries, Chinese healthcare professionals provide less emotional support to patients (Patterson et al., 1998). On the other hand, Chinese patients are often reluctant to discuss emotions with doctors. For example, an interview study of 20 Chinese cancer patients found that most interviewees would only express emotional needs to family members and did not expect healthcare professionals to respond to their emotions (Liu, Mok, & Wong, 2005). Also, many patients consider healthcare professionals incapable of responding to their emotions during encounters, and thus they turn to family members, nurse, and fellow patients for emotional support (Liu, Mok, & Wong, 2005).

Patients' perception of their doctors' emotional responsiveness during medical encounters is important given that when patients' emotional needs are ignored by their health care providers, patients' levels of stress, anxiety or depression may increase, which could have major impacts on their pain control and health-related quality of life (Brenes, 2007; Holmes, Christelis, & Arnold, 2013). As suggested by Epstein and Street (2007), patients feel more emotionally responsive when doctors can recognize patients' emotional problem, ask questions accordingly to understand it, show that understanding to them, and communicate with empathy.

### **Making Medical Decisions**

Chinese patients are usually quiet during medical encounters and dependent on doctors in medical decision making. Patients typically nod and agree with doctors, even though they may not fully understand the treatment (Jiang, 2013). Thus, Chinese patients' decision-making rests solely in the hands of doctors. The pattern of medical practice in China does not see the patient as an active participant in decision-making but as a passive body to be acted on (Bennett et al., 1999). A study of evaluating Chinese hospice care showed that few patients chose hospice care. Instead, they just followed doctors' decision to place them there (Smith & Smith, 1999). This appears to still be the case. Li and colleagues (2014) summarized three basic modes for clinical decision-making in China and indicated that family plays a more significant role in the decision-making process, while patients' autonomy and involvement remain limited.

Decision-making is an important communicative task. A high-quality decision is the one that is based on the patient's values and understanding of why such decision is made. To achieve a high-quality decision, health care providers should address patients' concerns about treatment options, and respond to their values and needs (Elwyn et al., 2012). Prior research indicated that the greater the match between the preferences of patients to be involved in the decision-making process and their perception of actual involvement, the less decisional regret and greater satisfaction with care (Lantz et al., 2005). Also, empirical evidence has been found that when patients perceive that they are provided with options for treatment, examination, and other diagnostic tests, they may actively participate with their doctors in making decisions. The importance of patients'

involvement in decision-making is shared by patients worldwide, as supported by the Salzburg statement endorsing shared decision making, supported by scholars from 18 countries (Barry & Edgman-Levitan, 2012).

### **Patient Satisfaction and Patient Trust in China**

Patient satisfaction level remains low in China. For instance, a survey conducted by Fudan University showed that only 15.4% of patients felt satisfied with their doctors (Yao et al., 2014). Similarly, in another study by Shanghai University, merely 28.7% of respondents saw doctor-patient relationships as positive. The primary reasons for patient dissatisfaction included the short and cursory medical consultation, followed by long waiting time, and difficulties in making appointment (Dai & Han, 2012). When exploring any rural-urban difference, Yan and colleagues (2011) conducted a cross-sectional survey of 1,600 patients from two provinces of China, and found that rural residents reported significantly higher satisfaction towards healthcare services received compared with those residing in urban areas, yet both satisfaction rates were relatively low. When comparing China and other countries, Yang and colleagues (2015) did a comparative study of patient satisfaction regarding liver disease care in the United States and China, and indicated that patients in the U.S. felt significantly more satisfied than their Chinese counterparts.

Patient trust in doctors in China is also problematic. The low level of patient trust has been regarded as one of major causes of medical conflicts in China (Tang, 2012).

According to an online survey conducted by Sohu (2007), a popular Chinese web portal, among 1,268 respondents, merely 27% of them stated that they trusted their doctors.

Tucker et al. (2015) conducted in-depth interviews with 160 Chinese patients to explore contributing factors to patient-physician mistrust. Their findings showed that the major causes included patients' perception of injustice within the medical sphere, knowledge imbalances, and unresolved disagreement with physicians. In addition, scholars highlighted that many Chinese patients generally distrust doctors because they believe that doctors purposely want them to pay more (Li, 2009). Thus, as Bloom and colleagues (2008) summarized, China is facing a crisis of trust in the health care sector.

## The Important Role of Patient-centered Communication in China

Prior research has documented the positive consequences of patient-centered communication on patient satisfaction. For example, a systematic review showed that when physicians are more patient-centered in their communication, patients feel more satisfied with their medical encounter experience (Williams, Weinman, & Dale, 1998). Specifically, the perceived level of information provided by doctors was positively associated with the level of patient satisfaction. When patients made the assessment of their physician, the quality of information exchange was the most important consideration (Dutta-Bergman, 2005). In addition, physicians' affective behaviors, such as empathy, encouragement and attentiveness, were positively associated with patient satisfaction as well (Ong, Visser, Lammes, & De Haes, 2000). Derksen and colleagues (2013) conducted a systematic review of the effectiveness of empathy in general practice, and indicated that there was a significant relationship between physicians' empathic communication and patient satisfaction. In China, similar results were also found. For example, a survey study among 4,945 patients indicated that the clarity of

doctors' explanation, positive attitude, and caring style were three significant predictors of patient satisfaction (Cheng, Yang, & Chiang, 2003). Thus, in the context of China, patient-centered communication plays a significant role in improving patient satisfaction.

H1: Patient-centered communication in medical encounters is positively associated with patient satisfaction.

In addition, patient trust has long been considered as an immediate outcome of patient-centered communication based on previous research. When doctors encourage more open sharing by letting patients know why disclosing accurate information is important to the treatment plan, and showing how that information is important to make a good medical decision, doctors may gain more patient trust (Banerjee & Sanyal, 2012). In addition to information sharing, responding to patients' emotions is also important to improve patient trust. Thom and Campbell (1997) interviewed 29 patients recruited from three different practice sites, and found that understanding a patient's individual experience, expressing caring, communicating clearly and completely, building partnership, and respect for patient encompassed the trust experiences. In a follow-up survey study, Thom (2001) found that being comforting and caring, demonstrating competency, encouraging and answering questions, and explaining were associated with trust among patients from the three practice sites. In fact, a couple of systematic reviews of patient-centered communication offered support for the impact of communication on patient trust. For instance, a systematic review of 69 articles supported the positive association between patient-centered communication and therapeutic alliance, where

patient trust is an important element. Specifically, the findings showed that interactions with clinicians who engage with patients, listen to what patients say, ask questions, and show sensitivity to their emotional concerns had positive correlations with patient trust (Pinto et al., 2012). Thus, consistent with the documented positive effects of patient-centered communication on patient trust, the current study puts forth the second hypothesis.

H2: Patient-centered communication in medical encounters is positively associated with patient trust.

#### **Effects of Patient Satisfaction and Patient Trust on Health Outcomes**

Patient satisfaction is one of the most important health care quality dimensions (Senarath, Fernando, & Rodrigo, 2006). Prior research has shown the positive impact of patient satisfaction on health outcomes. A systematic review of patient experience, and clinical safety and effectiveness found that patient satisfaction could exert significant impacts on various health outcomes, such as quality of life, physical and functional health status (Doyle, Lennox, & Bell, 2013). Other empirical studies also provided evidence on the effects of patient satisfaction on health improvement. For example, a quasi-experiment study among 79 postoperative cosmetic surgery patients found that patients' overall satisfaction with the quality of care was associated with less anxiety and reduction of uncertainty (Kulik, Shelby, & Cooper, 2000). Another survey study among patients with obsessive-compulsive disorder underscored the important role of patient satisfaction in the long-term course of emotional and mental health problems (Mavrogiorgou, Siebers, Juckel, & Kienast, 2013). In line with the documented

importance of patient satisfaction, the current study hypothesizes the positive associations between patient satisfaction and health outcomes.

H3: Patient satisfaction is positively associated with health outcomes (general, emotional, and physical).

Also, patient trust is fundamental to effective and harmonious interpersonal relationships in the health care system. Previous studies have supported that patient trust could facilitate health improvement. For example, a systematic review of 13 articles that examined how patient trust can be linked to health outcomes illustrated several mechanisms by which patient trust affects health conditions (e.g., patient disclosure, physician's caring, and compliance) (Lee & Lin, 2008). Specifically, when patients hold enormous trust towards their doctors, they would in turn more actively disclose sensitive health information during medical encounters, have better compliance with treatment recommendations, and obtain more physicians' caring behavior. In another systematic review, Doyle and colleagues (2013) summarized evidence on the links between patient experience and clinical effectiveness. Among the 55 studies reviewed, 3 studies focused on patient trust. Specifically, patient trust could improve quality of life (Thom, Hall, & Pawlson, 2004), facilitate preventive actions (O'Malley, Sheppard, Schwartz, & Mandelblatt, 2004), and enhance diabetes-related health outcomes (Lee & Lin, 2009). Consistent with prior research, the present study suggests the positive effects of patient trust on health outcomes.

H4: Patient trust is positively associated with health outcomes (general, emotional, and physical).

#### **Effects of Patient-centered Communication on Health Outcomes**

China is in the midst of carrying out an ambitious program of national health care reforms. Launched in 2009, this initiative has an important aim to improve the quality of communication between patients and doctors to facilitate good doctor-patient relationships (He, 2014). In light of the reported growth in medical disputes and violence between patients and healthcare providers, patient-centered communication might be one way to mitigate this problem. The positive impacts of patient-centered communication on health outcomes have been acknowledged by many Chinese scholars. For example, a survey study among 260 breast cancer survivors in southern China indicated that patients who received good communication with their doctors demonstrated higher levels of emotional well-being (Zhou et al., 2013). Another qualitative analysis of interviews with 29 HIV-positive Chinese patients also suggested that patients considered health care providers as important to meet their informational and emotional needs in consultations as well as during treatment (Chen et al., 2007). In the analysis of a nationally representative sample, Tang (2012) found that the improvement of doctor-patient communication in community health centers could help promote patients' perceived quality of life. Despite these benefits of patient-centered communication, other Chinese scholars, in fact, are cautious about the direct effects of communication on health, due to three major barriers in China: (1) limited consultation time because of doctors' high patient-load; (2) excessive treatment due to the inappropriate medical payment system; and (3) patients' low education level and lack of preparation for consultations (Ting, Yong, Yin, & Mi, 2016).

Considering the limited research on the effects of patient-centered communication on health outcomes in the context of China, the current study explores any possibility of both direct and indirect effects of communication on three types of health outcomes.

RQ1: Does patient-centered communication directly influence health outcomes (general, emotional and physical?

RQ2: Do patient trust and patient satisfaction mediate the relationships between patient-centered communication and health outcomes (general, emotional and physical)?

#### **CHAPTER III**

#### **METHODOLOGY OF STUDY 1**

# **Participants**

Study 1 is a cross-sectional analysis, and thus only Wave 1 data were used.

Participants were recruited by a Chinese online survey company (www.sojump.com)

that has more than 2.6 million online panel members in the country. The research
company recruited online panel members from social network sites, online banners, and
search engine ads. They participated in academic or commercial research in return for
cash payments. In October 2016, the survey company sent emails including a link to the
questionnaire to 4,200 qualified respondents who aged 40 or older, and have visited
doctor's office during the past 12 months. Participants in the sample read a consent form
before completing the online questionnaire. Due to the anonymous and low-risk nature
of this survey, the Institutional Review Board (IRB) at Texas A&M University
considered the study exempt from full IRB review. 758 people completed the online
survey, with the completion rate of 18%.

#### Measurement

All items were initially created in English and translated into Chinese to facilitate respondents' understanding. Back-translation was performed by two graduate students who know both languages to guarantee the linguistic equivalence between English and Chinese.

To test for reliability and validity of measures in study 1, principal component analysis (PCA) with varimax rotation was performed. Results showed that all measures loaded significantly onto their intended latent factors, establishing good construct validity. Percentages of variances also supported construct validity, as a substantial amount of variances in the measurement were explained by the latent constructs. In addition, acceptable Cronbach's alpha values were calculated to provide evidence for internal consistency. Table 1 reported factor loadings for the measurements, along with their Cronbach's alpha. Table 2 reported eigenvalues and % of variance explained for each of the factors.

To test for data normality, skewness and Kurtosis were examined. Curran, West, and Finch (1996) suggested that absolute values of skewness over 2 and kurtosis over 7 would mean that the data were severely non-normally distributed. Results indicated that in study 1, the skewness for all variables in the data did not exceed the absolute value of 1, and kurtosis of all variables did not exceed 4. Thus, the normality assumptions were met in this study. Table 3 reported mean, standard deviation (SD), skewness, and Kurtosis for each variable in the measurement.

Patient-centered communication served as a latent variable that was measured by three sub-constructs: exchanging information, responding to emotions, and making medical decisions. The measurement for exchanging information and responding to emotions was selected from prior work based on Epstein and Street's (2007) functional model of patient-provider communication (Mazor et al., 2016; Jiang & Street, 2017). Items for decision-making were drawn from Kaplan et al. (1996).

**Table 1: Summary of Principal Component Analysis Results for Study 1** 

Table 1. Summary of Trincipal Component Analysis Results for Study 1	Factor loading
Exchanging information (α=.86)	
The doctor thoroughly explained everything to you.	.88
The doctor was very informative about your health.	.89
The doctor's explanations and recommendations were clear and easy to	
understand.	.88
Responding to emotions ( $\alpha$ =.87)	
The doctor showed a genuine interest in your health.	.85
The doctor made you feel completely at ease during the consultation.	.83
The doctor tried to reassure and comfort you.	.87
The doctor seemed to care about your feelings.	.87
Making medical decisions ( $\alpha$ =.71)	
The doctor strongly encouraged you to help make the treatment decision.	.87
The doctor made certain you had some control over the treatment decision.	.90
The doctor did not ask you to help make the treatment decision but just told	
you what your treatment would be.	.60
Patient satisfaction (α=.90)	
How satisfied were you with the effect of your treatment/care?	.88
How satisfied were you with the explanations the doctor has given you about	
the results of your treatment/care?	.87
How satisfied were you with the choices you had in decisions affecting your	
health care?	.88
How satisfied were you with the care you received in the hospital/clinic?	.87
Patient trust ( $\alpha$ =.88)	
My doctor is extremely thorough and careful.	.88
I completely trust my doctor's decisions about which medical treatments are	
best.	.86
My doctor is totally honest in telling me about all of the different treatment	
options available for my condition.	.84
All in all, I trust my doctor completely.	.86
Emotional health (α=.87)	
Have you been a very nervous person?	.79
Have you felt so down in the dumps that nothing could cheer you up?	.83
Have you felt calm and peaceful?	.85
Have you felt downhearted and blue?	.79
Have you been a happy person?	.81

Table 2: Reliability and Validity Statistics for Measures in Study 1

Factor	Eigenvalue	Cronbach's α	% Variance
			Explained
Exchanging information	2.35	.86	78.3
Responding to emotions	2.90	.87	72.6
Making medical decisions	1.93	.71	64.2
Patient satisfaction	3.06	.90	76.5
Patient trust	2.95	.88	73.7
Emotional health	3.32	.87	66.4

**Table 3: Descriptive Statistics for Study 1** 

Variables	Mean	SD	Skewness	Kurtosis
Exchanging information	3.39	.86	52	2.83
Responding to emotions	3.32	.68	28	2.57
Making medical decisions	3.09	.86	03	2.66
Patient satisfaction	3.48	.75	42	2.85
Patient trust	3.47	.78	34	2.67
General health	3.50	.73	24	3.17
Emotional health	3.78	.86	65	2.89
Physical health	2.62	1.47	60	1.92

Exchanging information was assessed by three items. Respondents were asked to report the degree to which exchanging information outcomes were accomplished during past visits with health care providers. A four-point Likert scale was adopted, ranging from never=1 to always=4. The three items include; (1) "The doctor thoroughly explained everything to you"; (2) "The doctor was very informative about your health"; and (3) "The doctor's explanations and recommendations were clear and easy to understand" (M=3.39, SD=.86, Cronbach's  $\alpha$ =.86).

Responding to emotions was assessed by four items. Respondents were asked to report the degree to which responding to emotions outcomes were accomplished during

past visits with health care providers. A four-point Likert scale was adopted, ranging from never=1 to always=4. The four items include (1) "The doctor showed a genuine interest in your health"; (2) "The doctor made you feel completely at ease during the consultation"; (3) "The doctor tried to reassure and comfort you"; and (4) "The doctor seemed to care about your feelings" (M=3.32, SD=.68, Cronbach's  $\alpha$ =.87).

Making medical decisions was measured by three items modified from Kaplan and colleagues (1996). Respondents were asked to rate the extent to which decision-making outcomes were accomplished. A four-point Likert scale was used, ranging from never=1 to always=4. The three items include (1) "The doctor strongly encouraged you to help make the treatment decision"; (2) "The doctor made certain you had some control over the treatment decision"; and (3) "The doctor did not ask you to help make the treatment decision but instead just told you what your treatment would be". Item (3) was reverse coded for data analysis (M=3.09, SD=.86, Cronbach's  $\alpha$ =.71).

Patient satisfaction was measured by four items drawn from The Short

Assessment of Patient Satisfaction (SAPS) (Hawthorne, Sansoni, Hayes, Marosszeky, & Sansoni, 2006). Respondents were asked to rate their satisfaction towards health care services received. A five-point Likert scale was adopted, ranging from very dissatisfied=1 to very satisfied=5. The four items include (1) "Over the last 12 months, how satisfied were you with the effect of your treatment/care?" (2) "Over the last 12 months, how satisfied were you with the explanations the doctor/other health professional has given you about the results of your treatment/care?" (3) "Over the last 12 months, how satisfied were you with the choices you had in decisions affecting your

health care?" and (4) "Over the last 12 months, how satisfied were you with the care you received in the hospital/clinic?" All responses were averaged to create one scale for analysis (M=3.48, SD=.75, Cronbach's  $\alpha$ =.90).

Patient trust was measured by four items, adapted from previous studies (Anderson & Dedrick, 1990; Thom, Ribisl, Stewart, & Luke, 1999). Respondents were asked to rate the degree to which they agree with the following statements: (1) "My doctor is extremely thorough and careful"; (2) "I completely trust my doctor's decisions about which medical treatments are best"; (3) "My doctor is totally honest in telling me about all of the different treatment options available for my condition", and (4) "All in all, I trust my doctor completely". Responses were scored on a five-point Likert scale (1=strongly disagree to 5=strongly agree). The average of the four responses was adopted for data analysis (M=3.47, SD=.78, Cronbach's α=.88).

Health outcome variables included three types of self-reported health outcomes.

Measurement was drawn from SF-36 scales (Ware & Sherbourne, 1992).

General health was measured by one single item, asking respondents to rate their health condition, ranging from poor coded as "1" to excellent coded as "5" (M=3.50, SD=.73).

Emotional health was assessed with five questions, asking respondents to identify how frequently they experience the following emotional problems during the past 4 weeks: (1) "Have you been a very nervous person?"; (2) "Have you felt so down in the dumps that nothing could cheer you up?"; (3) "Have you felt calm and peaceful?"; (4) "Have you felt downhearted and blue?"; and (5) "Have you been a happy person?". A 5-

point Likert scale was used, ranging from "1" very frequently to "5" very rarely. Items (3) and (5) were reverse coded. The responses were summed and then averaged (M=3.78, SD=.86, Cronbach's  $\alpha$ =.87).

Physical health was assessed by four items, asking respondents whether they experienced the following problems as a result of their physical health during the past 4 weeks: (1) "Cut down the amount of time you spent on work or other activities"; (2) "Accomplished less than you would like"; (3) "Were limited in the kind of work or other activities"; and (4) "Had difficulty performing the work or other activities". A binary scale was used, where 1 means no, while 0 means yes. The four responses were summed up to create one index for analysis ranging from 0 to 4 (M=2.62, SD=1.47).

Demographic characteristics, including respondents' age, gender (1=male; 0=female), marital status (1=yes, 0=no), education level (from 1= middle school or below to 4= master's degree or above) and personal monthly income (from 1=500 USD or less; to 6= 3001 USD or more) were controlled to reduce confounding effects.

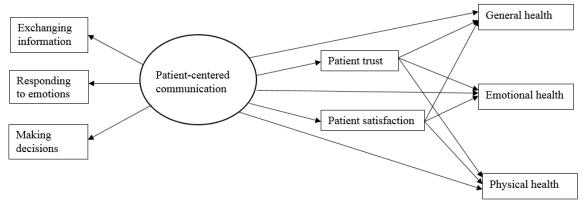
## **Analytic Procedure**

For study 1, structural equation modeling (SEM) was performed with *Mplus* 7. Holbert and Stephenson (2003) suggested that to more closely examine complicated relationships among variables, SEM is recommended. In study 1, hypotheses and research questions require the test of mediation pathways involving latent variables. Therefore, SEM provides a suitable analytical tool for understanding the complex communication as a process.

Before fitting the structure equation modeling and examining the relationships between the key variables, confirmatory factor analysis (CFA) was first performed to confirm the factor structure of the only latent variable, patient-centered communication. In the proposed model, patient-centered communication was measured by three subconstructs: exchanging information, responding to emotions, and making medical decisions. CFA indicated that all of the items significantly loaded on patient-centered communication, and demonstrated good model fit statistics:  $\chi^2(23)=56.525$ ; RMSEA=.044 (90% confidence interval (CI): .030 - .058); CFI=.992; and SRMR=.018 (Hu & Bentler, 1999).

After fitting the measurement model, the structural model was performed. In the covariance structure analysis, maximum likelihood of estimation was used. The four control variables (e.g., age, gender, education, and income) served as exogenous variables that linked all the paths to the six major variables. To simplify the presentation, these exogenous variables were not shown in the model. The six major variables, patient-centered communication, patient satisfaction, patient trust, general health, emotional health, and physical health served as endogenous variables. As shown in Figure 1, paths were drawn from patient-centered communication to patient satisfaction and patient trust, then to three health outcomes. Paths were also drawn directly from patient-centered communication to three health outcomes. The proposed model showed a good model fit,  $\chi^2(104)=191.367$ ; RMSEA=.033 (90% CI: .026 - .041); CFI=.987; and SRMR=.021 (Hu & Bentler, 1999).

Figure 1. Conceptual Framework for Study 1



To test the mediation effects more closely, many researchers have recommended to use bootstrapping methods (Hayes, 2013; Williams & MacKinnon, 2008). Following Hayes's suggestions, the bootstrap analysis was conducted with 10,000 iterations and bias-correlated estimates. The reported mediation effects can be interpreted such that when the lower and upper 95% CIs are either both below or both above zero, the mediation effect was significant, whereas if the lower and upper CIs include zero, there is no significant mediation effect.

## **CHAPTER IV**

## **RESULTS OF STUDY 1**

# **Descriptive Statistics**

Of the 758 respondents, the mean age was 46.5 (ranging from 40 to 70); 59% were male; 76.2% received a college degree or higher education; 54.5% had monthly personal income of 1000 USD or more.

# **Hypotheses and Research Questions**

To recap, study 1 advanced 4 hypotheses and 2 research questions related to the pathways linking patient-centered communication to health outcomes. The results were illustrated in Table 4.

Table 4. Predictors of Endogenous Variables in SEM for Study 1

	Patient-centered	Patient	
Variables	communication	satisfaction	Patient trust
Patient-centered			
Communication	NA		
Patient satisfaction	.82***	NA	
Patient trust	.89***	NA	NA
General health	.09	.28***	.02
Emotional health	.25*	.20**	.18*
Physical health	.12	.28***	.04
•			

<sup>\*</sup>p<.05. \*\*p<.01. \*\*\*p<.001

Coefficients are standardized.

H1 predicted a positive association between patient-centered communication and patient satisfaction. This hypothesis was supported ( $\beta$ =.82, p<.001). When patients experienced more patient-centered medical visits, they would feel more satisfied with health care services received.

H2 posited that patient-centered communication was positively associated with patient trust. This hypothesis was also supported ( $\beta$ =.89, p<.001). Thus, patients would have greater interpersonal trust towards their doctors when they had more patient-centered medical visits. The high coefficients reflected in the results of H1 and H2 indicated that patient-centered communication served as a strong predictor of patient satisfaction and patient trust.

H3 predicted the positive effect of patient satisfaction on three types of health outcomes. The findings showed that patient satisfaction was positively associated with general health ( $\beta$ =.28, p<.001), emotional health ( $\beta$ =.20, p<.01), and physical health ( $\beta$ =.28, p<.001). Thus, H3 was supported.

H4 hypothesized that patient trust was positively related to three health outcomes. This hypothesis was partially supported. The results demonstrated that patient trust positively predicted emotional health ( $\beta$ =.18, p<.05), but failed to significantly affect general health ( $\beta$ =.02, p=.87) and physical health ( $\beta$ =.04, p=.64).

RQ1 explored the direct effects of patient-centered communication on health outcomes. The findings indicated that patient-centered communication was positively related to emotional health ( $\beta$ =.25, p<.05). However, the direct effects on general health ( $\beta$ =.09, p=.39) and physical health ( $\beta$ =.12, p=.26) were not supported.

RQ2 tested the indirect mediation effects, with the bootstrapping approach. The results found that patient satisfaction mediated the effects of patient-centered communication on general health (effect value=.23, SE=.04, 95% CI=.15 to .31), emotional health (effect value=.23, SE=.05, 95% CI=.13 to .33), and physical health (effect value=.36, SE=.08, 95% CI=.20 to .52). In addition, patient trust mediated the effect of patient-centered communication on emotional health (effect value=.26, SE=.06, 95% CI=.14 to .38). However, patient trust failed to exert mediation effects on general health (95% CI=-.07 to .25) and physical health (95% CI=-.01 to .39).

#### **CHAPTER V**

#### **DISCUSSION OF STUDY 1**

Study 1 examined patient-provider communication in the face-to-face context. It assessed the role patient-centered communication might play in influencing patients' health outcomes by illustrating a mediation pathway model. Specifically, the study found that patient-centered communication (e.g., exchanging information, responding to emotions, and making medical decisions) affected health outcomes (e.g., general, emotional, and physical) indirectly, mediated by patient satisfaction and patient trust. In addition to the indirect effects, patient-centered communication could also directly improve patients' emotional health.

An important finding in this study pertains to the direct effect of patient-centered communication. The results indicated that communication could directly influence emotional health, while there was no significant impact on general health and physical health. This finding is in line with Street and colleagues (2009), who contended that in some instances, patient-provider communication can directly improve patients' emotional well-being. For example, physicians address patients' emotional distress by using verbal expressions of understanding, legitimation, empathy and support, which in turn could release patients' pressure and stress, and enhance their emotional well-being after the consultation (Epstein & Street, 2007). Several systematic reviews also provided evidence on the direct influence of patient-provider communication on emotional health. For instance, Van Dam and colleagues (2005) conducted a systematic review of doctor-

patient communication in diabetes care, and found that among the totally eight studies reviewed, the three studies that focused on emotoin-related health issues all demonstrated direct and positive effects of communication on outcomes of interests, including levels of patient worry, depression and anxiety symptoms, and well-being. Similarly, in Derksen and colleagues' systematic review of empathatic communication in medical consultations, two studies that centered on emotional health demonstrated that empathy in medical communcation was highly valued for coping with emotional problems, and correlated with reduced levels of anxiety (Derksen et al., 2013). Thus, the finding of direct effects only on emotional health outcomes from the current study and previous systematic reviews may suggest that compared with physical or other general health outcomes, communication can be more therapeutic for emotional health. One plausible explanation might be that physical health outcomes are complex and affected by a number of physiological and psychological factors, therefore, they need to be treated through a series of pharmacological and behavioral means. However, it is likely that doctors' affection and respect during medical communication had the potential to immediately enhance people's emotional states. Thus, considering the direct impact of communication, health care providers, when talking with patients who have emotional health problems, should think about what emotional burdens patients might have, and configure strategies to adequately address their emotional concerns during medical consultations.

Another significant finding is the mediation effects of patient satisfaction and patient trust. This finding echoes Street and colleagues' (2009) argument that in most

situations, patient-provider communication could indirectly influence health. The finding is also consistent with previous systematic reviews that highlighted the need to examine the social mechanisms underlying relationships between communication and health. For instance, in Griffin et al.'s systematic review (2004) of clinical trials of interventions designed to improve patient-provider communication, the majority of studies provided evidence for the indirect effects of communication on health.

In the current study, patient satisfaction significantly mediated the effects of patient-centered communication on all three health outcomes. Patient satisfaction is a psychological notion that mirrors the good quality of health services delivered. When patients received care that is more responsive to their specific needs and values, they may feel more satisfied with their health care, due to better understanding of the severity of illness, clearer view of treatment, and more informed decision-making (Finney et al., 2015; Mauksch, Dugdale, Dodson, & Epstein, 2008). Such experiences of satisfaction might be connected to more self-confidence, greater energy, more positive attitude in the course of care, and other indicators of better health, well-being, and quality of life (Street, 2013). Thus, the results in the current study suggest that across different health conditions, patient satisfaction matters. Doctors should make efforts to provide more patient-centered communication with health care consumers, which is a strong facilitator of patient satisfaction.

Also, the mediation effect of patient trust is important to note. The results showed that patient trust is a crucial subsequent stage in improving emotional health outcomes. Interacting with doctors who are more patient-centered during medical

consultations would enhance patients' perception that doctors will behavior in patients' best interest (Baker, Mainous, Gray, & Love, 2003). As patients hold greater trust towards their doctors, they might be more active in participating in decision-making, and become more explicit with their worries and thoughts on the risks of treatment options (Berry et al., 2008; Kraetschmer, Sharpe, Urowitz, & Deber, 2004). When doctors understand patients' concerns and opinions, they can provide more specific information to address patients' needs, validate their emotional experiences, respond to emotions accordingly, and offer strategies to cope with emotional burdens (Manary, Boulding, Staelin, & Glickman, 2013). Therefore, health care providers should provide care that respects and responds to patients' needs, which could improve patients' trust in doctors, which in turn might have more direct influences on emotional health outcomes.

The mediation pathway model tested in the current study informs that the quality of health care is tied to productive and informative interactions between doctors and patients (e.g., patient-centered communication), patients' attitude towards health care service received (e.g., patient satisfaction), and patients' interpersonal relationship with doctors (e.g., patient trust). In addition, both the direct and indirect pathways illustrated in the present study might suggest that health care providers should make efforts to identify the social mechanism leading to a desired outcome, and then work backwards to figure out what needs to happen during medical consultations to achieve the outcomes of interest. For example, Street and colleagues (2014) found support for a pathway linking patients' active communication about pain to pain control, mediated by changes in pain medication. They recommended that clinicians should first identify the specific

contributing factor to the improved health outcome, such as adjusting medication treatment to control pain, and then configure strategies to achieve this, such as asking patients' questions specifically about pain during consultations.

The findings in this study are particularly important to the context of China. When violence towards Chinese doctors becomes a serious social issue, there is an urgent need for more research to explore effective ways to mitigate this problem. Although Chinese scholars and policy makers have advocated to improve doctor-patient communication skills during medical consultations, patient-centered communication is still a relatively new concept to Chinese doctors and patients. No prior research, to the best of knowledge, has specifically examined how patient-centered communication could help solve some of the problems of violence and crises in the Chinese health system. The social mechanism underlying the impacts of patient-centered communication on health outcomes in China was not adequately investigated. The findings from this study indicated that patient-centered communication matters in the context of China. For a long period of time, Chinese doctors have been in a dominate position during medical encounters, while Chinese patients usually play, and are expected to conform, to a subordinate role (Bennett, Smith, & Irwin, 1999). Due to this doctor-centered communication in medical consultations, patients often fail to reconcile differences they have with doctors regarding their health care. Instead, serious doctorpatient differences (e.g., regarding type of treatment needed, appropriate diagnostic tests) can fester in ways that lead to dissatisfaction, mistrust, animosity, and, in some case, violence (Zhang & Sleeboom-Faulkner, 2011). The present study highlighted the

importance of patient-centered communication in China. When doctors provide useful information that satisfies patients' needs, appropriately respond to patients' emotional concerns, and engage patients in the decision-making process, patients might feel enhanced satisfaction about their health care, and have more interpersonal trust towards doctors, which help improve the quality of patients' experiences with health care providers, and the quality of health care services patients received. It is, for this reason, important that Chinese health care organizations and doctors should provide care that is respectful of and responsive to patient preferences, needs, and values, and facilitate greater patient satisfaction and patient trust, which could ultimately enhance health outcomes.

# **Implications for Health Care Providers**

The results showed that patient-centered communication had both direct and indirect effects on patients' health outcomes. This highlights the importance of a patient-centered approach to delivering health care services. Health care providers should foster healing relationships with patients by showing trust, rapport, respect and understanding of their needs, beliefs, values, and preferences. It is also significant to facilitate effective information exchange. Clinicians should ask patients about their information needs, provide understandable explanation, avoid medical jargon, and check for understanding. In addition, doctors need to recognize patients' emotional states, ask appropriate questions to understand it, communicate the understanding to patients, and respond with empathy or tangible assistance. By following this patient-centered approach, providers' communication can positively influence patients' attitudes and perceptions of health

care, and enhance doctor-patient relationships, which, in turn, help improve health outcomes of interests.

# **Implications for Health Interventions**

The findings indicated that patient-centered communication in medical encounters has great potentials to improve health outcomes. In addition, patient satisfaction and patient trust are two critical subsequent stages. This suggests that an effective health intervention is more than merely encouraging health care providers to become more patient-centered in medical communication. Health care organizations and doctors themselves should also make efforts to improve the communicative experience in consultations, and improve patient satisfaction and patient trust. For example, health interventions targeting communication skills are of significance. Health care organizations can provide more training on doctors' communication skills, and doctors need to offer more opportunities for patients to express emotional concerns, ask questions, and seek clarifications. Also, improving patients' communication skills is important as well. Efforts could be focused on teaching patients how to ask questions to seek needed information, provide information (e.g., express concerns, report symptoms), and verify information (e.g., clarify questions, check understanding). In addition, considering the mediation effects found in this study, health care organizations should pay close attention to patient satisfaction. Strategies such as designing a surveillance system for monitoring patients' communicative experiences as they relate to quality of care indicators, might help improve patient satisfaction in the long term. Also, strategies, such as providing means for doctors to maintain harmonious communication with

patients outside the clinical settings (e.g., patient portals, and social media), could help increase mutual trust. Through such regular communication with patients and timely responses to patients' concerns, patients may have elevated level of trust in doctors when they feel heard, understood, and respected.

# **Implications for Theories**

This study has made important theoretical contributions. First, the study extends the current literature that mostly focused on pathways linking clinical communication to health in the context of western societies. This study demonstrates that the pathway model which was originally proposed in the United States can be applied to different contexts, such as China. It is important that this opens up new research trajectories for health communication scholars as it illustrates that more relevant studies could be conducted in different countries to examine whether the theoretical model is applicable cross-culturally. Second, the direct and indirect effects of patient-centered communication found in this study add to the growing body of research that supports both partial mediation and complete mediation, and suggests that patient-centered communication, by itself as well as together with other factors, can both bring about change in one's health condition. Third, this study offers an analytical approach that future research can use to examine pathway models linking communication to emotional health outcomes. Last, the present study underscores the importance to take into account individual functions of patient-centered communication in different countries. A general statement that communication can enhance health would be uninformative, because it neglects the difference in elements of doctor-patient communication (e.g., information

exchange vs. responding to emotions vs. shared decision-making). Without differentiating the nature of communicative functions in this manner, effects of communication may be obscured in the health care system, hindering theoretical development.

## **Limitations and Future Directions**

This study also has several limitations. First, the sample in this study is not nationally representative, and is not a random sample. The use of non-random sample can cause a series of problems. For example, non-random samples can be more biased than random samples. That is, it is impossible to assess sampling errors and unable to generalize the conclusion to a larger population with non-random samples. Future studies should overcome this limitation by using nationally representative samples and random samples. Second, the use of online survey means that all measures are selfreported by respondents. As such, self-reporting biases could occur in the data. For example, it may be difficult for respondents to recall their past medical visits with doctors. In this case, the self-reported patient-centered outcomes might be inaccurate. Similarly, respondents may also overestimate or underestimate their health conditions. Future research could use more objective measurements of health outcomes (e.g., hypertension and metabolic control), and use video-recording and coding of the actual medical consultations to assess doctors' patient-centered communication behavior. Third, this study is cross-sectional in design. Thus, causality can only be inferred. Future research can use longitudinal survey design or experimental methods to establish whether the relationships between patient-centered communication and outcome

variables in this study (e.g., general, emotional and physical health outcomes) might change over time. Nonetheless, the relationships among variables in this study were based on strong theoretical reasoning and suggest reasonable pathways through which patient-centered communication can contribute to better health outcomes. Fourth, the current study only included four control variables: age, gender, education, and personal monthly income. It is important to include more control variables to reduce confounding effects. For example, place of residence is an important control variable. In China, people living in rural areas are different from those in urban areas, in terms of living conditions, access to health care, health insurance, and even occupation. These and other possible factors related to place of residence might influence the relationships among variables tested in this study. Also, considering the use of online survey, it is necessary to include the amount of general Internet use as a control variable. The frequency of Internet use might affect how patients view doctor-patient relationships, and more importantly influence how patients communicate with doctors during medical consultations. Fifth, this study recruited survey respondents aged 40 or above. In the final sample, in general, respondents are younger (mostly in the age range: 40-50, and very few in the age group 60 or above), and well-educated (most have college education). Future studies should definitely examine older respondents, preferably over 60 years old, and lower education groups, especially those from under-served and underprivileged communities with limited access to health care services.

### Conclusion

There is a paucity of empirical studies that systematically investigate the mechanisms by which doctor-patient communication can influence improvements in patient health outcomes. With an aim to build and test a pathway model in the context of China, the current study offers support for both direct and indirect effects of patient-centered communication. These findings add to our understanding of social mechanisms underlying the relationship between patient-centered communication and different health outcomes (general, emotional and physical). Findings have implications for Chinese health care organizations and providers to deliver high-quality services that help mitigate the severe doctor-patient tension in China, and ultimately improve patients' health, well-being, and quality of life.

#### **CHAPTER VI**

#### LITERATURE REVIEW OF STUDY 2

## **Internet-based Interventions to Improve Online Patient-provider Communication**

Since June 2008, China has become the world's largest market of Internet users. There are totally 649 million Internet users, accounting for 47.9% of China's population as of January 2015 (Feng, 2015). Recent years has also witnessed an increasing number of Chinese people using the Internet for health purposes. For example, a national survey among 4,553 Chinese adults indicated that 33.2% of respondents have used the Internet to seek health information (Wang, Viswanath, Lam, Wang, & Chan, 2013). However, using the Internet for doctor-patient communication is still a new communication practice. Even in many developed countries, the adoption rate remains relatively low. For example, in the United States in 2013, less than 30% of adults have communicated with doctors via the Internet, compared to about 80% of American adults have sought health information online (National Cancer Institute, 2014). In Europe, only 12.3% of patients have approached healthcare providers on the Internet (Kummervold et al., 2008). Considering the low adoption rate, interventions that aim to improve patients' knowledge and skills to use the Internet to communicate with doctors may be needed to provide new opportunities for increasing access to health care services.

Prior research has shown great potentials of Internet-based interventions to improve patients' ability to use online health resources. For example, an intervention that provided Internet health information classes to 470 patients with HIV infection was

associated with a significant improvement in the following outcomes: self-efficacy in online health information seeking, skills of evaluating health information, and the number of times patients discussed online information with health care providers (Car, Lang, Colledge, Ung, & Majeed, 2011). Similarly, another intervention that provided computer training to older adults using NIH online resources had significant effects in improving participants' knowledge about computers and the web, and attitudes toward computers use for health-related purposes (Xie, 2012). In China, no intervention, to the best of knowledge, has been conducted to improve patients' ability of online patient-provider communication. Thus, this dissertation fills this void by proposing a four-week Internet-based intervention to improve Chinese people's skills to use the Internet for communication with doctors.

# **Internet-based Interventions Targeting Health-related Technology Use**

During the past decade, health communication scholars have become interested in using the Internet as an efficient system to deliver health-based education and promotion programs. Prior research suggested that Internet-based interventions could lead to improvements in behavior change, such as physical activity (Cavallo et al., 2012), eating habit (Jiga-Boy, 2014), and smoking cessation (McClure et al., 2013), as well as enhanced health outcomes among patients with breast cancer (Harris, Cleary, & Stanton, 2015), chronic back pain (Riva, Camerini, Allam, & Schulz, 2014), and posttraumatic stress disorder (Wagner, Schulz, & Knaevelsrud, 2012). Despite the wide documentation of effectiveness of Internet-based interventions on health outcomes, the availability of web-based interventions specifically designed to promote health-related

technology use is still fairly limited. The next section reviews the current literature in this line of research.

# **Outcomes of Internet-based Interventions**

Many interventions aimed to motivate participants to adopt health-related technologies. For example, Schrader and colleagues (2014) conducted an Internet-based intervention to improve patients' usage of an online chronic disease management system. Their results showed that the number of logins to the eHealth system increased during the first 4 weeks, and varied between week 4 and week 8, but decreased rapidly after week 8. Through their qualitative analysis, burden of illness and low levels of information technology literacy were identified as major barriers to patient engagement. Another intervention focused on the improvement of people's ability to locate quality online research and skills to evaluate the scientific literature. Their findings demonstrated a significant increase in overall research skills (e.g., online health information seeking and quality evaluation) (Long et al., 2016). Kalichman et al.'s webbased intervention aimed to not only enhance HIV/AIDS patients' Internet use for health purposes, health information coping, and evaluation capability, but also improve their health-related outcomes, such as social support and emotional well-being (Kalichman et al., 2006). In a similar vein, Xie's online collaborative learning intervention targeted both technology skills for using the Internet to seek health information and make health decision, and psychological effects, such as self-esteem and self-efficacy (Xie, 2011b). Based on the current literature, many interventions only focused on enhancing

participants' ability to use technologies, while others targeted both technology skills and health outcomes.

#### **Duration of Internet-based Interventions**

The duration of previous interventions varied vastly. Li and colleagues (2013) designed a web-based social network electronic game to enhance people's understanding of mental health information, and their intervention lasted for 3 weeks. In Xie's intervention study, older adults attended a 4-week online training session to learn how to use NIH website resources (Xie, 2012). Similarly, in the Internet-based health information consumer skills intervention for people with HIV/AIDS, participants needed to take the online course twice a week for 4 consecutive weeks (Kalichman et al., 2006). Strong and colleagues (2012) adopted an online system (Senior CHAT) to improve senior participants' health information literacy, and their training period was 6 weeks. There are other interventions with longer training sessions. For example, Xie's another eHealth literacy intervention via an online collaborative learning system lasted for 5 months (Xie, 2011a). Despite different lengths of intervention programs, significant improvement in outcomes of interest has been found in many studies. For example, the 3-week social gaming program, an example of short interventions, demonstrated that electronic games implemented through social networking sites could effectively enhance users' ability to seek and understand online mental health information (Li et al., 2013). On the other hand, longer inventions could also generate positive effects. For instance, the 5-month online learning program suggested that the intervention, regardless of learning method and information dissemination channel, was generally successfully in

enhancing e-health literacy (Xie, 2011a). Thus, although the duration of interventions varied, the lack of variability in study outcomes according to intervention duration could inform that the effectiveness of Internet interventions may be not be related to the duration of the intervention, but rather the intervention messages and activities.

# Internet-based Interventions Targeting Communication with Health Care Providers

The progress of information technologies is changing the way patients communicate with clinicians. Communication technologies, such as clinical information systems and electronic health records, have offered new opportunities for efficient and high-quality patient-clinician communication. The next section reviews web-based interventions that specifically aimed to facilitate the communication between patients and health care providers.

Ammenwerth and colleagues (2012) conducted a systematic review of controlled trials on the impact of electronic patient portals. From the total 1,306 references between 1990 and 2011, 13 papers were retrieved for full text analysis, and finally 5 papers were identified in their systematic review. Their findings showed that significant changes in the patient portal group, compared to a control group, were observed for the following parameters: decrease in face-to-face medical consultations, increase in the numbers of telephone contact and online messages sent, and better adherence to treatment.

Zhou and colleagues (2007) conducted another Internet-based study among 3,201 patients to examine how the use of patient portals would influence doctor-patient communication in face-to-face interactions and via telephone. They calculated the

differences in primary care medical visit and number of telephone contact in the pre- and post-periods (defined, respectively, as 3-14 months before and 2-13 months after registration for the patient portal). The results indicated that annual primary care outpatient visits decreased by 6.7% to 9.7% for those who used electronic messaging. Also, participants who used electronic messaging had a smaller increase in documented telephone contacts (16.2%) than members with no access to patient portal in the control group (29.9%). Thus, this study demonstrated that electronic messaging may increase efficiency and patient access issues to some health services.

In an Internet-based randomized controlled trial among 107 patients with heart failure, participants in the intervention group were trained to use the System Providing Access to Records Online (SPARO), while the control group received no training. Researchers found that participants in the intervention group sent more online messages to clinicians than the control group over the course of the study. Participants mainly sent online messages to schedule appointments (20% of total messages), to refill medications (15%), to ask questions about medications (14%), to get test results (12%), to report feeling ill (8%), and to get assistance interpreting test results (3%). Thus, this study illustrated that providing patients with online medical communication tools was feasible and could increase their access of care (Ross, Moore, Earnest, Wittevrongel, & Lin, 2004).

Allen and colleagues (2008) conducted an Internet-based health coaching intervention to enhance patient-provider communication on chronic pain, depression and impaired mobility. They found that 35% of participants exchanged e-mails with the

nurse e-coach; 88% who contacted the e-coach also expressed willingness to continue coaching; and 71% viewed the online materials prior to their doctor's visits. In their follow-up study, they also found that the Internet-based intervention increased patients' discussion about chronic conditions with doctors. Specifically, compared with participants in the control group, members in the intervention group stated that their health care providers gave them good advice about their health, and referred them to a specialist (Leveille et al., 2009). This Internet-based coaching intervention suggested that communication technologies could provide new opportunities for patients to receive more effective and affordable care, and improve their ability of communicating with doctors as well as self-managing health issues.

Another Internet-based intervention was a randomized controlled trial with 606 patients from an academic internal medicine practice (Lin, Wittevrongel, Moore, Beaty, & Ross, 2005). Participants in the intervention group used a patient portal to send online messages to health care providers for appointments, prescription refills, and referrals. Participants in the control group received usual care, without using the portal. After the 6-month intervention, researchers compared the content of portal communications. The findings showed that participants who used the patient portal reported improved communication with doctors. Also, intervention group participants reported a higher level of satisfaction with the online doctor-patient communication. This study concluded that patients who used the portal particularly valued the portal's convenience, reduced communication barriers, and increased communication between patients and health care providers.

Internet-based interventions have also been utilized to activate patients with mental health problems in their communication with doctors. For example, Steinwachs and colleagues (2015) conducted an Internet intervention to help patients with schizophrenia communicate with doctors about evidence-based treatments. 50 patients used an interactive online system. 24 participants in the intervention group were required and expected to view video clips of actors simulating a patient discussing treatment concerns. 26 participants in the control, however, were shown an educational video about schizophrenia treatment before a routine follow-up appointment. Researchers found that intervention group had longer medical visits, and had a proportionately greater patient contribution to the dialogue, and less verbal dominance by doctors compared with control group visits. Also, patients in the intervention group asked more questions about treatment information, disclosed more lifestyle information, and more often checked whether they understood information correctly. Therefore, this study demonstrated that Internet-based communication tools had the great potential to empower patients with schizophrenia to engage more actively in a patient-centered dialogue about their treatment.

### **Factors Influencing Online Communication with Doctors**

Although the Internet offers great opportunities for patients to interact with clinicians online, there remains a gap between patients' willingness to communicate with doctors via the Internet from those who have actually done so. For example, a study among 2,624 American adults showed that merely 4% have ever communicated with their doctors via the Internet, although 74% reported willingness to contact doctors in

this way (Cummings, 2006). Similarly, a survey study among 2,314 patients from 19 general health clinics indicated that although over 50% of patients reported having email access and were willing to use it for communication, only 5.8% have used it to communicate with their health care providers (Couchman et al., 2005). Considering the inconsistency on the degree to which patients are willing to, able to, and do use the Internet to communicate with doctors, the next section reviews factors that might influence patients' Internet use to communicate with doctors.

## **Sociodemographic Factors**

Ye and colleagues (2010) conducted a systematic review of email use for patient-provider communication. They found three studies that examined the relationships between sociodemographic characteristics of patients and their email use to communicate with providers. One study reported that prior use of email with their providers was significantly related to annual household income but weakly associated with education (Couchman et al., 2005). Another study indicated that users of email communication with providers were twice as likely to have a college degree, were younger, were less frequently ethnic minorities, and more frequently reported fair/poor health status (Houston, Sands, Jenckes, & Ford, 2004). Similar results were also found from an analysis of the National Ambulatory Medical Care Survey (NAMCS), which showed that the likelihood of patients' access to a provider who did email consults was greater for male patients, for patients aged 45–64, and for nonminority patients, (Sciamanna, Rogers, Shenassa, & Houston, 2007). In another national survey study among 7,674 respondents in the U.S., those who rated health information exchange with

clinicians via electronic health records important were more likely to be Hispanic, and Internet users, but less likely to be women (Wen, Kreps, Zhu, & Miller, 2010). In Europe, a representative sample of citizens from seven European countries showed that young, well-educated, and working people were most interested in communicating with doctors via the Internet (Santana et al., 2010). Specifically, communicating with a health professional by email seemed particularly appealing to well-educated, working citizens, up to 25 years old.

## **Technological Factors**

Access to Internet technology is one factor that could influence patients' Internet use as a source of social support and other health-related resources (Yli-Uotila, Rantanen, & Suominen, 2013), including communicating with clinicians. For example, Jiang and Street (2017) analyzed the 2013 Health Information National Trends Survey (HINTS), and found that the ease of Internet access was positively associated with online communication with doctors. In addition to Internet access, knowing the contact information of health care providers is an important technological step for the subsequent online communication. For instance, Sittig and colleagues (2001) surveyed 9,500 users in WebMD, a consumer health-focused website, and found that although over half of the patients indicated that they would like to contact providers via email, the majority of them do not know their provider's email address, which is the main barrier for the adoption of email communication with doctors.

Also, when patients are not aware of the working mechanism underlying the online patient-provider communication, they might be less likely to use such online

communication tools. Moyer and colleagues (2002) surveyed 476 outpatient clinic patients, and found that the major barrier to the adoption of online communication with their clinician is the fact that patients have little understanding of how the online communication actually works. For example, they have concerns about how to guarantee that their sent messages will get to their doctors rather than other people, and they also wonder how long it would take to get a response from clinicians. The last technological factor pertains to the quality of experience in online patient-provider communication. In other words, whether patients' usage experience in online communication with clinicians is easy and convenient matters. In a review study by Or and Karsh (2009), factors contributing to the acceptance of consumer health information technologies were identified. Among the 52 studies examined, the ease of use has been rated as the main predictor of technology acceptance. As such, Or and Karsh (2009) emphasized that, the effective design of health information system should not be overwhelmingly complicated, and the ease of use of the system can increase its adoption and diffusion, leading to possible positive health-related outcomes, such as enhanced quality of life, medication adherence, supporting patient self-care, and facilitating the process of healthcare delivery.

### **Patient Factors**

Patients' attitude and motivation also play a significant role in influencing the adoption of communication technologies. Jiang and Street (2017) found that when patients were activated to manage their own health, they were more likely to communicate with doctors via the Internet to exchange health information. In a

systematic review of patient acceptance of consumer health information technology, Or and Karsh (2009) highlighted the role of technology self-efficacy. Of the 52 reviewed studies, three specifically examined the effects of self-efficacy in influencing technology acceptance. For example, Hsu and Chiu (2004) introduced two types of Internet selfefficacy (i.e., general Internet self-efficacy and web-specific self-efficacy), and concluded that both types were predictive of electronic health service acceptance. Another study surveyed 753 patients and indicated that self-efficacy was an important determinant of patients' interests in using the Internet as a health resource in primary care (Mead, Varnam, Rogers, & Roland, 2003). Similar result was also found in an intervention for HIV/AIDS patients. In this study, computer self-efficacy served as a significant predictor of the acceptance of a health information system called TIDES (Lai, Larson, Rockoff, & Bakken, 2008). In addition to self-efficacy, the systematic review by Or and Karsh (2009) also underscored the effects of patients' attitude towards the outcome of using health information technologies. 6 out of the 52 reviewed articles explored the effects of users' perceived usefulness of the technology on technology acceptance, and supported its positive influence on the adoption of consumer health information technologies, such as computer-based health education system (Boberg et al., 1995), self-management system (Lai et al., 2008), and general Internet use for health information seeking (Diaz et al., 2002). Specific to online doctor-patient communication, prior research also offered evidence for the importance of users' attitudes. For example, Wilson and colleagues (2004) conducted an online survey among 163 patients, and found that the better perceived outcomes associated with the provider-delivered e-health

system, the more likely they would adopt this technology. Another empirical study examined 143 patients' acceptance of an Internet-based patient-physician communication application. The results supported the positive and significant effects of perceived technology usefulness on patients' technology acceptance (Klein, 2007). Previous studies highlighted various benefits associated with online doctor-patient communication, such as increasing access to care, learning more about patients' health conditions, understanding treatment options, saving cost and time, and reducing inconvenience of travel for consults (Dickerson et al., 2004; Fox & Duggan, 2013; Kuehn, 2013; Parikh, Sattigeri, & Kumar, 2014).

# **Application of Social Cognitive Theory to Internet-based Interventions**

During the recent decades, there has been an increasing emphasis on utilizing health behavior theories to guide Internet-based interventions. Behavioral theory provides a guiding principle to design, implement, and evaluate the effects of web-based health promotion campaigns. Among all the theories, the Social Cognitive Theory has been widely used in Internet-based interventions, including those targeting health-related technology use as outcomes (Bandura, 2004; Kalichman et al., 2006). SCT was developed by Albert Bandura (Bandura, 1986; Bandura & McClelland, 1977).

According to Bandura (1986), one's behavior is influenced by a triadic, dynamic and reciprocal model where personal factors, environment factors and behavioral factors interact with each other. In other words, changes in any one of these factors will influence and elicit a change in other factors, which ultimately influences one's behavior.

The multi-faceted nature of SCT provides a comprehensive theoretical framework to examine various stages of behavior change (i.e., initiation, adoption, and maintenance). Although SCT can explain maintenance and persistence of behaviors, it was initially proposed to explain factors that influence learning and adoption. According to Bandura (1986), one's confidence in certain behavior only becomes an important factor when the behavior is perceived to be new and challenging. The initiation of a new behavior, such as learning how to use online platforms to communicate with clinician in this case, may pose a challenge to people as it carries along with it changes in other already established behavioral components, such as face-to-face medical consultations. Thus, in the proposed study, the Internet intervention is designed in line with principles of SCT, a theory that has been used to inform many previous effective Internet-based interventions. For example, an intervention targeting improvement of Internet health information seeking and coping was based on the Social Cognitive Theory. In this study, the intervention components for building skills for using the Internet for health and support resources increased self-efficacy and skills for Internet use, and improved active coping and information-seeking coping (Kalichman et al., 2006). Another primary care e-communication intervention focused on the behavioral capability, an important construct from the Social Cognitive Theory. This intervention held e-Learning workshops with an objective to enhance doctor-patient communication, in terms of how to prepare, ask questions, check understanding, and express concerns. The findings showed that the web-based intervention was accessible and effective at increasing patients' participation in communication with doctors (Lussier, Richard, Glaser, &

Roberge, 2016). Similarly, another Internet-based intervention targeted behavioral capability by teaching patients to send secure messages directly to their physicians, and to request appointments, prescription refills, and referrals. After the intervention, patients perceived less adoption barriers, and became more proficient in sending online messages to doctors (Lin et al., 2005). In sum, based on the Social Cognitive Theory, the current study proposes an Internet-based intervention to specifically improve Chinese people's self-efficacy, behavioral capability, outcome expectation, and awareness of using the Internet to communicate with doctors.

# **Self-efficacy**

Self-efficacy, the central component of SCT, has implications for the initiation of a behavior. Widely considered as the most important prerequisite of behavior change, self-efficacy is one's confidence in successfully performing a particular task or behavior. Higher self-efficacy has been associated with stronger intention for behavior change, and thus may play a significant role in the initiation of a behavior, in this case, online communication with doctors (Bandura, 1997). According to SCT, mastery experience, verbal persuasion, vicarious experiences (i.e., social modeling), and interpretation of physiological and psychological states are ways in which more efficacious cognitions can be fostered (Bandura, 1997). For example, an Internet-based intervention for people living with HIV/AIDS focused on motivation and skills to improve self-efficacy in general Internet use and Internet health information seeking (Kalichman et al., 2006).

Although self-efficacy is the most studied SCT construct, the SCT model also utilizes several other variables for the promotion and investigation of behavior change.

Thus, it is essential to examine other SCT constructs (i.e., behavioral capability and outcome expectations).

### **Behavioral Capability**

Behavioral capability refers to a person's actual ability to perform a behavior through essential knowledge and skills. In order to successfully perform a behavior, a person must know what to do and how to do it (Bandura, 2002). The exposure to knowledge can promote the engagement of skill development, which is essential in the construct of behavioral capability. To become better at a skill, attending relevant training is an effective way. Research has found that the more training participants attend, the higher level of skills to utilize online health-related resources participants would learn (Paek & Hove, 2012). Xie (2011b) indicated that the actual ability to use technologies plays a key role in increasing the adoption of information and communication technologies for health purposes among elderly people. Thus, to promote health information seeking, Xie's intervention utilized collaborative learning method to enhance participants' Internet use skills.

# **Outcome Expectation**

Outcome expectation is an expectation that a given behavior will produce a particular outcome. According to SCT, outcome expectations could influence behavior, with positive outcome expectation increasing behavior and negative outcome expectations decreasing behavior (Williams, Anderson, & Winett, 2005). The outcomes may include physical, emotional, social, and self-evaluative outcomes. People might communicate with doctors via the Internet, because they expect some positive impacts

on their health, or they enjoy maintaining a social/interpersonal relationship with their health care providers, or they self-evaluate the consequence of this communicative practice, and may find great potentials to increase self-satisfaction and self-worth in the process of care (Bandura, 2004). Moreover, when people place positive value on the expected outcome, the effect of outcome expectations on behavior would be strengthened (Williams et al., 2005).

#### Awareness

In addition to the three constructs from SCT, the current study adds a new variable into the conceptual framework, the awareness of technologies. Awareness is one's knowledge of the existence of an innovation/technology. Awareness precedes other processes in innovation adoption. A positive perception may in turn lead to innovation adoption (Agarwal & Prasad, 1998). Online communication with clinicians still remains relatively new to many patients. For example, in Australia, an interview study of 47 patients indicated that only 42.5% were aware of this communicative practice (Bradford, Caffery, & Smith, 2015). Similarly, in Korea, Jung and colleagues (2012) conducted a survey study among 243 patients, and found that less than 50% of respondents were aware of the option of receiving health care service via the Internet. Awareness is even lower in developing countries. For instance, a review of telemedicine in China concluded that application of technologies for health care service delivery is at an early stage in China (Wang & Gu, 2009). Specifically, Zhan and colleagues (2011) contended that Chinese people are not familiar with health information technologies, and the government should support and promote the development of communication

technology use in the health care system. In sum, an important step in the adoption process of online patient-provider communication is to enhance patients' awareness of its applications. In fact, the Diffusion of Innovation Theory (Rogers, 1995) states that the first stage of the technology diffusion is to expose the innovation information to audiences.

### **Summary**

The Social Cognitive Theory emphasizes that personal, behavioral, and environmental factors can influence and be influenced by one another to change behaviors. It is important to note that SCT has been widely used to guide and improve the design and effectiveness of behavioral interventions. Thus, in the current study, SCT serves as the theoretical foundation for the Internet-based intervention that aims to promote online patient-provider communication in China. Specifically, this intervention focused on two behavioral factors (e.g., self-efficacy, and behavioral capability) and two personal factors (e.g., outcome expectation, and awareness) that could potentially increase Chinese people's Internet use to communicate with doctors (e.g., usage frequency, and quality of usage experience).

# **Description of the Internet-based Intervention in the Current Study**

The current study proposed a theory-driven Internet-based intervention to promote online doctor-patient communication among Chinese people. The intervention was implemented via a blog, entitled "Talk to your doctor". The content delivered on this blog targeted specific constructs of SCT. Since SCT is a broad behavioral theory, it is a challenge to incorporate all constructs in a single intervention program. For this

study, blog content was developed based on four constructs: self-efficacy, behavioral capability, outcome expectation, and awareness.

Self-efficacy content aims to improve an individual's belief that he/she can conveniently and easily use online tools to communicate with doctors. Examples of messages might include testimony from other users who have communicated with doctors via the Internet; related reinforcement that highlights the ease of use and usefulness of the communication platform; and postings emphasizing one's accomplishments. One example of "self-efficacy" blog was a story of a new mother. She shared her experience of using the Internet to make medical appointments, saying that "I have used the Internet to make appointments with doctors for a couple of times. It is really convenient. I vividly remember that my little son had a fever in the early morning. I immediately used a mobile app to make an appointment with a doctor. The cost is exactly the same as the traditional means". A second example was a testimony from a patient who has used microblogging to communicate with doctors. The direct quote from the patient was "It is very easy to use Weibo (Chinese Twitter) to communicate with doctors. When I feel sick, and wonder whether I should go to the hospital, I can send private messages to doctors for their professional suggestion. The thousands of doctors on Weibo become a useful channel for self-diagnosis and management".

Behavioral capability content focuses on the provision of strategies and skills to use online platforms to receive health services. Examples might include tutorial videos, learning plans, and articles offering step-by-step instructions. An example of "behavioral capability" blog was a video tutorial demonstrating how to use Haodf.com, an online

doctor review website. Specifically, detailed instructions were shown in terms of searching for doctors' information either by hospital name or by illness type, reviewing online comments on doctors, directly asking questions to a selected doctor, and scheduling appointment with the doctor. A second example was another video tutorial teaching patients how to use the "Spring Rain Health", a mobile application to communicate with doctors. In this video tutorial, participants could learn the skills of sending either text or voice messages to doctors, searching for best answers to health-related questions in the database, which contains millions of cases or answers from doctors, creating and managing personal electronic health records, and making medical appointments with doctors.

Outcome expectation content centers on the favorable outcomes associated with online doctor-patient communication. Examples of postings included peer testimony on the benefits by other users; videos or stories of people using online doctor-patient communication tools; and expert interview talking about the positive impacts of online medical consultations. An example of "outcome expectation" was a testimony from a patient who often used mobile applications to make medical appointments. The direct quote was "I have very heavy workload, and thus have limited spare time. Previously, when I get sick and want to see an expert doctor, it takes a whole day in the hospital in order to make an appointment, which is a waste of my time. However, now with Wechat, a mobile application, it takes less than five minutes to successfully make an appointment with my desired doctor. That is really good." A second example was a video introducing the general benefits of videoconference use for medical visits. A doctor in the video said

"To many patients in China, seeing a good doctor is not easy. This is especially true for people living in rural areas or small cities, where medical resources are insufficient. With the application of videoconferencing, patients do not need to travel to big cities, saving money and time. Videoconferencing also provides the opportunity for doctors from different hospitals to discuss and coordinate patient care in real time, helping make a better treatment option".

Awareness content aims to make audiences realize the application and importance of Internet use to communicate with doctors. Examples of blogs might include expert interview introducing Internet applications for medical consultations, governmental official documents promoting this practice, lists of online platforms for doctor-patient communication, and early adopters' testimony. An example of this category was a video from the National Health and Family Planning Commission of China. In this video, Bin Li, the minister of Ministry of Health talked about Chinese government's initiative to promote Internet use as a new option to deliver healthcare services. She mentioned that "by the end of November 2015, 1,238 Tier 3 hospitals have already created patient health record database, and 660 Tier 3 hospitals have used social media or mobile apps to communicate with patients. In the future, Chinese government would make greater efforts to improve the effective use of new communication technologies to provide healthcare resources to patients, and facilitate better quality of care". A second example was a testimony from a doctor who actively used new media to communicate with patients. Dr. Xiaoming Gong, a physician in Peking Union Medical College Hospital said that "I started to use the Internet to communicate with my patients

in 2013. At that time, 70% of my patients made appointments with me through my webpage on Haodf.com. This year, 2015, I use Weibo and Wechat to answer questions more frequently. In fact, very few of my patients went to the hospital to make appointments with me".

In sum, Chinese people report low levels of Internet use to communicate with health care providers compared to other health-related Internet use, such as information seeking and online social support groups. Internet-based interventions have shown great promise for promoting online doctor-patient communication. However, to the best of knowledge, no intervention has been developed to specifically target Chinese patients who are suffering from limited access to care. The purpose of study 2 is thus to implement a web-based intervention to promote participants' online communication with doctors, increasing their opportunity for greater health care access. Findings of the current study may add to the limited literature on web-based interventions to enhance Internet use for doctor-patient communication.

Thus, based on prior research on Internet-based intervention and the Social Cognitive Theory, study 2 proposed the following hypotheses:

H5: The Internet-based intervention will increase the frequency of online patient-provider communication.

H6: The Internet-based intervention will improve the quality of users' experience in online patient-provider communication.

H7: The Internet-based intervention will enhance the levels of self-efficacy, behavioral capability, outcome expectation, and awareness of online patient-provider communication.

#### **CHAPTER VII**

#### **METHODOLOGY OF STUDY 2**

## **Study Design and Participants**

Study 2 is a four-week randomized controlled pilot trial based on the Social Cognitive Theory. It was conducted to examine the efficacy of a blog-based intervention targeted at promoting online patient-provider communication among Chinese patients. There were two inclusion criteria for participation: participants (1) should be 40 years old or older, and (2) should have visited doctor's office during the past 12 months. Participants were recruited by a Chinese research company (www.sojump.com). In October 2016, the company sent emails to 4,200 qualified participants in the online panels. The email included basic information about the study. Participants were informed that they would need to complete an online survey, and be provided with a link to a blog. Participants were expected and required to follow the updates on the blog for four weeks, and after the four weeks, they would need to complete another survey. Finally, 758 people completed the wave-1 survey. Then 379 of them were randomly assigned to a blog with intervention materials, and the other 379 participants were provided with a link to another blog without intervention. At the end of the intervention, the company sent emails including a link to another questionnaires to the 758 participants. Out of the 758 people, 520 completed the wave-2 survey.

### **Intervention group**

Participants in the intervention condition received access to content posted on a blog on Sina, one of the most popular blog service providers in China. They were encouraged to regularly view and interact with the postings (e.g., comment and share). Content posted on this intervention blog was in the form of 5-10 minutes videos that covered different aspects of online patient-provider communication. Over the course of the intervention, totally eight videos (two per week) based on social cognitive principles (e.g., self-efficacy, behavioral capability, outcome expectation, and awareness) were distributed to influence behavior change regarding online patient-provider communication. Along with each video, every blog posting always included a brief introduction of the topic, written information regarding the content of the video, and a reinforcement message encouraging participants to watch the video.

### **Control group**

Participants in the control condition received access to another blog on Sina, and were similarly encouraged to regularly view and interact with the content posted on the blog. Content on this blog was about patient-provider communication in the face-to-face medical encounters rather than in the online settings, and was not created based on Social Cognitive Theory. The frequency of updates was the same as the intervention blog (e.g., two postings per week). However, the content was in the form of text only, without video modules. Blog postings in the control condition included topics such as "What is patient-centered communication?", "What should patients prepare before visiting a doctor?", and "What should patients do after medial consultations?".

#### Attrition

Attrition from the intervention program could be an issue of concern when 50% or more of participants dropped out during the intervention. Thus, the current study attempted to hold the attrition rate below 50%. To achieve this goal, the intervention was structured in ways that have been previously demonstrated to attenuate attrition. Three strategies were utilized: (1) providing incentives for participation; (2) sending reminders during intervention; and (3) requiring to take weekly quiz to facilitate active learning. The current study retained 255 participants in the intervention group, and 265 participants in the control group with compete data at both baseline and at the end of the intervention. The attrition rates of 32.7% and 30.1% respectively in the intervention and control groups are reasonable as most online longitudinal studies and web-based interventions revealed an attrition rate between 25-35% (Hiskey & Troop, 2002; Wantland, Portillo, Holzemer, Slaughter, & McGhee, 2004).

### Measurement

Study 2 focuses on several outcomes of the intervention, including the frequency of and quality of users' experience in online patient-provider communication, as well as SCT constructs of self-efficacy, behavioral capability, outcome expectation, and awareness. All study variables were assessed at the baseline, and four weeks after the introduction of Internet-based intervention.

Similar to study 1, before testing hypotheses, reliability and validity of measures at both wave-1 and wave-2 in study 2 were examined. As indicated in Table 5, PCA with varimax rotation showed that all measures loaded significantly onto their intended latent factors, establishing good construct validity. In addition, acceptable Cronbach's alpha

values were calculated to test for internal consistency. All the Cronbach's alpha values were above .80, demonstrating good reliability.

**Table 5: Summary of Principal Component Analysis Results for Study 2** 

Table 5: Summary of Principal Component Analysis Results 10	Factor loading (Wave 1)	Factor loading (Wave 2)
Frequency of online patient-provider communication	α =.84	$\alpha = .83$
Emails	.73	.70
Social media	.76	.80
Health information service websites	.79	.81
Hospital/physician websites	.84	.81
Mobile apps	.79	.79
Quality of users' experience in online patient-provider communication	$\alpha = .84$	$\alpha = .86$
It takes a lot of efforts to have online communication with doctors	.72	.80
It is frustrating to have online communication with doctors	.85	.87
I am concerned about the quality of the health information	.85	.83
The health information I obtain is hard to understand	.85	.87
Self-efficacy	$\alpha = .88$	$\alpha = .89$
I feel confident in using online tools to communicate with doctors	.79	.82
I am confident that I can use the Internet to communicate with doctors	.79	.81
I feel online communication with doctors is a skill that I can do easily	.84	.85
I think it is easy to interact with doctors online	.84	.84
Online doctor-patient communication is clear and understandable	.86	.84
Behavioral capability	$\alpha = .87$	$\alpha = .89$
Find doctors' contact information	.86	.89
Schedule an appointment with doctors	.80	.83
Ask doctors for information about your treatment or actions	.88	.90
Request for medical consultations	.87	.87
Outcome expectation	$\alpha = .82$	$\alpha = .84$
Improve their health	.79	.80
Reduce their waiting time to see a doctor	.83	.84
Cut the their travel time to a doctor's office	.81	.82
Reduce medical cost	.80	.81
Improve their medication control		
Awareness	$\alpha = .81$	$\alpha = .84$
I think it is appropriate to communicate with doctors via the Internet	.83	.83
Online patient-provider communication is an important innovation	.79	.83
Online patient-provider communication is critical for my health care	.82	.83
I am aware of Internet use to communicate with doctors	.77	.80

Also, skewness and Kurtosis were used to test for data normality. The results showed that all the absolute values of skewness and Kurtosis met the criteria set by Curran, West, and Finch (1996). Thus, the normality assumptions were satisfied in study 2. Table 6 reported mean, standard deviation (SD), skewness, and Kurtosis for each variable in the measurement.

**Table 6: Descriptive Statistics for Study 2** 

Table 6: Descriptive Stati	Mean	SD	Skewness	Kurtosis
Variables	(Wave 1)	(Wave 1)	(Wave 1)	(Wave 1)
Frequency	1.35	.82	13	1.91
Quality of experience	3.18	.80	.12	2.72
Self-efficacy	3.73	.70	56	3.28
Behavioral capability	3.55	.76	51	2.83
Outcome expectation	3.88	.63	59	3.19
Awareness	3.90	.62	59	3.12
	Mean	SD	Skewness	Kurtosis
Variables	(Wave 2)	(Wave 2)	(Wave 2)	(Wave 2)
Frequency	1.73	.69	.84	3.12
Quality of experience	3.23	.81	.65	2.47
Self-efficacy	3.78	.72	73	3.58
Behavioral capability	3.52	.80	64	3.04
Outcome expectation	3.92	.67	88	3.29
Awareness	3.95	.67	80	3.97

Frequency of online patient-provider communication was measured by asking respondents to identify during the past 4 weeks, how frequently they have used the following Internet applications to communicate with doctors: (1) emails; (2) social media; (3) health information service websites; (4) hospital/physician websites; and (5)

mobile apps. A 5-point Likert scale was used (1=never; 2=once; 3=two or three times; 4=four or five times; 5=more than five times).

Quality of users' experience in online patient-provider communication was measured by 4 items, adapted from the Information Seeking Experience (ISEE) scale (Arora et al., 2009). Respondents were asked to identify the degree to which they agree with the following statements: (1) "It takes a lot of efforts to have online communication with doctors"; (2) "It is frustrating to have online communication with doctors"; (3) "I am concerned about the quality of the health information obtained via the online communication with doctors"; and (4) "The health information I obtain from the online communication with doctors is hard to understand". Responses were scored on a 5-point scale (from 1=strongly agree to 5=strongly disagree) and averaged.

Self-efficacy in online patient-provider communication was measured by 5 items, adapted from prior research that drew insights from SCT, assessing the confidence that patients have to communicate with doctors via the Internet (Klein, 2007; Lankton & Wilson, 2007). Respondents were asked to express the extent to which they agree with the following statements: (1) "I feel confident in using online tools to communicate with doctors"; (2) "I am confident that I can become skillful in using the Internet to communicate with doctors"; (3) "I feel that online communication with doctors is a skill that I can do easily"; (4) "I think it is easy to interact with doctors online"; and (5) "My interaction with the online tools for doctor-patient communication is clear and understandable". Responses were scored on a five-point scale (from 1=strongly disagree to 5=strongly agree) and averaged.

Behavioral capability of online patient-provider communication was measured by asking respondents to rate the extent to which they have the knowledge and skills to communicate with doctors via the Internet to (1) find doctors' contact information via the Internet; (2) schedule an appointment with doctors via the Internet; (3) ask doctors for information about your treatment or actions via the Internet; and (4) request for medical consultations via the Internet. Responses were scored on a 5-point Likert scale, ranging from 1=very bad to 5=very well. These five items are drawn from previous review of major functions of online doctor-patient communication (Osborn, Mayberry, Wallston, Johnson, & Elasy, 2013; White, Moyer, Stern, & Katz, 2004), and were taught in the intervention.

Outcome expectation of online patient-provider communication was measured by 5 items, adapted from prior research on electronic healthcare (Hu, Chau, Sheng, & Tam, 1999; Klein, 2007), asking respondents to rate the extent to which they agree that online doctor-patient communication can (1) improve their health; (2) reduce their waiting time to see a doctor; (3) cut the their travel time to a doctor's office; (4) reduce medical cost; and (5) improve their medication control. Responses were scored on a 5-point scale (1=strongly disagree to 5=strongly agree) and averaged.

Awareness of online patient-provider communication was measured by 4 items, adapted from Agarwal and Prasad's (1998) information technology awareness scale. Respondents were asked to identify their agreement with the following statements: (1) "I think it is appropriate for me to communicate with doctors via the Internet"; (2) "I believe that online patient-provider communication represents an important innovation";

(3) "I think that online patient-provider communication is critical for my health care"; and (4) "I am aware of Internet use to communicate with doctors". Responses were scored on a 5-point scale (1=strongly disagree to 5=strongly agree) and averaged.

## **Analytic Procedure**

To assess self-reported changes in online patient-provider communication, from baseline to four weeks follow-up, a series of paired-sample T tests were conducted to determine if significant changes in the frequency of and quality of users' experience in online communication with doctors occurred over the duration of the study.

Similarly, to investigate changes in SCT variables (self-efficacy, outcome expectation, and behavioral capability) in online patient-provider communication, from baseline to four weeks follow-up, another series of paired-sample T tests were performed.

The T tests mentioned above can generate p values to inform whether the intervention has significant effects. However, the p values fail to reveal the size of the significant effects. Thus, to examine the effects of the intervention on outcome variables more closely, effect sizes were calculated. Researchers have recommended Cohen's term d as an effect size index (Carson, 2012; Sullivan & Feinn, 2012). Cohen (1988) classified effect sizes as small (d=0.2), medium (d=0.5), and large ( $d\ge0.8$ ).

## **CHAPTER VIII**

### **RESULTS OF STUDY 2**

# **Descriptive Statistics**

Participant characteristics for the study sample at the baseline were presented in Table 7. Specifically, the average age was 46.5, and 58.9% were male. A majority of the sample had bachelor's degree (72.1%, M=2.79), and a monthly personal income of less than USD1500 (75.6%, M=2.85). A series of independent-sample T tests revealed that at the baseline, no significant differences were found between intervention group and control group in participants' age (t=-.09, p=.93), gender (t=-.35, p=.73), education (t=-.35, p=.73), and monthly income (t=.54, p=.59).

Table 7: Comparison of Intervention Group and Control Group at Baseline

	Control Group	Intervention Group	t	p
Variables	Mean	Mean		
Age	46.61	46.65	09	.93
Gender	.58	.60	35	.73
Education	2.8	2.82	35	.73
Income	2.85	2.79	.54	.59
Frequency	1.64	1.63	.37	.71
Quality of experience	3.15	3.2	71	.48
Self-efficacy	3.72	3.71	.06	.95
Behavioral capability	3.58	3.51	1.09	.28
Outcome expectation	3.85	3.87	32	.75
Awareness	3.92	3.88	.90	.37

## **Completers versus Non-completers**

Study completers were defined as providing data at both two assessment periods (baseline, and four weeks). Accordingly, in the intervention group, 255 of the 379 participants who provided baseline data were considered as completers; and in the control group, 265 of the 379 participants were considered as completers. A series of independent-sample T tests showed that the 255 completers in the intervention group did not differ significantly from the 124 non-completers in their age (t=-.96, p=.34), gender (t=.54, p=.59), education (t=-1.28, p=.20), and income (t=.37, p=.72). Similarly, in the control group, there were not significant differences between the 265 completers and the 114 non-completers in their age (t=-.54, p=.59), gender (t=-.90, p=.37), education (t=-.49, p=.62), and income (t=.95, p=.34). The following sections demonstrate results from data analyses of completers' responses.

### **Intervention Effects on Online Patient-provider Communication**

In the first step, participants' frequency of online patient-provider communication at the baseline was compared. As shown in Table 7, at the baseline, participants (n=255) in the intervention group reported a mean of 1.63, which means during the past 4 weeks, participants have used the Internet to communicate with doctors for less than twice, while those in the control group (n=265) reported a similar mean of 1.64. The independent-sample T test showed that there was no significant difference between these two groups (t=.37, p=.71).

Similarly, participants' quality of users' experience in online patient-provider communication was also compared. As indicated in Table 7, at the baseline, participants in the intervention group reported a mean of 3.2, which is slightly above the average

quality of usage experience. In the control group, participants reported a mean of 3.15. The independent-sample T test demonstrated no significant difference between groups (t=-.71, p=.48).

Thus, these two findings suggested that participants in the intervention and the control groups at the baseline had similar usage frequency of and quality of users' experience in online patient-provider communication.

Table 8: Comparison of Time 1 and Time 2 in the Intervention Group

	Time 1	Time 2	t	р	Cohen' d
Variables	Mean	Mean			
Frequency	1.63	1.88	-5.72	.000	.43
Quality of experience	3.2	3.25	-1.00	.32	.04
Self-efficacy	3.72	3.84	-2.71	.007	.19
Behavioral capability	3.51	3.51	07	.95	.02
Outcome expectation	3.87	3.99	-3.15	.002	.19
Awareness	3.88	3.98	-2.62	.009	.12

In the second step, a series of paired-sample T tests were conducted to examine whether the changes after the four-week intervention would be significant. Results were illustrated in Table 8. Regarding the frequency of online patient-provider communication, analyses showed that in the intervention group, at Time 2, participants reported the mean of 1.88, compared with the mean of 1.63 at Time 1. There was significant difference (t=-5.72, p<.001). In the control group, as shown in Table 9, however, the average usage frequency at Time 2 (M=1.59) was not significantly greater than that at Time 1 (M=1.64) (t=1.23, p=.22). Therefore, the intervention was effective in increasing participants' usage frequency of online patient-provider communication.

H5 was supported. To test the effect size of the intervention on participants' usage frequency, the Cohen's d was calculated. The Cohen's d value was .43, which demonstrated an approximately medium level of effect size.

Table 9: Comparison of Time 1 and Time 2 in the Control Group

	Time 1	Time 2	t	р
Variables	Mean	Mean		
Frequency	1.64	1.59	1.23	.22
Quality of experience	3.15	3.22	-1.39	.17
Self-efficacy	3.72	3.71	.28	.78
Behavioral capability	3.58	3.53	1.22	.22
Outcome expectation	3.85	3.86	21	.84
Awareness	3.92	3.91	.33	.74

In terms of the quality of users' experience in online patient-provider communication, as illustrated in Table 8, the paired-sample T tests indicated that in the intervention group, although the mean at Time 2 (M=3.25) was greater than that in Time 1 (M=3.2), its difference was not statistically significant (t=-1.00, p=.32). In the control group, as shown in Table 9, similar results were found. The mean at Time 2 was 3.22, while the mean at Time 1 was 3.15. However, the difference was not statistically significant (t=-1.39, p=.17). Thus, the intervention failed to improve the quality of users' experience in online patient-provider communication. H6 was not supported.

### **Intervention Effects on SCT Outcomes**

In the first step, the Social Cognitive Theory variables at the baseline were compared between the intervention group and the control group. The comparisons were illustrated in Table 7. Participants in the intervention group (n=255) reported the mean of 3.72 in self-efficacy at the baseline, while those in the control group (n=265) had a

mean of 3.72. The independent-sample T test showed that participants at the baseline did not differ significantly in their self-reported level of self-efficacy in online patient-provider communication (t=.06, p=.95). Also, the mean of behavioral capability in the intervention group (M=3.51) was not significantly different from that in the control group (M=3.58) (t=1.09, p=.28). Regarding outcome expectation, the intervention group reported a mean of 3.87, compared with 3.85 in the control group, suggesting no significant difference (t=-.32, p=.75). Similarly, awareness reported in the intervention group (M=3.88) and the control group (M=3.92) did not differ significantly (t=.90, p=.37). In sum, the levels of four Social Cognitive Theory outcomes in both groups at the baseline were not significantly different.

In the second step, a series of paired t-tests were used to assess changes in the Social Cognitive Theory variables after the four-week intervention. As indicated in Table 8, in the intervention group, participants' reports of the mean of self-efficacy increased from 3.72 at Time 1 to 3.84 at Time 2, and this change was significant (t=-2.71, p<.01). In the control group, as shown in Table 9, there was no significant increase from Time 1 (M=3.72) to Time 2 (M=3.71) (t=.28, p=.78). Thus, the intervention was effective in terms of enhancing participants' self-efficacy in online patient-provider communication. The Cohen's d was .19, showing a small but significant effect size.

Regarding behavioral capability, as shown in Table 8, people in the intervention group reported a mean of 3.51 at Time 2 compared with 3.51 at Time 1, indicating non-significant changes (t=.-07, p=.95). In the control group, similarly, no significant increase was found from Time 1 (M=3.58) to Time 2 (M=3.53) (t=1.22, p=.22) (See

Table 9). Therefore, this intervention failed to significantly influence one's behavioral capability of online patient-provider communication.

The third SCT variable, outcome expectation, as depicted in Table 8, significantly increased from Time 1 (M=3.87) to Time 2 (M=3.99) in the intervention group (t=-3.15, p<.01). As illustrated in Table 9, participants in the control group, however, reported insignificant changes in the means of outcome expectation from Time 1 (M=3.85) to Time 2 (M=3.86) (t=-.21, p=.84). Thus, the intervention generated satisfactory effects on enhancing people's outcome expectation of online patient-provider communication. The Cohen's d value was .19, demonstrating a small but significant effect size.

Last, in terms of awareness, a significant increase was observed from baseline to four weeks after the intervention. As demonstrated in Table 8, in the intervention group, the mean of awareness increased from 3.88 to 3.98, and this change was statistically significant (t=-2.62, p<.01). As shown in Table 9, in the control group, there was no significant change from Time 1 (M=3.92) to Time 2 (M=3.91) (t=.33, p=.74). Therefore, it is important to note that the intervention has exerted significant effects on improving awareness of online patient-provider communication. The Cohen's d was .12, suggesting a small but significant effect.

#### **CHAPTER IX**

#### **DISCUSSION OF STUDY 2**

Chinese people have long been facing the problem that health care is expensive and difficult to access. The purpose of this study was to deliver an Internet-based intervention to promote online patient-provider communication in China. Internet-based interventions have shown great potentials for promoting health-related issues. However, no published Internet-based interventions have been specifically implemented to improve online patient-provider communication in the context of China. Thus, the current study aimed to evaluate usage frequency, and quality of experience in online communication with doctors, and associated Social Cognitive Theory outcomes of self-efficacy, behavioral capability, outcome expectation, and awareness among Chinese participants.

As expected, participants in the intervention group increased their usage frequency at the end of the four-week intervention. And the effect size was shown as medium. This finding is similar to the results of other Internet-based interventions promoting online patient-provider communication in the western societies. For example, Ross and colleagues (2004) conducted a randomized controlled trial to teach patients how to use patient portals to send messages to clinicians. Their results showed that participants in the intervention group contacted clinicians more often than those in the control group. A systematic review of the effects of interventions for enhancing health consumers' skills to search and use online health information provided more convincing

evidence for the importance of web-based training programs to enable patients to become more literate in using health-related technologies (Car et al., 2011). In this review study, randomized controlled trials showed positive changes in people's readiness and the actual adoption of the Internet to seek health information, including "the number of times patients discussed online health information with health providers on the Internet". No adverse effects were reported. Also, Allen and colleagues (2008) conducted a series of Internet-based interventions that aimed to improve electronic communication in the health care, and concluded that the Internet provides an efficient and low-cost platform that intervention studies can utilize to improve patient-clinician communication and patients' self-management (Leveille et al., 2009). In fact, many researchers have highlighted the efficacy of using the Internet to deliver health care interventions. For instance, a systematic review of the published literature on why interventions were delivered over the Internet and summarized several major reasons: reducing cost and increasing convenience for users; overcoming isolation of users; the need for timely information; stigma reduction; and increased user control of the intervention (Griffiths, Lindenmeyer, Powell, Lowe, & Thorogood, 2006). Thus, the results of the current study adds empirical evidence to the literature that the Internetbased Intervention could be effective in enhancing online patient-provider communication, particularly in the context of China.

Contradictory to the expectation, the present intervention failed to improve the quality of users' experience in online patient-provider communication. This finding might reflect a number of limitations of Internet-based interventions. The first and

foremost is probably the lack of effective control over participants' involvement in the training process. Scholars suggested that participants' attitude towards Internet interventions varied vastly. Those with greater willingness would have more active engagement during the intervention, while others with more negative attitudes might lose interests and become more passive in the learning process (Mohr et al., 2010). A second related problem with this Internet intervention is that simply disseminating messages or showing tutorial videos in the computer-mediated environment could be less effective due to the insufficient guidance and support from the intervention organizers. Several researchers contended that Internet interventions should not be regarded as a full replacement for face-to-face interventions. Instead, they recommended that a more effective Internet intervention should incorporate face-to-face programs or therapies that complement each other (Andersson & Titov, 2014). In addition, there remains another gap in the literature that many previous interventions only aimed to improve the adoption rate of certain technologies (e.g., the number of logins to eHealth systems, the number of online messages sent to doctors, and the frequency of seeking health information online) (Long et al., 2016; Schrader et al., 2014), and very few studies focused on the quality of users' experience in such online communication process. In fact, users' online experience matters, particularly in the diffusion of new technologies. Technology use is not simply "on" or "off". For some, using health-related technologies might be easy and understandable. Yet, for others, navigating the online information environment might be confusing, suffering from various problems, such as information overload, complicated content, inconvenient access to accurate information

(Jiang & Street, 2016). Therefore, there is a need for interventions that not only encourage patients to use technologies, but also provide more systematic training to enhance the quality of usage experiences. This Internet-based intervention might reflect the fact that despite the use of tutorial videos to offer step-by-step instructions, participants still encountered many difficulties in the adoption process. Future intervention endeavors could provide more solid education and assistance to overcome barriers in their usage experience. For example, after watching a tutorial video, if participants have any questions, they can conveniently ask the intervention organizers, who should respond timely. Also, several information sessions in face-to-face settings might be an alternative platform to help participants more effectively use online patient-provider communication tools.

As predicted, the intervention significantly improved participants' self-efficacy in online patient-provider communication. Specifically, two strategies were used to enhance self-efficacy in this study. First, videos showing interviews with users who shared their own easy and convenient usage experience in online communication with doctors were used, providing role models to promote adoption. Second, for each blog posting that introduces an online patient-provider communication application, written reinforcement messages were included to strengthen participants' confidence in using the recommended platform. Thus, the significant change in self-efficacy over the duration of this study suggested that web-based interventions could be effective in increasing people's confidence and self-efficacy in recommended behavior change, in this case, starting to use the Internet to communicate with doctors. This result was

consistent with many previous Internet-based interventions targeting health-related technology use. For example, Kalichman and colleagues (2006) organized a series of online training sessions to help patients with HIV/AIDS to use the Internet to seek and evaluate health information. In one session, they disseminated messages that aimed to reduce anxieties about using computers, gaining familiarity with the Internet, and motivating confidence in using the Internet. They found that participants' self-efficacy in health-related Internet use increased after the intervention. Similar result was also observed in Wójcicki and his team' Facebook intervention, supporting the great potentials of Internet interventions to increase self-efficacy in behavior change (Wójcicki, Grigsby-Toussaint, Hillman, Huhman, & McAuley, 2014). Although the effect size was small (Cohen's d less than 0.2), this study does offer an empirical evidence for the importance of self-efficacy in promoting health-related technology adoption. This conclusion is in line with prior research. For instance, a systematic review of self-efficacy in Internet-based learning programs showed that in general, people' selfefficacy plays a positive role in their attitude, and the processes and outcomes derived from Internet-based learning (Tsai, Chuang, Liang, & Tsai, 2011). Therefore, it is important that health educators and communicators, when promoting health-related technology use, should take into account what concerns target participants might have towards the new technology, and configure strategies to attenuate their worries and pressure, and increase their confidence in using the technology.

Different from the hypothesis, behavioral capability in online patient-provider communication has not been significantly improved after the intervention. This is

inconsistent with prior research that supported that Internet-based interventions could enhance participants' ability to communicate with doctors. For example, Lussier and colleagues (2016) held e-Learning workshops to enhance patients' skills to communicate with doctors, and their findings demonstrated significant improvement in patients' actual ability to ask questions, check understanding, and express concerns. Another web-based Intervention also targeted behavioral capability to send online messages to health care providers, and found that the intervention was effective at increasing skills to contact doctors to request appointments, prescription refills, and referrals (Lin et al., 2005). Compared with these previous interventions that illustrated significant effects, there might be two plausible explanations for the failure to improve behavioral capability in the current intervention. First, the present intervention merely adopted several tutorial videos to teach participants relevant skills in online patient-provider communication, without more comprehensive training. In Lussier et al.'s study, research coordinators played a key role in facilitating effective learning throughout the online workshops. Also, in the offline settings, at the clinic, nurses assisted participants to better study the primary care e-communication, to complement the online workshops. Second, the current study measured behavioral capability in terms of four types of activities: (1) finding doctors' contact information via the Internet; (2) scheduling an appointment with doctors via the Internet; (3) asking doctors for information about your treatment or actions via the Internet; and (4) requesting for medical consultations via the Internet. Although tutorial videos covered these four topics, a more thorough and in-depth introduction of each activity is needed. For instance, in Lin et al.'s intervention, specific

modules were offered to teach each of the three targeted behaviors: requesting appointments, prescription refills, and referrals. Thus, future intervention studies should have a clearer understanding of targeted behavior capability, and offer more concrete and comprehensive training on each targeted behavior, illustrating step-by-step procedures. With these details in the instruction, users may become more proficient in performing the recommended behavior.

As hypothesized, the present intervention significantly increased participants' level of outcome expectation about online patient-provider communication. In the intervention blog, two types of messages were created to highlight benefits patients can reap from online communication with doctors. First, patients shared their stories that emphasized the positive consequences of using the Internet to communicate with doctors, such as reduced cost, timely response, and increased convenience. Second, interviews with government officials were used to underscore the importance of online patient-provider communication not only on patients themselves, but also on the health system, and the society as a whole. The findings from the current study were consistent with prior research that supported the efficacy of web-based interventions to enhance outcome expectations. For example, Paek and Hove (2012) designed and implemented three online training sessions to improve middle school students' eHealth literacy. With a general basis of social cognitive constructs, they created intervention messages to emphasize that seeking health information from the Internet can benefit themselves and people who are important to them, help them stay healthy, and avoid getting ill or unhealthy. Their findings showed that these online training sessions significantly

enhanced participants' perceptions of outcome expectations about Internet use for health information. In addition, it is important to note that outcome expectation has been incorporated into many previous interventions to promote health behaviors, such as physical activity (Anderson, Wojcik, Winett, & Williams, 2006), healthy eating (Michie, Abraham, Whittington, McAteer, & Gupta, 2009), smoking cessation (Strecher et al., 2008), and diabetes control (Ryan, Schwartz, Jennings, Fedders, & Vittoria, 2013). These studies demonstrated that the more positive consequences of health behaviors introduced to patients, the greater willingness they might have for health behavior change. The current study provides empirical evidence that in addition to health behavior change, outcome expectation could be a strong facilitator of health-related technology use, in this case, the adoption of online patient-provider communication. Therefore, health care providers and health educators should make greater efforts to place positive values on the expected outcomes, when promoting health information technologies to patients.

Also as predicted, the present intervention significantly enhanced participants' awareness of online patient-provider communication. This is not surprising, given that a large amount of intervention messages introduced new channels and platforms patients could utilize to contact health care providers. For instance, an interview with China's minister of Ministry of Health showed that the Chinese government has made great endeavor to promote Internet use for doctor-patient communication for people living in both urban and rural areas, highlighting that in the near future, patients should have different options to receive their health care services with the assistance of health

information technologies. Improving awareness is an important initial step in the diffusion of innovation process. Many scholars have incorporated this construct to motivate people to start to use new technologies. For example, Hilty and colleagues (2015) conducted a systematic review of studies that promoted Internet-based platforms to complement in-person care options during the 1996-2015 period, and drew a conclusion from their review that both patients and clinicians have to become aware of the application of telemedicine, and thus interventions might be needed to increase their awareness and understanding of web-based options for the delivery of health care services. Similar conclusion was also found in an in-depth literature review of determinants of successful telemedicine implementations, stating that making people aware of the application of new technologies for health care is an important stage for technology acceptance and diffusion (Broens, Vollenbroek-Hutten, Hermens, van Halteren, & Nieuwenhuis, 2007). Thus, considering the low levels of awareness of online patient-provider communication in China, during medical encounters, health care providers should proactively introduce and encourage this new option of medical communication, which could offer different means for coping and self-care resources for patients.

Findings from the present study are particularly important to the Chinese health care system, given that many patients in China encounter difficulties in accessing health care services. On the one hand, the overall medical resources offered by health care organizations are insufficient, resulting in long waiting time and short consultation time in the hospital (Shen et al., 2010). Meanwhile, as the ageing population rapidly

increases, the gap between supply and demand of medical resources is enlarged, leading to greater difficulty in receiving health care timely (Deng et al., 2014). On the other hand, recent years has witnessed an increasing number of Chinese people who regularly use the Internet for health purposes, and the Chinese government also encouraged the development of health information technologies (Wang et al., 2013). The Internet might provide a new opportunity for the delivery of health care services. Thus, the current study adds to the limited research that supported the great potentials of intervention programs to educate the public to use new media technologies for health services, and underscores the need for more endeavor to promote online patient-provider communication in the context of China.

### **Strengths**

The current study has several strengths. First, this study is one of few examining the effects of an Internet-based intervention to promote online patient-provider communication, and the only one, to the best of knowledge, that has been conducted among middle aged and older people in the context of China. A second strength is that the intervention is grounded in behavioral theory. Behavioral theories have been widely used for health promotion. The present intervention demonstrates that behavioral theory can help researchers move beyond health behavior change, providing testable and sound approaches and frameworks to facilitate health-related technology use. As many researchers suggested, interventions based on behavioral theories could be more effective in changing behavior than non-theoretical interventions (Hamel, Robbins, & Wilbur, 2011). Third, the use of a control or comparison group helps make better causal

inferences. The final strength is the use of blog to deliver intervention messages. Prior research suggested that the rapid and innovative advances in Web 2.0 design may offer opportunities for positively influencing health-related behaviors (Korda & Itani, 2013). Compared with the more conventional methods of delivering an Internet-based interventions (e.g., access to static website, email delivery of intervention messages), the great accessibility and reach of blogging, its multi-media functions (e.g., text, picture, audio, and video), and fewer constraints (e.g., cost, time, effort, and resources) make blog-based intervention an effective means to influence behavior.

#### Limitations

Several limitations should be noted when interpreting the results and building upon the findings. First, using the online panels to recruit participants made it impossible to generalize the conclusion from the current study to a larger population. For example, a majority of the sample had college education, within the age group 40 to 50. Thus, it reduced insights as to whether or not a blog-based behavioral intervention is effective in producing desired outcomes among all the population. Second, the current study adopted participants' self-reported outcomes, and thus how accurate their responses were remains unclear. For example, considering the intervention lasting for 4 weeks, some participants might not clearly remember how many times they actually used the Internet to communicate with doctors. Overestimation or underestimation could occur. Future interventions could require participants to login in to view intervention materials, and record the duration of each visit. Through this practice, more objective and accurate indicators of participants' actual behavior can be provided. Third, the attrition rate of

32.7% in the intervention group, although within the acceptable range, still indicates the need for more innovative strategies to maintain participant retention. Future interventions may consider having a coordinator or moderator in the intervention to encourage participations. Fourth, the current study only surveyed participants before and immediately after the intervention, without a wave-3 survey to understand relapse effects. Thus, future research can conduct another round of survey at 3 months after the intervention to see whether there might be any significant decrease in the intervention effects. Fifth, the design of this intervention could be regarded as a pilot study in nature. The intervention mainly used videos to disseminate information. More systematic training to participants is needed to improve their actual ability to communicate with doctors via the Internet. Also, before implementing the intervention, additional steps to understand target audiences' needs and attitudes, and pretest intervention messages might strengthen the effectiveness of this intervention. Last, although blogging features an interactive communication platform, this intervention failed to take full advantage of the interactive functions. Future research in this line can encourage more participant/user-generated content (e.g., giving comments, sending feedback, and sharing information within their social network). The more active engagement may increase participants' perceptions of ownership and accountability within the intervention program, which in turn could lead to increased effectiveness.

### **Future Directions**

Research utilizing Web 2.0 technologies to improve health-related technology use is still in its nascent stage. There are several implications for future research. First,

considering the insignificant effects of the current intervention on participants' actual ability to communicate with doctors via the Internet, and the quality of their experience in the online patient-provider communication, future research should configure more effective strategies to not only encourage participants to use technologies, but also help them become more capable and proficient of using technologies to communicate with doctors for various purposes (e.g., ask question, send examination results, medication refill). Thus, for each targeted behavior, researchers can consider to make relevant learning plans for participants, and guide them step-by-step to achieve the set learning goals during the intervention. Second, the current study was one of the first attempts to use social media, in this case, blog, to implement interventions to promote online patient-provider communication. To better understand the use of social media, it would be beneficial for future research to examine the extent to which interactive features of social media (e.g., commenting, sharing, chatting, posting pictures or videos) might differentially influence the targeted behavior change. Thus, future interventions should pay more attention to participants' online interactions with the intervention, as simply viewing interventional content alone might not be sufficiently powerful to adequately influence behavior change. Third, while the present study found support for the efficacy of blog-based interventions targeting online patient-provider communication, future studies may want to explore the potential of other Internet platforms to implement interventions (e.g., mobile apps, patient portals, health information service websites, and social networking sites). In addition, researchers may conduct cross-national comparative studies to investigate whether the effectiveness of Internet-based

interventions could be found across countries and cultures. Fourth, despite the use of Social Cognitive Theory as the theoretical framework in this intervention, many scholars suggested to use integrated models that incorporate different health behavior theories (Fishbein & Yzer, 2003), stating that an integrated health communication model based on different theories has greater combined explanatory power than that of any of these individual theories. Therefore, it may have merits to combine different theories (e.g., Health Behavior Model, Theory of Reasoned Action, etc.) as a foundation for intervention designs.

### **Summary**

The present study shows that the blog-based intervention offers promise for increasing the usage frequency of online patient-provider communication, and self-efficacy, outcome expectations, and awareness of online patient-provider communication. To the author's knowledge, no other web-based interventions have been developed to specifically target middle aged or older population in the context of China.

The current study faces challenges of lack of control over participants' actual learning and less comprehensive training on online patient-provider communication skills, thereby negatively influencing the quality of online communication experiences. However, despite these challenges, this theory-based intervention promoted improvement in participants' frequency of online communication with doctors, and several psychosocial variables from the Social Cognitive Theory. It demonstrates that Internet-based interventions may provide an important strategy to effectively promote

health-related technology use (e.g., online patient-provider communication), and offer important implications for health education in the Chinese health care system.

### **CHAPTER X**

### **CONCLUSION**

The Chinese health care system has suffered from the severe tension between patients and doctors during the past decade. Faced with the increasing number of deaths and injuries of health care providers, Chinese scholars have made great efforts to explore possible reasons for the deterioration of doctor-patient relationships. Study 1 of the dissertation offers a new perspective by examining how patient-centered communication can influence patient satisfaction and patient trust, two important contributing factors to the violence towards doctors, and proposes a pathway model linking communication to health outcomes. Study 1 makes several important contributions to the existing literature. First, this study examined and confirmed different functions of patient-centered communication (e.g., exchanging information, responding to emotions, and making medical decisions) in the context of China. Second, by presenting the paths from patientcentered communication to three types of health outcomes, the social mechanisms underlying the impact of patient-centered communication were illustrated. Third, this study provided practical implications for health care providers by showing how they can achieve desirable outcomes through their medical consultations.

While improving patient satisfaction and patient trust holds enormous potentials to mitigate the conflicting doctor-patient relationship in China, another important contributing factor to the crisis in the health care system is the difficulties many Chinese patients are facing in receiving health care timely, as well as the expensive health care.

The online patient-provider communication may bring a new option for the delivery of good and affordable health services. However, online communication with doctors is still a relatively new concept to the Chinese patients. Thus, to promote this new but important practice, study 2 of the dissertation conducts a blog-based intervention among Chinese patients who aged 40 or above. This study provides support for the efficacy of delivering behavioral interventions via the Internet. This intervention resulted in improvements in participants' online patient-provider communication frequency, and related psychosocial constructs from social cognitive theory (e.g., self-efficacy, outcome expectations, and awareness). The multi-media features and interactive functions of Web 2.0 technologies, along with its low cost and high accessibility, would make blogging and other social media an appealing platform where intervention studies can utilize to promote health-related technology use. As the gap between the supply and demand of medical resources in China increases, Chinese patients might have greater needs and interests in receiving health care services via the Internet. Thus, how to more effectively motivate patients to use the Internet for receiving health care services, and more importantly how to improve the quality of users' experience in such online communication remain an important issue to the Chinese health care system.

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# APPENDIX A

# QUESTIONNAIRE (ENGLISH)

1. In general, would you say your health is:
1=Poor; 2=Fair; 3=Good; 4=Very Good; 5=Excellent
2. These questions are about how you feel and how things have been with you during the last 4 weeks.  Please answer the following questions using the following scale:  1=Very Frequently; 2=Frequently; 3=Occasionally; 4=Rarely; 5=Very Rarely
Have you been a very nervous person? Have you felt so down in the dumps that nothing could cheer you up? Have you felt calm and peaceful? Have you felt downhearted and blue? Have you been a happy person?
3. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?  Please answer the following questions using the following scale:  0= Yes; 1= No
Cut down the amount of time you spent on work or other activities  Accomplished less than you would like  Were limited in the kind of work or other activities  Had difficulty performing the work or other activities (for example, it took extra effort)
4. Based on your previous medical encounter experience, indicate the degree to which you agree/disagree with each statement provided.  1= Strongly Disagree
The doctor thoroughly explained everything to you. The doctor was very informative about your health. The doctor's explanations and recommendations were clear and easy to understand.
The doctor showed a genuine interest in your health. The doctor made you feel completely at ease during the consultation The doctor tried to reassure and comfort you. The doctor seemed to care about your feelings.

The doctor strongly encouraged me to help make the treatment decision The doctor made certain I had some control over the treatment decision The doctor did not ask me to help make the treatment decision but instead just told me what my treatment would be.
5. Using the scale below, continue to indicate the degree to which you agree/disagree with each statement provided.  1= Strongly Disagree  2= Disagree  3= Neutral  4= Agree  5= Strongly Agree
My doctor is extremely thorough and careful I completely trust my doctor's decisions about which medical treatments are best My doctor is totally honest in telling me about all of the different treatment options available for my condition All in all, I trust my doctor completely.
6. Using the scale below, continue to indicate the degree to which you satisfy/dissatisfy with the health care service you receive.  1= Very dissatisfied
Over the last 12 months, how satisfied are you with the effect of your treatment/care?Over the last 12 months, how satisfied are you with the explanations the doctor/other health professional has given you about the results of your treatment/care?Over the last 12 months, how satisfied were you with the choices you had in decisions affecting your health care?Over the last 12 months, how satisfied were you with the care you received in the hospital/clinic?
7. Using the scale below, indicate during the past 4 weeks, how frequently you have used each of the following online platforms to communicate with doctors.  1=Never 2=Once 3=Two or three times 4=Four to five times 5=More than five times
Email Social media Hospital/physician websites Health information service websites Mobile apps

8. Using the scale below, continue to indicate the degree to which you agree/disagree
with each statement provided.  1= Strongly Agree
It takes a lot of effort to have online communication with doctors.
It is frustrating to have online communication with doctors.
I am concerned about the quality of the health information obtained via the online
communication with doctors.
The health information I obtain from the online communication with doctors is
hard to understand.
9. Using the scale below, indicate the degree to which you agree/disagree with each statement provided.
1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree
I feel confident in using online tools to communicate with doctors.
I am confident that I can become skillful in using the Internet to communicate with
doctors.
I feel that online communication with doctors is a skill that I can do easily.
<ul><li>I think it is easy to interact with doctors online.</li><li>My interaction with the online tools for doctor-patient communication is clear and</li></ul>
understandable.
10. Using the scale below, continue to indicate the degree to which you agree/disagree
with each statement provided.  1- Strongly Disagrae 2- Disagrae 2- Neutral 4- Agrae 5- Strongly Agrae
1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree
I have the knowledge and skill to find doctors' contact information via the Internet I have the knowledge and skill to schedule an appointment with doctors via the Internet.
I have the knowledge and skill to ask doctors for information about your treatment
or actions via the Internet.
I have the knowledge and skill to request for medical consultations via the Internet.
11. Using the scale below, continue to indicate the degree to which you agree/disagree
with each statement provided.
1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree
Online doctor-patient communication can improve my health.
Online doctor-patient communication can reduce my waiting time to see a doctor.
Online doctor-patient communication can cut my travel time to a doctor's office.
<ul> <li>Online doctor-patient communication can reduce medical cost.</li> <li>Online doctor-patient communication can improve my medication control.</li> </ul>
omine doctor patient communication can improve my medication control.

_	ne scale below, continue to indicate the degree to which you agree/disagree
	tatement provided.
I= Strongly	Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree
I belief innovation I think	it is appropriate for me to communicate with doctors via the Internet. Eve that online doctor-patient communication represents an important of that online doctor-patient communication is critical for my health care. Eve that online doctor-patient communicate with doctors.
	of questions asks about the demographic information for sorting purpose.  ot be identified by the information you provided here.
Age	
Gender	
	Male1
	Female0
Education	
	Middle school or below1
	High school2
	Bachelor3
	Master or above4
Monthly inc	come
	500 USD or below1
	501-1000 USD2
	1001-1500 USD3
	1501-2000 USD4
	2001-3000 USD5
	3001 USD or more 6

### APPENDIX B

# QUESTIONNAIRE (CHINESE)

1. 总体来说,您的健康状况是。 1=很差; 2=较差; 3=一般; 4=较好; 5 非常好	
2. 在过去 4 周里,您出现以下状况的频率是? 1=大部分时间; 2=比较多时间; 3=一部分时间; 4=小部分时间; 5=极少时间	司
我容易变得紧张。 我的情绪不好,什么事都不能使您高兴起来。 我的情绪低落。 我的心理很平静。 我是个快乐的人。	
3. 在过去 4 周里,您的工作、学习或日常活动有无因为身体健康的原因而出现下这些问题? 0=有; 1=没有	] []
<ul><li>(1)减少了工作或其他活动的时间;</li><li>(2)本来想要做的事情只能完成一部分;</li><li>(3)想要干的工作或者活动种类受到限制;</li><li>(4)完成工作或者其他活动的困难增多(比如需要额外的努力)</li></ul>	
4. 根据您过去的就医经历,您对下列陈述的"同意"或"不同意"程度如何? 1= 非常不同意; 2=不同意; 3=中立; 4=同意; 5=非常同意	
医生完整地解释了我病情的各个方面。 医生针对我的病情给我提供了许多信息。 医生对我病情和治疗方案的解释很清晰,易懂。	
医生很关心我的健康状况。 医生让我觉得在就医过程中很放松。 医生努力安慰我,并给我信心。 医生很在乎我的感受。	
医生鼓励我参与治疗方案的确定。	

医生告诉我,我可以参与自己治疗方案的确定。 医生不让我参与治疗方案的确定,而是直接把他制定的治疗方案告诉我。
5. 根据您过去的就医经历,您对下列陈述的"同意"或"不同意"程度如何? 1= 非常不同意; 2=不同意; 3=中立; 4=同意; 5=非常同意
<ul><li>我的医生考虑周到,认真负责。</li><li>我相信医生为我制定的治疗方案是最好的。</li><li>针对我的情况,医生会坦诚地告知我不同的治疗方案。</li><li>总之,我完全相信我的医生。</li></ul>
6. 您对您所接受的医疗服务的满意程度如何? 1= 非常不满意; 2=不满意; 3=中立; 4=满意; 5=非常满意
你对你病情的治疗效果满意程度如何? 医生向你解释治疗结果,你对此满意程度如何? 你对你治疗方案的满意程度如何? 你对医院的整体服务满意程度如何?
7. 您在过去 4 周内,使用以下互联网平台与医生或医院联系(如挂号,提问,交流病情等)的频率是? 1= 没有使用过; 2=1-2 次; 3=3-4 次; 4=4-5 次; 5=5 次以上
<ul><li>——电子邮件</li><li>——社交媒体(如微博,微信,百度知道)</li><li>——医院或医生网站</li><li>——手机软件(如春雨医生,阿里健康)</li><li>——第三方医疗服务网站(如好大夫在线,丁香医生)</li></ul>
8. 根据您以往通过互联网与医生/医院的进行交流的经历,您对下列陈述的"同意"或"不同意"程度如何? 1= 非常不同意; 2=不同意; 3=中立; 4=同意; 5=非常同意
<ul><li>我需要花费很大的精力,才能在互联网上与医生进行交流。</li><li>在互联网上与医生进行交流时,我感到很失望。</li><li>在互联网上与医生交流所获得的信息,其质量让我很担忧。</li><li>在互联网上与医生交流所获得的信息,很难理解。</li></ul>
9. 针对互联网就医,您对下列陈述的"同意"或"不同意"程度如何? 1= 非常不同意; 2=不同意; 3=中立; 4=同意; 5=非常同意

<ul><li>工我有信心能通过互联网与医生进行交流。</li><li>我有信心能掌握互联网就医的技巧。</li><li>我觉得通过在网上与医生交流是一件容易做到的事。</li><li>我认为在网上与医生进行互动很简单。</li><li>通过互联网与医生进行交流简单易懂。</li></ul>
10. 针对互联网就医,您对下列陈述的"同意"或"不同意"程度如何? 1= 非常不同意; 2=不同意; 3=中立; 4=同意; 5=非常同意
我已经掌握了相应的知识和技巧,通过互联网找到医生的联系方式。 我已经掌握了相应的知识和技巧,通过互联网来挂号。 我已经掌握了相应的知识和技巧,通过互联网向医生咨询我的病情和治疗方案。
我已经掌握了相应的知识和技巧,通过互联网与医生预约网上咨询。
11. 针对互联网就医,您对下列陈述的"同意"或"不同意"程度如何? 1= 非常不同意; 2=不同意; 3=中立; 4=同意; 5=非常同意
与医生进行网上交流,有助于改善我的健康。 与医生进行网上交流,能减少我去医院看病的时间。 与医生进行网上交流,能减少排队挂号和等待看病的时间。 与医生进行网上交流,能增强我对自身病情的控制。
12. 针对互联网就医,您对下列陈述的"同意"或"不同意"程度如何? 1= 非常不同意; 2=不同意; 3=中立; 4=同意; 5=非常同意
我认为通过互联网与医生进行交流是很合适恰当的。 我相信,互联网就医代表了一项重要的技术创新。 我认为互联网医疗对我的健康很重要。 我已经意识到互联网医疗的存在。
以下内容为个人背景调查。您不需要姓名等个人信息。 您的具体周岁年龄是 岁
您的性别 男

您的教育程	度
	初中及以下1
	高中/中专 2
	大学本科
	研究生及以上 4
您的个人月	收入(税前)
	3000 元及以下1
	3001-6000 元2
	6001-9000 元3
	9001-12000 元4
	12001-18000 元5
	18001 元及以上6

## APPENDIX C

## **BLOG LOCATION**

Blog for intervention group: <a href="http://blog.sina.com.cn/u/2038863555">http://blog.sina.com.cn/u/2038863555</a>

Blog for control group: <a href="http://blog.sina.com.cn/u/3214559883">http://blog.sina.com.cn/u/3214559883</a>