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Where You Go and Whom You Ask? A Study of Source Selection and Usage in Chinese International Students' Health Information Behavior

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Where You Go and Whom You Ask? A Study of Source Selection and Usage in Chinese International Students' Health Information Behavior

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Abstract

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Past literature has established that international students underutilized university health and counseling services despite of the perceived health needs and special health problems arise from the acculturation process. The gap between perceived needs and subsequent health information seeking actions has been found to be especially significant in the Chinese international student subgroup. This study looks into Chinese international students' source selection decisions and influencing factors in the process of health information seeking, and employs qualitative template analysis method built upon the theoretical framework of Comprehensive Model of Information Seeking (CMIS). Analysis reveals a set of user and source related factors and evaluative criteria used in decision-making including source quality, availability, understandability, cultural sensitivity and relevancy and utility. The least-effort principle is supported, while language and cultural dimensions are also found to mediate the cost-benefit analysis by affecting relevancy judgment, which altogether result in the prioritization of self-care methods and the underutilization of professional healthcare sources.

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Chapter One: Introduction

The United States is one of the most popular destinations for students pursuing overseas education. According to February 2015 data released by the Student and Exchange Visitor Program, U.S hosted a record number of 1.13 million international students on an F (academic) visa or M (vocational) visa. This marked a 14 percent growth compared to 2014, and approximately 50 percent more than in 2010 (U.S. Immigration and Customs Enforcement). In the academic year of 2014/15, international students constituted 4.8 percent of the total U.S higher education population and about 30 universities had more than 5,000 international students enrolled. Among all the international students, 60 percent are from Asian nations, whereas Chinese students represent the largest group, which takes up a third of the total international population (Institute of International Education).

In today's increasingly globalized world, the competition for talented and self-funded international students has become more intense with the benefits of recruiting international students being widely recognized (Luo & Jamieson-Drake, 2013). Firstly, international students make significant contributions to the economy of the host countries. According to the National Association of Foreign Student Advisers (NAFSA) report, international students and their dependents contributed $26.8 billion to the U.S. economy in academic year 2013-2014. Expenditure international students made in sectors including higher education, accommodation, dining, retail, transportation, telecommunications, and health insurance helped create and support 340,000 U.S jobs. Besides, research also substantiated cultural and academic contributions international students made in U.S campus, and supported that interaction with students of different cultural backgrounds promotes the development of language skills, cognitive abilities

and overall intellectual growth of domestic students (Andrade, 2006; Choudaha & Chang, 2012; McCormack, 2007; Luo & Jamieson-Drake, 2013).

At the University of Texas at Austin Campus, international students composed 10 percent of the overall enrollment, and contributed an estimated $1.46 billion to the Texas economy in 2013-2014 (ISSS UT-Austin).

Health Needs and Problems of International Students

Accompanying the influx of international students, there is an increasing awareness of the potential needs and problems of this specific cohort, particularly in developed countries that host large populations of international students, such as Australia, Canada, U.S, etc. While international students in colleges, like domestic students, have to cope with role demands in the transition to post-secondary study, this transition process is further complicated by the differences between their own cultural values, social norms and customs and those of host countries' (Arthur & Hiebert, 1996; Hechanova-Alampay et al., 2002; Thomas & Althen, 1989; Poyrazli & Grahame, 2007).

A wealth of literature has looked into the unique set of challenges facing international students compared to their domestic counterparts (Hechanova-Alampay et al., 2002; Ward, Bochner &Furnham, 2001). Common problems identified in literature include language and cultural barriers, loneliness, interpersonal problems, homesickness, lack of social support, academic and financial problems, discrimination and racism, etc. (Surdam & Collins, 1984; Sandhu & Asrabadi, 1994; Ying & Liese, 1994; Mori, 2000; Tseng & Newton, 2002; Yeh & Inose, 2003; Sherry, Thomas & Chui, 2010; Poyrazli & Grahame, 2007). Those studies also, in light of psychological acculturation research tradition, argue that these challenges they experienced are typically manifested as acculturative stress. Acculturative stress is generally

considered to be the stress reactions brought out by stressors in the acculturation process, which potentially results in deterioration in health status of individuals who are undergoing acculturation (Berry & Kim, 1987; Berry, 1995).

The current body of literature studying the acculturative stress of international students, though lacking in empirical evidence, has suggested the negative impact of acculturative stress on international students' physical and mental health. Thomas and Althen (1989) listed psychological symptoms induced by excessive acculturative stress including depression, anxiety, neuroticism, paranoid feeling, etc. Physical problems like appetite disturbance, sleep problems, low energy, headaches, gastrointestinal ailments, higher susceptibility to illness, impairment of immune systems, etc. are also discussed in literature as correlates to acculturative stress (Thomas & Althen, 1989; Mori, 2000; Winkelman, 1994).

Considering the significant assets international students bring to host countries, it is important that host countries pay adequate attention to the well-being of this group of people. For schools and policy-makers, overlooking the unique potential health risks of international students might cause even more distress and frustration in this cohort, which is already lacking in social resources and networks. This issue may contribute to an overall negative reputation regarding the study abroad experience in the host country (Hechanova-Alampay et al., 2002; Bailey & Dua, 1999; Ang & Liamputtong, 2008). Obtaining a comprehensive understanding of how international students respond to their perceived health needs and where and how they seek health-related information and help, therefore, is fundamental to informing the decision-making process geared towards the health promotion of this sub-group of students.

Underutilization of University Health and Counseling Services

Regardless of the large amount of studies on the challenges and acculturative stress international students experienced during the process of adaption, studies that specifically address international students' health seeking behavior are limited in the current body of literature, with a primary focus on the students' interaction with university health and counseling services.

It was evidenced that international students tend to underutilize university health and counseling services, or in other words, they do not regularly seek health-related information and help from health professionals at university health and counseling services (Ogbudimkpa et al., 1988; Bradley et al., 1995; Mori, 2000; Zhang & Dixon, 2003; Fallon & Barbara, 2005; Ang & Liamputtong, 2008; Russell, Thomson, & Rosenthal, 2008; Hofmann, 2010; Shen, 2011; Austin, 2013). And this is found especially salient with Asian international students, in particular students of Chinese origins (Ang & Liamputtong, 2008; Russell, Thomson, & Rosenthal, 2008; Aubrey, 1991; Hofmann, 2010; Rothstein & Rajapaksa, 2003; Zhang & Dixon, 2003;Fallon & Barbara, 2005; Hyun et al., 2006; Shen, 2011).

The criteria that researchers employed to evaluate the appropriate level of utilization versus underutilization are not consistent. Russell, Thomson, and Rosenthal (2008), in their study of international students' health seeking behavior in an Australian university, discussed three benchmarks for evaluating appropriate level of usage. Most of the studies determine the overall underutilization of international students by comparing their usage level against domestic students' or by drawing on evidence from differences between different ethnic groups within domestic population. Russell, Thomson, and Rosenthal argue that these two criteria are either inappropriate or barely relevant to determine underutilization on the part of international students. They point out that it would be more adequate and enlightening to evaluate

international students' perceived needs for help in relation to actual help-seeking behavior and see if there exists a significant gap between perceived needs and consequent actions. The author of the present research also agrees that this evaluation basis is more relevant in the study of international students' health seeking attitudes and decision-making process. However, only a few studies are based on this reasoning.

Hyun, Quinn, Madon, and Lustig (2006) studied the prevalence of mental health needs in international graduate students and their use of counseling services. They found a wider gap between perceived needs and usage for international graduate students, though it was not peculiar to this subgroup but also existed similarly in graduate domestic students. Underutilization is supported, yet it is not uncommon among students in comparison with non-students adult populations (Fletcher et al., 2007). They also empirically documented international students' awareness of on-campus counseling services. When compared to domestic students, a significantly lower awareness is detected. Comparatively, international students are also significantly less likely to obtain information from university health center website.

A set of researches based on Australian universities also provides valuable insights into the gap between perceived needs of international students and use of services. Russell, Thomson, and Rosenthal (2008) found that the gap between perceived needs and consequent actions was not identical within the international student population. Generally, non-Asian students are more likely to take actions based on perceived needs. While comparing country of origin with students' usage of services, significant relationship is not established with only one exception: being a student from People's Republic of China (PRC) was a "significant predictor of not acting on perceived need" (p. 66). This finding also corresponds to other studies indicating the general underutilization on the part of Asian international students and Chinese international students in

particular (Ang & Liamputtong, 2008; Aubrey, 1991; Hofmann, 2010; Rothstein & Rajapaksa, 2003; Zhang & Dixon, 2003; Fallon & Barbara, 2005; Hyun et al., 2006; Shen, 2011).

Similar finding is also presented in the study of Fallon and Barbara (2005) based in Australia. They found that Chinese students are more likely to be unsatisfied with health services, find it too difficult to access the services, and to place greatest importance on self-medication, whereas research on international students as a whole found that they are generally satisfied and even more satisfied than domestic students (Austin, 2013; Hofmann, 2010).

A few studies have examined factors that inhibit the utilization of university health and counseling services from a cultural perspective.

Mori (2000), while studying the accessibility of university mental health service to international students, enumerated cultural differences including perceived stigma attached to psychological disturbances and personal disclosure in Asian culture, tendency to somaticize psychological disorders and interpret them as somatic illnesses, and structural difference like unfamiliarity with and misconception of counseling practices, and unawareness of the existence of counseling services as explanations for international students' notable underutilization of the counseling services.

Ang and Liamputtong (2008), by conducting in-depth interviews in an Australian university with eight Chinese international students, concluded that they generally did not view university counseling service as a supportive source they would use for psychological problems and difficulties, and they primarily relied on intimates, i.e. family and friends, as the major sources of support, which is consistent with previous research on the help-seeking behaviors of international students (Bradley et al., 1995). They also associated social stigma with a negative

view and lower usage of counseling services. Other factors they identified include language proficiency and lack of knowledge of counseling services.

Shen (2011) conducted research in a Canadian university to examine the role of culture in Chinese international students' general health-seeking behaviors, offering insights especially related to Chinese culture values and health beliefs. Under the theoretical framework of the intercultural health communication model of Witte and Morrison (1995), the author posited perceived efficacies of health-related behavior, perceived barriers of access and usage, and the influences of traditional Chinese medicine and Chinese cultures interacting with the previous two variables, which altogether contributed to less frequent usage of services. The results of twelve semi-structured interviews suggest that Chinese students' health perceptions and beliefs are influenced by traditional Chinese culture and medical concepts, which have potential sway over their perceived efficacy and perceived barriers in health information seeking and communication. For example, the beliefs of internal and external reasons for diseases, the idea of yin-yang balance, side-effects of western medicine, beliefs of the importance of diet, rest, and nutrition as self-treatment and so forth, contribute to high control over managing their own health condition and high barriers to visiting university health services. Other factors including lack of knowledge, long wait time, and language proficiency are also discussed in this study.

Except for the scarcity of research that looks into the gap between perceived needs and utilization of university health and counseling services, there was even less attention paid to international students' coping experiences with health-related needs and help-seeking from other on-campus and off-campus information sources, despite that the role of family and friends as important sources and self-diagnosis and self-care methods were somehow suggested in literature as is discussed above.

Only one existing work, to my knowledge, has tapped into the sources of health and medical information that international students might seek given a particular type of ailment. Fallon and Barbara (2005) surveyed international students about their usage of possible sources of medical advice for each ailment: stomach complaint, broken arm, skin rash, nosebleed, insomnia, and frequent headaches. Respondents were allowed to choose from a list of one or more possible sources they might resort to for each of the ailments. The results showed that around half of the respondents seek information *only* from family and friends for such problems as stomach complaint (42.1 percent), nosebleed (59.1 percent), and insomnia (50.5 percent), without consulting any health professionals. For other ailments, the percentage of students *only* seeking help from family and friends is comparatively low (broken arm 4.6 percent, skin rash 17.1 percent, frequent headaches 23.1 percent), yet still alarming. Such findings not only indicate family and friends are considered a legitimate source for medical information, but also raise questions about whether the decision to not approach health professionals happens before or after information-seeking from family and friends.

It would also be more valuable to investigate why international students prefer one source to another and the factors and criteria that affect their source selection and decision-making process. Fallon and Barbara only listed interpersonal sources in their study, but for those who choose to self-diagnose and use self-treatment, health information obtained from impersonal sources across different types of traditional or non-traditional media might also play an important role in their health-information seeking behaviors. Also, when multiple sources are used, it might also be valuable to look into the order of usage and see how international students move around multiple sources in both English and Chinese languages and navigate the complex health

information environment which is further complicated by their situation in the acculturation process.

Problem Statement

Based on the previous discussion, the author of the present study is intent to make the following 3 points.

First, a significant gap between perceived health needs and consequent actions is the only relevant basis for the evaluation of underutilization, yet such an underutilization pattern is not unique to international students; it is also seen in the general student population. Being Chinese international students, however, is identified as a significant predictor of not seeking help when needs are perceived, and particularly strong dissatisfaction with university health services is also observed in this sub-group. Therefore, the health-seeking behaviors of this particular subgroup, a group that constitutes the largest proportion of international students in the U.S., warrant special investigation.

Second, given the recognized underutilization and lack of awareness of and dissatisfaction with university health resources, how Chinese international students perceive these on-campus sources and how they cope with perceived health needs using other interpersonal and impersonal sources have not yet been well explored in current literature.

Third, the author of this present study believes that it would provide valuable insights into Chinese international students' health-seeking behaviors by looking into their source selection decisions and the influencing factors from a user-centered perspective. Meanwhile, their cross-source movement and how cultural and language factors affect health information seeking will be also explored to help understand their health information seeking behaviors in the acculturation context.

Therefore, 2 sets of research questions are proposed:

RQ1: How do Chinese international students make source choice decisions in the process of health information seeking?

RQ1a: What sources do they choose?

RQ1b: What factors and criteria do they use to make source choices?

RQ2: How do cultural and language factors affect the information seeking process and source choices?

Chapter Two: Literature Review

For the purpose of providing enlightening insights for the above-mentioned research questions, an overview of useful theoretical concepts and frameworks and related research studies will be presented in this section.

Health Information Seeking and Source Selection

Information seeking is a fundamental aspect of human activity for dealing with the uncertain environment. It can be simply defined as the purposive acquisition of information from selected information sources (Johnson, 2003; Kuhlthau, 1993; Morrison & Vancouver, 2000; Lambert & Loiselle, 2007; Anker, Reinhart & Feeley, 2011; Zhang, 2014). In the health domain, human beings' information seeking behavior has triggered a lot of research interest in the recent decade with the advent of information age and enhanced individual responsibility and patient autonomy for monitoring one's own health condition and acquiring information for health decision-making (Lambert & Loiselle, 2007; Johnson, 2003; Loiselle & Dubois, 2003; Warner & Procaccino, 2004; Anker, Reinhart & Feeley, 2011; Zhang, 2014).

An important research focus in the domain of health information seeking is the selection and use of information sources, which has a direct impact on the outcome of the information seeking attempts (Cangelosi & Markharn, 1994; Lambert & Loiselle, 2007; Zhang, 2014; Johnson, 2003; Anker, Reinhart & Feeley, 2011). Thanks to the development and diffusion of information technology, health-related information nowadays can be found and gathered through an unprecedentedly diverse and complex array of sources of different characteristics, which makes the source selection decision more critical to the success of health information seeking (O’Keefe, HartwigBoyd &Brown, 1998; Gary et al., 2005; Lambert & Loiselle, 2007; Anker, Reinhart & Feeley, 2011; Zhang, 2014).

An information source is a container or carrier of information (Kuhlthau, 1999; Xu et al., 2006; Morrison & Vancouver, 2000). In this study, health information sources, are categorized as: a) Interpersonal sources, including health professionals, family members, acquaintances and friends; b) Impersonal sources, including traditional print media, traditional TV, and online sources (further segmented into search engine, blog posts, hyperlink-based websites, and web 2.0 properties including wikis, online forum/discussion group, Q&A sites, social network sites, and online video). This classification is borrowed from previous studies on source selection (Zhang, 2014; Warner & Procaccino, 2004).

Information source selection entails the selection of information channel and information content. The term "channel" is sometimes used interchangeably with "source." But in this study, channel is defined as the mode of communication in the way information is delivered from the source to the user (Xu et al, 2006) to avoid possible confusion. Different information sources can contain different types of content or provide types of content that are only or more available on specific information sources. Different information sources can also contain similar types of information content, but vary greatly in the way information is served, retrieved, and presented and the degree of user interaction.

More recently, the studies of information seeking have placed a greater emphasis on user-centered approach to conceptualize information seeking behavior rather than a system-centered perspective (Savolainen, 1993; Case, 2002). The sense making theory developed by Dervin (1992) views users or information seekers as independent cognitive entities who define their own information seeking gaps or needs and design their own time-space movements to bridge and make sense of the gap.

In line with Dervin's sense making theory, Kuhlthau (1993) proposes an Information Seeking Process (ISP) model that considers the information seeker's movement through time-space in the process of information seeking as a process of constructive learning to resolve uncertainty and extend knowledge. ISP identifies six stages in the process: 1) task initiation; 2) topic selection; 3) prefocus exploration; 4) focus formulation; 5) information collection; and 6) search closure. It is a useful model to analyze user's information seeking behavior and source selection and cross-source movement decisions because it connects the cognitive and affective states of the information seeker to the information seeking process. Moving from the initial state of information need to the resolution of uncertainty, the state of knowledge changes, one's ability to articulate information needs increases, judgment of information relevance becomes stricter and clearer, and one's affective feelings, attitudes and moods also change. Thus, one employs different search strategies that induce different information source choices (Kuhlthau, 1991; Case 2002).

In the realm of health information seeking and source selection research, the user-centered perspective is adopted in a wide range of studies that address general health information seeking, specific health situations and health risks, e.g. cancer, AIDS, diabetes, and sexually transmitted disease (Muha et al., 1998; Huber & Cruz, 2000; Tian & Robinson, 2008), and specific socio-demographic groups, e.g. women (Warner & Procaccino, 2004; Brown et al., 2002), ethnic minorities (O'Malley, Kerner, & Johnson, 1999; Cleveland et. al, 2008; Dobransky & Hargittai, 2012;Wang & Yu, 2015), international students (Pan, 2012), adolescence (Gary et al., 2005), senior citizens (Gollop, 1997), etc. They focus on or integrate factors of user characteristics (demographic, knowledge status, personalities, psychological needs, etc.), user's evaluation of information sources against certain criteria, and/or the information seeking context.

The scope of this study will be confined to source selection of Chinese international students in the process of health information seeking. It aims to explore how and why they evaluate and perceive information sources and make source selection decisions for different types of health-related problems, and how they navigate multiple types of multilingual information sources to fulfill information-seeking needs from a user-centered perspective.

Comprehensive Model of Information Seeking

The Comprehensive Model of Information Seeking (CMIS) developed by Johnson and Meischke (1993), is a viable theoretical framework for explaining user's selection and use of a particular information carrier for health information. It synthesizes 3 theoretical perspectives about health information seeking and source usage, including health belief model (Rosenstock, 1974), uses and gratifications (Katz, Blumler & Gurevitch, 1974), and the model of media exposure and appraisal (Johnson, 1983), and is one of the commonly adopted models for the studies of health information-seeking behaviors (Case, 2012).

The model postulates two major categories of factors that predict differential use of health information sources: user-related factors (demographics, experience with the diseases, and psychological needs) and source-related factors that involve users' evaluations of the characteristics and utility of certain sources.

User-related factors. Demographics factors such as one's socioeconomic status were also included in other models of health behaviors (Johnson & Meischke, 1993). Past research has looked into health behavior that varies by different ethnic groups, including Asian and Chinese Americans (Cleveland et al., 2008) and recent immigrants (Chen, Kendall & Shyu, 2010), which is only barely relevant to the international student population, because this short-term sojourner group, unlike the ethnic subgroup of the domestic population, upholds values of their own

cultures and confronts various unique types of uncertainties, confusions and difficulties during the acculturation process (Begley, 2000; Russell, Thomson & Rosenthal, 2008). Besides, international students in college aged 18-29 are upcoming adults and young adults whose health behaviors and source preferences have been documented to have significant differences from the usually older population studied in the research of ethnic minorities. Differences especially lie in the peer and parental influence on health behaviors (Lau, Quadrel & Hartman, 1990; Agosto & Hughes-Hassell, 2005) and the active use of online sources and engagement with social technologies (Ivanitskaya, O'Boyle & Casey, 2006; Hesse et al., 2005; Eysenbach, 2008; Fox & Jones, 2009; Dobransky & Hargittai, 2012; Pan, 2012). However, studies that specifically address international students' source selection and source use behaviors while confronted with the complex network of information sources further complicated by acculturation experience are relatively scarce.

According to CMIS, the degree of individual's direct experience with the disease, "either through symptoms or in one's personal network," also influences ones' information seeking behavior (Johnson & Meischke, 1993, p. 347). The effect of direct experience is supported in the initial tests of CMIS that focused on cancer-related information seeking (Johnson & Meischke, 1993; Johnson, 1997), and is also studied to predict differential information needs and information seeking behavior in the context of chronic illness (Fox & Purcell, 2010) and self-medication of minor ailments (Gray, Cantrill & Noyce, 2002; Almasdy & Sharrif, 2011). For this study, how Chinese international students' source selection decisions are shaped by their previous experience with certain diseases will be looked into to understand their general health-seeking behaviors and the practice of self-medication as a form of response to perceived health needs.

CMIS also identified 2 factors related to information seekers' psychological needs - salience and health beliefs. Salience is the perceived relevance and applicability of information to the problem one faces. Information that is perceived to be salient would be used to solve problems or to resolve ambiguity (Johnson & Meischke, 1993; Johnson 1997; Rice & Katz, 2000; Case, 2012). Thus salience is a very important factor that reflects one's underlying motivations in making source-choice decisions as it entails the personal relevance of the problem (Johnson & Meischke, 1993; Case, 2012).

However, other seeker or source related factors and variables in one's environment are also documented to affect the force of salience (Johnson & Meischke, 1993; Rice & Katz, 2001; Case, 2012). For instance, information from the online environment and personal network are more likely to be actively pursued than from passive media outlets like radio and broadcast TV, and thus leads to higher level of personal importance attached to that information, although messages delivered by passive, linear media sources might also provide relevance for anticipated future scenarios (Dutta-Bergman, 2004; Eysenbach, 2008; Gray, Cantrill & Noyce, 2002). Although the purpose of this study is to tackle with purposive and active health-information seeking behavior of Chinese international students, it might also be curious to know how passive exposure to health information on traditional linear media interacts with the general health-seeking behavior and fulfillment of perceived health needs.

Research that studies Internet use for health information-seeking also indicates the possible interplay between perceived information salience and direct experience with search skills, domain knowledge, Internet self-efficacy, trust and attitudes towards information seeking and an specific information source, etc. (Rice & Katz, 2001; Eysenbach, 2008; Rains, 2008; Case

et al., 2004; Gary et al., 2005; Dutta-Bergman, 2004; Cutilli, 2010), all of them being important factors that mediate information seekers' source-selection decisions.

Beliefs refer to the extent to which an individual perceives that he or she can control and shape the future events, or perceives that there are effective methods of control. It is an important motivational factor because first, it constitutes a domain-specific task-specific self-efficacy dimension that is critical to understanding the barriers to action. The idea is also substantiated in other theories of health and risk information seeking behavior, including Theory of Planned Behavior (as perceived behavioral control; Ajzen, 1988), Risk Information Seeking and Processing Model (as perceived information gathering capacity; Griffin et al, 1999), Extended Parallel Process Model (Witte, 1994), Theory of Motivated Information Management (Afifi & Weiner, 2004), and Planned Risk Information Seeking Model (as perceived seeking control; Kahlor, 2010). If the belief is that one is not capable of improving or controlling his or her health condition, and/or not able to affect a change by using specific information source, such belief has been found to impede health information seeking and source selection by affecting perceived current knowledge, perceived knowledge gap or information insufficiency, attitudes towards information seeking, and behavioral intention (Janz & Becker, 1984; Johnson & Meischke, 1993; Johnson, 1997; Witte, 1994; Afifi & Weiner, 2004; Kahlor, 2007; Kahlor, 2010; Hovick et al., 2014).

Besides, as opposed to the situation-specific self-efficacy, the social cognitive concept of locus of control is also implicitly incorporated into the Health Belief Model precursor of CMIS (Rosenstock, Strecher & Becker, 1988). In the view of Bandura's social cognitive theory (SCT), locus of control is related to the outcome expectation rather than efficacy expectation. It is classified along a spectrum of internality to externality, according to Bandura (1977) and Rotter

(1966). As for health information seeking, the internality reflects one's opinion that his or her informational and behavioral involvement can influence the health outcomes, while externality implies the opposite. Health locus of control has been studied as correlates of self-care, medication compliance, online health information seeking experiences and perceptions, etc., in which the internal orientation has typically been found to have direct and significant impact (Rosenstock, Strecher & Becker, 1988; Rains, 2008; Voils et al., 2005; Omeje & Nebo, 2011; Dutta-Bergman, 2004). The researcher of the present study believes that taking the combination of self-efficacy and health locus of control into consideration would benefit a deeper understanding of barriers Chinese international students have when seeking health-related information and the consequent source engagement actions.

Source-related factors. CMIS also identifies source-related factors or factors of the information carrier. CMIS posits that user-related antecedents provide the motive force for information seeking and determine the perceptions and evaluation of information carrier factors. The evaluations of the information sources factors against certain evaluative criteria are directly linked to the exposure of information sources and shape the exact form of information seeking actions (Johnson & Meischke, 1993; Case, 2002; Rice & Katz, 2000). Figure 1 shows the theoretical framework of Johnson’s Comprehensive Model of Information Seeking.

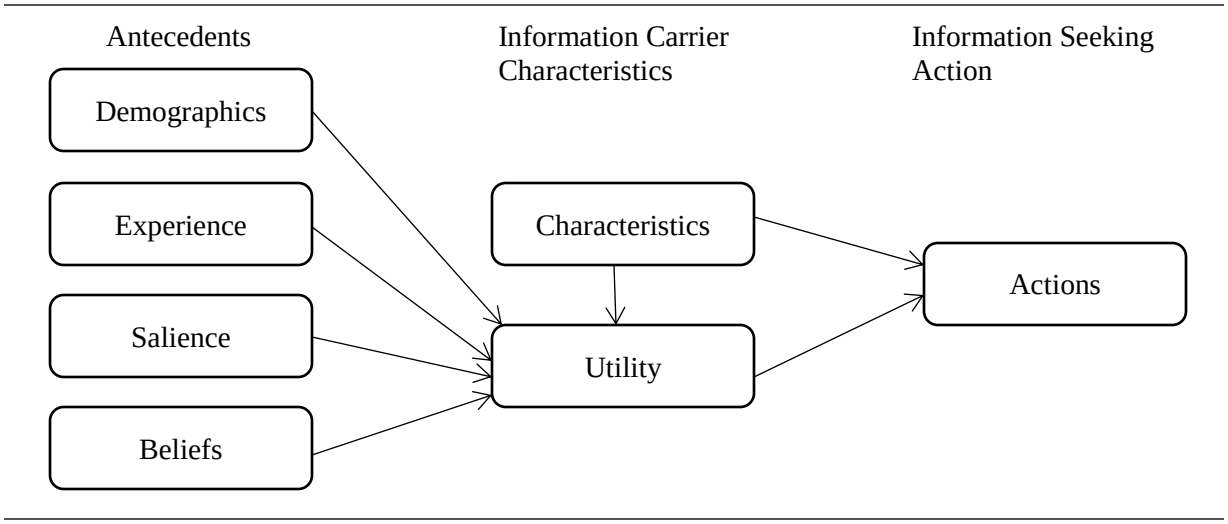

Figure 1: Comprehensive Model of Information Seeking (Johnson & Meischke, 1993, p. 345)

The information source factors can be organized into two subcategories: information carrier characteristics and utility.

Information carrier characteristics investigated include editorial tone (reflects user's perception of quality, credibility and the intentions of the information content) and communication potential (reflects user's perception of the presentation style and level of understandability). More recent studies of new media especially online sources and web 2.0 properties explored new carrier features and expanded and included new evaluative criteria that drive Internet use for health information seeking (Rice & Katz, 2000). Utility refers to whether the information contained within the source is important, topical, and relevant to the users' needs and information search goals and reflects the expectations regarding search results and satisfactions. CMIS predicts a positive relationship between the user perceptions of carrier characteristics and perceptions of utility as well as the subsequent action of source exposure. "The higher the evaluations of the characteristics, the greater will be an individual's exposure and perceptions of utility of a medium" (Johnson & Meischke, 1993, p. 349). And the perception of source utility is presumed to be related to a person's intention and readiness for information seeking, and is "expected to relate positively with information-seeking actions" (*ibid.*).

Decision criteria. The evaluative criteria that one adopts when making health information seeking and source selection decisions are also a topic of interest. The evaluative criteria of information carrier factors are commonly brought into the cost-benefit analysis to map out the decision-making rules governed by evaluative results. The cost-benefit paradigm that has its antecedents in the studies of economics is widely adopted by information science researchers (Hardy, 1982; Morrison & Vancouver, 2000; Xu, Tan & Yang, 2016; Zhang, 2014; O'Reilly, 1982; Gerstberger & Allen, 1968). It proposes that information seekers interpret, compare and evaluate information carrier factors against certain criteria and select information source on the basis of perceived benefits and perceived costs embedded in the criteria of using certain information source.

Past research has developed two distinct reasoning: one inserts that benefit related to obtaining quality and useful information is a more important consideration, and the other advocates the least-effort principle which maintains that minimizing the cost, which is usually associated with accessibility, is the dominant rule (Hardy, 1982; O'Reilly, 1982; Gerstberger & Allen, 1968; Xu, Tan & Yang, 2005).

In regard to health information seeking behavior, the least-effort principle seems to be supported in many research studies. Johnson and Meischke (1991) in their study on women's source preference and selection related to information on breast cancer indicates that doctors are the most preferred source due to its high level of information credibility and authoritativeness while media are actually the most used one. Zhang's (2012) study on college students' source selection found that doctors are the preferred sources of high credibility but are consulted at a later stage in the information seeking process due to the problem of unavailability. The least-

effort principle appears to be a good explanation, but these research findings also imply and should be examined within a certain information-seeking context.

The present study aims to use qualitative methods to identify the evaluative criteria Chinese internal students use across different interpersonal and impersonal sources along the whole process of information seeking, and to look into how these criteria are tied to and weighted in the cost and benefits calculations that determine the information seeking actions.

Information seeking action. The last component of Johnson's Comprehensive Model of Information seeking is information seeking actions as the outcomes of the proceeding classes of variables. The information seeking actions involve conscious choices of sources that are characterized by method (the sources selected), scope (the number chosen), and depth (the degree to which the source is examined), and imply cognitive and affective changes in the information seeking process. He also asserts that different information sources serve different functions as the cognitive and affective states of the information seekers change in the process (Johnson, 1991; Johnson & Meischke, 1993; Case, 2002).

In this sense, although CMIS seeks to explain the usage of particular sources, it seems to accord with the sense-making approach that views information seeking as a gap bridging process that begins with the perception of a gap and goes on as a dynamic movement in time-space as an individual's knowledge and feelings change (Dervin, 1992). The antecedent factors (user/health related factors) begin to apply at the beginning of the process, and continuously shape the information seeking action as it proceeds. The information seeking actions and search results, in turn, reshape the non-demographic antecedents of experience, salience and beliefs.

In line with the sense making theory and the staged model of Information Seeking process (ISP), Johnson (2003) also agrees that information seeking behavior should be

understood as influenced by a variety of contingents factors in the context. The empirical tests of CMIS on cancer-related information seeking reveal that the relationship between antecedents and information carrier factors is more meaningful at the later stages of information seeking with sources that are perceived to be more authoritative (e.g. doctors). Individual differences, task differences, and different problematic situations are also found in other studies to affect information seeking process by modifying user/health-related factors, source perceptions, and evaluative criteria in the cost-benefit analysis (Johnson & Meischke, 1993; Allen & Kim, 2001; Case, 2002; Johnson, 2003; Xu, Tan & Yang, 2005; Pan, 2012; Zhang, 2014).

This study does not seek to empirically test the linkage between the elements in CMIS. But by using CMIS as well as sense-making theory and Information Seeking Process as frameworks, it aims to provide insights on the information seeking process of Chinese international students by looking into their source choices, usage, and time-space movement between information sources at different stages and in different contexts. This would help to answer the previously stated research questions and provide possible solutions to address the widely suggested underutilization of professional healthcare services in this population, which could pose a threat to Chinese international students' health condition during the critical and complex studying abroad period of time.

Language and Bilingual Competency

One distinct cultural characteristic that is essential to answer the research questions of the present study is the language competency of Chinese international students.

Language has been commonly referred to as a cultural barrier that hinders international students' utilization of professional health sources. However, the current body of literature is lacking in providing consistent evidence on how English language proficiency affects health

information seeking. Researches on Chinese immigrants showed that even those immigrants who spent long years in the U.S. or received higher levels of education and had good to close-to-native English language proficiency reported feeling stressed and misunderstood while communicating with health professionals (Chen, Kendall & Shyu, 2010).

Besides, international students enrolled in U.S. universities at least need to pass the language proficiency tests, including TOEFL and IELTS, to meet to university entrance requirements and secure student visas (Pan, 2012). Therefore, they should be considered as bilingual users who have the potential advantages of leveraging bilingual information sources, a behavior especially facilitated by the growing body of multilingual sources online and the machine translation (MT) and cross-language information retrieval technologies (CIRT) integrated by major search engines (Rieh & Rieh, 2005; Pan, 2012; Hong, 2011). However, user-centered studies on bilingual users' information seeking behavior are relatively scarce, especially limited in the health and medicine domain, and they all placed a major focus on the task-based online information searching strategies. None of them, to my knowledge, tapped into the role this distinct user characteristic plays in the information seeking process or its interplay with other investigated user/health-related factors, source factors and decision criteria.

Not only does information source selection entail channel and content selection, but also the language choice that is simultaneously and consciously made for bilingual users along the information seeking process. In regard to online information seeking, a general assumption made by most CLIR researchers is that bilingual users who have skills in a second language but are not equally competent might still use their first language to submit search queries to better express information needs (Chen, 2006; Ogden & Davis, 2000). However, Rieh and Rieh (2005), in their study of Korean bilingual academic users' behaviors, perceptions, and preferences with

multilingual information sources online, found that the academic users made language choices based upon the type of tasks, rather than language familiarity. Foreign search engine was used for academic research and the search was performed in English. Korean search engine was used for personal information needs and the search was performed in Korean. These search engines, although they support multilingual information retrieval, were only used for monolingual search. And multilingual search usually was not conducted for one type of search tasks. From their interviews with 28 participants, the reasons for using English search engine and submitting search queries in English for academic research tasks stem from two major causes: one is that performing search solely in English allows them to accurately specify the academic terms and locate useful information without the need to evaluate the translation accuracy; the other is that they believe, in terms of academic research, documents in English are of higher quality, more current, more advanced, and more credible. It implies that language itself is factored into source quality evaluation and influences relevancy judgment in certain information seeking contexts.

Pan's research in 2012 is the only study to my knowledge that addresses Chinese international students' health-related online information seeking in the multilingual web environment, although the focus was on different types of tasks as independent variables and examining the relationship between task type and the online information search process. Three types of tasks, factual, interpretative and exploratory tasks and scenarios were pre-defined by the researcher, and the participants' online information seeking process was observed in terms of start source, language selection, use of translation tools and time spent. The results of this study are limited in its ability to inform the present study because of its experimental setting and pre-defined tasks. But it did offer some valuable insights. First, regardless of task types, Chinese students tend to use English as the primary search language to access English documents, though

Chinese is also used for some students; Google is the primary search engine to start search instead of Baidu, the major Chinese search engine; Translation tools are not used for most of the participants.

Second, the difference of task types are only found significant with respect to time spent on searching. For exploratory tasks that are perceived to be complex and difficult for them to find useful and authoritative information, the participants spent significantly more amount of time and visited more web pages, while they didn't adopt a different search strategy with regard to language choice and source choice. A similar finding is found in Karlgren and Hansen's study (2002) on Swedish users who are fluent in English using simulated domain and work–task scenarios. It also reported that relevance-assessment to judge the trustworthiness and usefulness of information in foreign language is more time-consuming and difficult than in first language, and is affected by task characteristics. Pan attributed the use of English as the primary language regardless of task types and difficulties to the facts that the graduate students in the study have good English skills and that the task itself was provided in English. However, why this time-consuming and cognitive demanding task does not affect search strategy and language choice is not well explained in Pan's study.

In addition to the Internet-based information sources, language choice is also made for other sources, although, unlike the Internet, in the real-word interpersonal setting, bilingual capacities might not be supported or language choice is passively forced for the use of a particular source. But previous research studying language as a cultural barrier demonstrated that international students prefer to use Chinese-speaking family members and friends as major supportive sources, perform self-medication, avoid seeking help from university health service, and express anxiety, stress and dissatisfaction with health professionals (Shen, 2011; Fallon &

Barbara, 2005; Russell, Thomson, & Rosenthal, 2008; Ang & Liamputtong, 2008). These findings clearly indicate the impact of language and the associated communication easiness and effectiveness on their source selection decisions.

Hence, the research of the present study believes that language in health information seeking serves a cognitive and affective dimension that plays a role in the cost-benefit analysis. Using exploratory research method, this study will integrate language choice and selection while exploring Chinese International students' time-space movement between information sources at different stages of information seeking in different contexts, and probe into the influence of Chinese international students' language and bilingual capacities on the information seeking process.

Chapter Three: Methodology

The current study is exploratory and seeks to offer insights for the following sets of research questions:

RQ1: How do Chinese international students make source choice decisions in the process of health information seeking?

RQ1a: What sources do they choose?

RQ1b: What factors and criteria do they use to make source choices?

RQ2: How do cultural and language factors affect the information seeking process and source choices?

The study employed a semi-structured in-depth interview method to tap into Chinese international students' source selection decisions in seeking health-related information. It is a commonly used method in studying information seeking from a user-oriented perspective, which offers the best way to explore and investigate human behavior in depth, especially when very little is known about them (Patton, 1990; Fidel 1993; Wildemuth, 2009). Chinese international students' health information seeking behavior is not well explored in relation to source selection, source usage, influencing factors and decision criteria. It aims to describe and understand how they behave and why they behave based on "studying real-life situations as they unfold naturally" and on the elicitation of participants' opinions on the investigated questions (Patton, 1990, p. 40).

Sample

The study only targeted full-time Chinese international students enrolled in The University of Texas at Austin whose nationality and country of citizenship are People's Republic of China and who are aged 18-29, with an accumulated stay in the U.S. for less than 8 years. It is

limited to The University of Texas at Austin to collect a convenience sample. To ensure the participants of the study actually had health-related concerns or problems and perceived information needs during their studies in the U.S. and meet all the inclusion criteria, a screening survey (see Appendix A) was completed prior to invitation to participate in the interviews. The survey contained basic demographics questions including nationality and country of citizenship, gender, age, accumulated year of stay in the U.S., year of college at The University of Texas at Austin, and a question asking whether or not they have any health-related problems and concerns in the past year. For those answered yes to this question, they were asked to provide a brief description of the situation and how they sought information or help. At the end of the survey, participants were asked to agree to provide personal emails and to be contacted for interviewing scheduling and gift card handling communications.

Participation in the study was voluntary. Participants could choose to withdraw from the interview at any time and/or refuse to answer any questions, without suffering any negative consequences. Upon successful completion of the whole interview process, participants received an Amazon digital gift card worth $10 as compensation.

Approval for human subject research from the University of Texas at Austin Institutional Review Board (IRB) was obtained on January 25th, 2016. Recruitment message (see Appendix B) along with the URL link of the online screening survey was then sent out to the target population via the researcher's personal network and was posted on UTCSSA (University of Texas at Austin Chinese Students and Scholars Association) website and discussion forum. Snowballing technique was also used to ask participants to recommend other individuals to participate (Creswell, 2004).

Judgmental sampling (a non-probability sampling method) was employed to select individuals who have richer health information seeking experience, and to ensure representation across a full range of Chinese international students in regard to age, gender, education level and years of stay in the U.S. The purpose here was not to generate a representative sample to generalize the results to a population, but rather to learn from those who can best offer insights for the questions of interest (Creswell, 2004). Consequently, a total of 12 participants were recruited into the study. Table 1 summarizes the characteristics of the subjects.

Age & Year of College	Undergraduate students Age 19, 20,21	4
	Graduate students Age 22, 23, 24	5
	Doctoral Students Age 23, 25,26	3
Gender	Female	7
	Male	5
Years of Stay in the U.S.	2 year	3
	3 years	2
	4 years	2
	5 years	3
	6 years	2

Table 1: Summary of participant characteristics

Data Collection

One-on-one in-depth interviews were conducted in a private study room on the University of Texas at Austin main campus, lasting about 58 to 100 minutes. The interviews were recorded by a digital voice recorder. Participants were first given a brief introduction to the study, and were asked to review the informed consent form. The researcher obtained signatures

of participants after ensuring that participants fully understood the nature of the study and all the benefits and risks involved.

Following basic questions about general health condition before and after coming to the U.S., whether or not they have health insurance, and asking them to self-report their general English language proficiency and language competence in communicating their health needs, a time-line interview was employed. It is an interview method derived from the sense-making approach (Dervin, 1992) in order to explore the whole information seeking process as was seen and experienced by the participants. They were asked to recall and reconstruct one or two most memorable incidents of seeking health-related information, starting from describing the situation and providing the time-line steps in terms of what help they sought, what actions they took and what information sources they used (Dervin, 1992; Fidel, 1993). Each step was recorded on a piece of paper by the investigator. Participants were then given a comprehensive list of information sources (see Appendix C) to help them reflect again on the information seeking process and to add new steps with regard to the sources that they didn't think of in the first place. Participants were also asked to reflect on other health information seeking scenarios with regard to the usage of any of the listed sources.

The investigator then asked the participants to elaborate in details what happened in each step, reasons for doing so, how they felt physically and emotionally, and when an information source was selected, asked them to describe the evaluations of the source, use of the source and difficulties, use of the information found, and the impact on later information seeking process and information seeking outcomes. Language choice and reasons for choosing to use English or Chinese were also asked. When difficulties associated with language and cultural problems were implied in the use of information sources, how language and cultural problems influence source

evaluation and source usage would then be explored. When the whole information seeking process resolved completely on self-diagnosis, self-medication or self-treatment, and health professional within or outside university health services were not consulted at all at any levels or steps, the reasons behind the decision would also be probed into.

Since all the participants of the study are native Chinese speakers from People's Republic of China, they were allowed to use either English or Chinese, or both, in a way that they felt most comfortable with. The researcher transcribed the interviews verbatim and translated Chinese conversations into English. The researcher is a native Chinese speaker with a B.A. in English and thus is competent in both languages to render such translation.

Data Analysis

Considering the wealth of knowledge developed in the realm of health information seeking and the paucity of literature on Chinese international students' source selection behaviors, qualitative thematic analysis was employed, and specifically template analysis was used to provide insights for the proposed research questions. The initial coding template was *a priori* codes identified in advance to include themes derived from the theoretical constructs of CMIS and related works (e.g. information seeking context, user/health related factors, source factors, evaluation criteria, source choice, information seeking outcome, etc.) and themes determined by the research questions (e.g. language and cultural influences). But the template remained open to continuous revision through the additional readings of the transcript (King, 1998; Trapp et al., 2013; Brooks et al., 2015). Using template analysis allows the examination of this rarely studied subgroup in the widely adopted CMIS framework, as well as the freedom to identify novel qualities in regard to the Chinese international students' health information

seeking behaviors. It helps to provide more qualitative insights on the unique challenge facing the international student population as is compared to the general domestic population.

The researcher first read through the data in full to become familiar with the transcripts. Preliminary coding was then carried out starting with *a priori* themes. The emerging themes were organized into meaningful categories and memos were made to define and clarify the hierarchical and lateral relationships within and between these categories. The template was reconstructed as the coding proceeded. The final template was then applied to code the full textual data. Different pieces of transcript were coded into categories and subcategories according to their different themes. They were highlighted with different colors on a computer word processor (King, 1998; Brooks et al., 2015).

Chapter Four: Results

Information Seeking Context and Information Needs

The information-seeking context wherein information gaps are perceived and information needs are induced is critical to understanding information seeking motives and behaviors in the process (Johnson & Meischke, 1993; Johnson, 2003; Zhang, 2014). Information seeking context was explored in the interview by asking participants to describe the specific health problem or concern and to comment on the characteristics of the situation in terms of urgency, severity, rarity, time when it occurs, possible causes, and on their physical and emotional reactions. They can be categorized in the following 3 types:

- Common health problems of varying degree of perceived severity and urgency;
- Chronic problem getting worse or making a sudden change in its normal pattern;
- Rare or uncommon situations of varying degree of perceived severity and urgency.

The following insights can be developed from the data. First, participants (n=8) attributed the causes of the health problem to an excessive level of stress in school and life. For example, one participant remarked:

> It was my first semester studying in the U.S. and was around the mid-term exams. I felt so stressful because I knew I fell behind other students quite a lot and had problem understanding what the professor taught in class and I really missed home and my dad and mom.

Stressors identified include high workload at school, loneliness, homesickness, and the feeling of helplessness and lack of social support when he/she just started school in the U.S. It seems to substantiate the negative influence of acculturation stress that could give rise to deterioration in Chinese international students' health conditions.

Such interpretation of one's health problem seems to affect the information seeking process in 2 ways: first, having unexpected health problems when one is under high pressure causes even more stress, making one feel passive and reluctant to tackle with it or seek help. "I skipped a lot of class. I felt negative about things and just wanted to sleep all day. My thought is that I won't die because of that [persistent fever] after all." Second, overwhelmed by the environment, they tend to pay less attention to the health problem itself until it got significantly worse. "I was under a lot of pressure and very busy with my thesis. I knew I should see a doctor for the problem [amenorrhea]. But I could not afford a waste of time...I waited for another 3 to 4 months."

However, none of the participants that expressed high levels of stress considered seeking help from the university counseling service, due to reasons related to language and communication problem, utility and understandability, social stigma and etc., which will be discussed in detail in later sections. These insights are consistent with previous research findings on international students' use of university counseling services (Bradley et al., 1995; Ang & Liamputtong, 2008). One of the reasons some participants mentioned is still associated with the pressure they had during the acculturation process. "If I had that time to go to counseling services, I'd rather spend it doing my homework... It took me longer to do the reading or to write the essay than my American classmates... I need to study harder." Instead, they largely rely on friends who are also Chinese international students studying in the U.S. for helps related to mental health needs, indicating a strong influence of friends.

Second, some participants didn't consult a health professional for problems in a timely manner, and some wouldn't visit a doctor at all, even if they perceived it to be severe, urgent or rare. For example, participants described the following situations:

> I tolerated the horrible itching [from some unknown bug bites] for another two weeks before I finally went to SSB [Student Service Building] to see a doctor... I think it was a very severe situation, but, you know, I just hoped it would get better on its own.
>
> I called the 24-hour nurse line of UHS [University Health Service] about my situation [a possible electric shock], they asked me to go to an emergency center immediately... I didn't go... I went back to UHS to do a complete body check after 3 days.
>
> I had a high fever and really bad cough.... When I went to the University Health Center after a week, the doctors let me take an x-ray and told me I had already gotten pneumonia.

Acculturation stress that is mentioned above can be an explanation. But more user and source-related reasons need to be further explored.

Third, participants were found to have information needs that have strong cultural implications and relations. For example, two of the participants mentioned about a minor health problem associated with traditional Chinese medical concept of yin-yang balance - *热气*, *yit-hei* or *yeet-hay*. This translation *yit-hei* or *yeet-hay* is directly rendered from the Cantonese pronunciation of the word, because there seems to be no equivalent in the English vocabulary. The literal translation is "heat" or "hot air." It basically indicates an imbalanced state of one's body and could be related to symptoms such as sore throat, pimples, mouth ulcers, and more (Kong, 2013). The problem itself, as was commented on by a participant, is "inexplicable." "I won't expect any U.S. doctors to understand that because I think American people won't have this problem... You just need to restore the balance." Such kind of peculiar health needs were found to affect the information seeking process.

Source Selection and Cross-source Movement

Table 2 summarizes the information seeking processes, source selections and cross-source movement paths of the most memorable health information seeking incidents described by the 12 participants in the interviews. Self-care, though not an information source, was added for a better understanding of the participants' information seeking process.

As is shown in Table 2, participants commonly used more than 1 source for a specific health concern. Self-care is a common practice and for 4 information-seeking scenarios listed in the table, self-care became an end itself while professional advice was not sought at any stages. Health professionals were very often consulted at a later stage (Zhang, 2012), following a failure of self-care practices. The time lag could be dangerously long for some health conditions as was discussed in the previous part.

Participants of this study seemed to rely heavily on friends and online sources during the initial phrase to obtain a deeper understanding of the problem or to explore of possible solutions or future steps. All participants sought information from friends who are also Chinese; while 10 participants indicated that they would only consult Chinese friends for health-related concerns. Some participants also reported consulting family members, especially those who have family members working as health professionals, while some other participants didn't feel like "bothering" their family because they are "too far away to help" and they "didn't want them to be worried."

The process is not always linear. Online sources, containing a huge diversity of information, especially serve different purposes, ranging from finding similar situations and shared voice, formulating the problem, diagnosing, looking for treatment plans or recommendations, looking for drug information and instructions, making appointment, self-training for concepts and vocabulary to prepare for doctor meeting, as well as post-doctor-visit

search for unfamiliar concepts and unknown words. The heavy usage of online information is not uncommon among the young adult and college student population (Ivanitskaya, O'Boyle & Casey, 2006; Hesse et al., 2005; Eysenbach, 2008; Fox & Jones, 2009; Dobransky & Hargittai, 2012) and was also found in other research studying Chinese international students (Melkote & Liu, 2000; Chen, 2004; Pan, 2012).

In the following sections, the factors influencing the information seeking and source selection behaviors will be looked into in details.

Problem	Time taken before seeking professional help	1st source	2nd source	3rd source	4th source	5th source	6th source
Infected wisdom teeth	NA	Family	Online	Friends	Self-care		
Bug bite	2-3 weeks	Self-care	Friends	Family	UHS		
Sports injury, skin rash	3 days	Self-care	Friends	UHS			
Sore throat, body aches, dizziness	NA	Self-care	Friends	Self-care			
Urinary tract infection	Same day	Online	Friends	Urgent care clinic outside the University	UHS	Online	
Amenorrhea	5 months	Family	Friends	Online	UHS		
Severe abdominal pain	Same day	Online	Friends	Hospital emergency room			
Electric shock	3 days	Online	24-hour nurse line of UHS	Friends	Online	UHS	
Severe allergic hives	1 week	Self-care	Online	Friends	Self-care	UHS	Online
Acute allergy	Same day	UHS Urgent Care					
High fever, severe cough	1 week	Self-care	Friends	UHS	UHS second visit		

Table 2: Summary of the source selection movement along information seeking timeline depicted by participants.

NA signifies health professionals were not consulted at any stage of information seeking process.

Sore throat, fever, headache	NA	Friends	Online	Self-care			
Neck spasm	Same day	Online	UHS Urgent Care				
Respiratory tract infections, tonsillitis, persistent fever	1-2 weeks	Self-care	Friends	Family	UHS		
Skin rash	NA	Online	Self-care				
Menstrual disorder, abnormal bleeding	2 months	Online	Family	Online	UHS	Online	
Hordeolum/Stye	4 days	Friends	Self-care	UHS	Online		

Table 2 continued.

User-related Factors

In addition to the acculturation stress and traditional medical believes of Chinese international students that were discussed in relation to the information-seeking context, this section summarizes other user characteristics and psychological needs that constitute information-seeking motives and appear to affect source evaluation and usage.

Direct experience. Previous experience with the health problem seems to affect the information seeking process in 3 ways. For a previously experienced common health problem or minor illness, regardless of the problem characteristics, information was often sought towards self-diagnosis and self-treatment, which seems to be anticipated and prepared before they came to the U.S. "Use my own medicine brought from China" is a ubiquitous theme found in all participants.

For a chronic problem, self-medication is also employed to control the situation but a sudden deterioration is more likely to bring them directly to a health professional. As was remarked by one participant,

> I have been suffering from allergies since high school... This time I had allergic reactions and breakouts on my skin again. I knew pills wouldn't help for this kind of situation. I went to university health center immediately and just walked in without making appointment. I didn't even check if they would accept walk-ins.

Fox and Purcell's study (2010) on the source usage of people with chronic diseases also shows that this group of people is more connected to health professionals for medical assistance.

If one did not have any previous experience with certain health problems and symptoms oneself, seeking shared or similar experience from friends and online sources is also a common motive for participants. The information sought is also of high relevancy or salience to one's

problem. For interpersonal sources like friends, "getting medicine from friends who used it before for the same problem," "getting medical advice from friends of same experience," or "treatments recommended by friends" are quite common among the participants (n=10). Similarity is also sought online for reassurance purposes (Powell et al., 2011; Zhang, 2014), and whether or not the reassurance is attained could affect the information seeking process to a large degree. As was mentioned by two Participants,

> I used Baidu to search for "Chinese students in the U.S. menstrual disorder," and it appears that many other people had similar experience. I felt reassured... I waited for another 2 months hoping things get better itself [before I went to see a doctor].
>
> I searched for "I cannot move my neck" using Google... I read a few pages and they all said it could just be a neck spasm. I was so glad. I initially thought I was paralyzed and had to call 911... I just took the bus to the SSB.

Saliency. Perceived saliency of information or advertisements of over-the-counter medical products from traditional media channels is very low for the participants of this study, mainly due to low channel exposure. Only 2 in 12 participants could recall the ads and the brand names of some medical products they saw on TV, but neither of them would consider purchasing these products for health problems, showing a very low level of information saliency and trust. "I don't believe that would solve my problem. I would consult doctors or pharmacist or look up online reviews." "I just remember the ad because it is kind of silly. But I don't feel it has anything to do with me. I'd rather use what I have prepared and brought from home." 6 participants reported that they never or hardly watched any TV programs while 4 participants would only tune into sports or drama programs without paying any attention to any TV ads. None of these participants were active magazine and newspaper readers, while 2 participants did

do some newspaper and magazine reading occasionally, they didn't remember encountering any information related to medical products.

Lack of knowledge and awareness of available and appropriate sources are also found in the participants of this study. 9 in 12 participants indicated that they didn't know what services were actually offered at University Health Services. Except for 3 participants who visited the UHS Urgent Care Clinic before, none of the rest participants were aware of its existence and thought that choosing from pre-determined time slots to make appointments was the only available method even for situations that require prompt evaluations. Besides, 10 in 12 participants, regardless of the number of years they have stayed in the U.S. and the experience they had with health-related problems, expressed that they had very low trust of urgent care clinic if it was not associated with the University Health Services, and had never considered it as an accredited source they would use for medical advice and treatment. The major reason is that these participants had no knowledge of or experience with urgent care in the U.S. and could only refer to its Chinese counterpart *诊所* [clinic] which is not normalized in Chinese healthcare systems and is considered by participants to be "privately operated and lacking in qualifications."

Participants pointed out that they would rather "go to the nearest hospital" or "go to ER directly" if the health condition occurred after hours when UHS was closed. Such would very likely result in a high level of inappropriate emergency room visit, which was also suggested in the previous study of International students (Fallon & Barbara, 2005).

Besides, knowledge gap exists with regard to other aspects of the U.S. healthcare systems, which is also found in the other studies of Chinese students and Chinese immigrants (Shen, 2011; Chen, Kendall & Shyu, 2010; Cleveland et al., 2008). One participant put:

> I visited an urgent care near my place before. They charged me a lot of money. I cannot remember the exact number. I didn't understand why it could cost so much but I just paid accordingly. And my insurance company sent me some paperwork later on. Honestly I didn't understand what it was talking about and I asked my roommate, he didn't know either. I just let it go.

Another participant who had been studying in America for about 6 years expressed his confusion over the student insurance:

> I wanted to know more about my student insurance and I remembered I checked out the website, but I just couldn't understand. It was so complicated. I remembered hearing from my American classmates that no one in the U.S. could ever understand that. Anyway, I just hope I will never have to deal with that.

Locus of control and self-efficacy. Participants (n=7) indicated that they had a stricter control over their health condition after they came to the U.S., taking a more active approach to manage their health. The conviction that one's personal behavior and active involvement would determine outcomes reflects an internally oriented locus of control (Bandura, 1977; Rosenstock, Strecher & Becker, 1988). For example, one participant commented:

> I would always take actions at the first sign of getting sick and try to eat healthier, sleep more and take pills to get rid of it or prevent it from getting worse. When I was in China, I honestly wouldn't care at all. If I eventually get sick, I have family and friends to take care of me.

Previous studies have established the direct impact of internal locus of control on active online information seeking, self-care, and medication compliance (Rains, 2008; Voils et al., 2005; Omeje & Nebo, 2011; Dutta-Bergman, 2004). However, the behavior of self-diagnosis and self-

medication without professional advice raises concerns about the health risks resulted from inappropriate or even harmful self-care actions (Wilkinson, Darby & Mant, 1987).

Despite that the participants indicated that they were more health conscious and more actively engaged in health management behaviors, the avoidance of professional healthcare sources and the delayed usage were manifested in the participants' behavior patterns. In addition to the lack of required background knowledge that is discussed above, it was also found in the data that they were lacking in required communication skills and thus experience low self-efficacy to interact with health professionals. The communication difficulties seem to be more related to health literacy and health communication skills in English, rather than general English capacity. All of the 12 participants reported that their English capacities in the health contexts were lower than general English proficiencies. Difficulties with understanding medical terminologies, describing body parts and symptoms, and understanding nurses or doctors with strong accents were found in the data. It shows that talking in non-native language in the health context is a cognitively demanding task for Chinese international students especially when they are in bad health conditions.

> You know it is even harder to describe your conditions and symptoms to the doctor when you feel sick. It requires more "brain power" to process information in English and when you are sick, your brain just shuts down. You couldn't think of words to say and all these words came to you like alien language you never heard of. Especially many of the words were those you never learned or used in your entire life ... I think my English is good, at least above average. I can talk with my friends and colleagues without any difficulties, but not with doctors.

The low self-efficacy experienced by the participants also stimulates negative emotions. "I knew I had a lot to say. But I could not accurately pinpoint my problems to the doctors. I tried to use those easy and plain words as well as body gestures... I felt stupid and embarrassed...What I felt was just futility."

On the contrary, they expressed that they had a higher self-efficacy in communicating health terms in Chinese, and correspondingly a higher level of health literacy. Participants indicated that they could much easily describe their symptoms in Chinese medical terms. "I knew it was *肌腱* [muscle tissue] and it was inflamed so it became *肌腱炎* [tendinitis]. But I only knew the Chinese words." In order to facilitate communication in English with health professionals, a learning process of English words, terminologies, and descriptive expressions within a short phase of time before the visit was adopted by some participants, while others commented that there was not always a time for them to learn and usually they were just too sick to do the learning which requires strong cognitive competencies.

Although all of them recognized the learning of words and expressions helped with the communication, yet it didn't ensure a successful communication. Because the learning was usually conducted online in the impersonal environment, the misuse and misinterpretation of online translation results or search results may cause even more communication difficulties. "Wrong word for the subject matter," "inappropriate word in the context," "a word does not actually exist in American English," and "wrong pronunciations" are common problems reported by participants. Some participants would still experience a lower self-efficacy in the communication even if they prepared beforehand because they were not sure whether or not they used the "right word that accurately describe the right things."

Source-related Factors and Evaluative Criteria

The following evaluative criteria of source factors were found in the data to influence source selection decisions and information seeking process: quality, availability, understandability, cultural sensitivity, and relevancy and utility. They will be discussed in details on how evaluations are made and how they are weighted in the cost-benefit analysis for decision-making.

Quality. Source quality, in terms of trustworthiness and authoritativeness, was evaluated in different ways for different sources. Health professionals at UHS were perceived to be the most trustworthy source of the highest authority by nearly all participants, which could explain the cross-source movements towards University Health Service for a final resolution, especially when self-care measures failed to meet the information-seeking needs. However, not all health professionals were considered equally trustworthy, as participants (n=10) doubted the credibility of urgent care clinics outside university, mainly due to a lack of knowledge and experience.

Brand name is less influential in their evaluation of source quality due to low awareness, which is very different from researches on the general consumer segment (Peterson et al., 2003; Zhang, 2014). Participants (n=9) said they were unfamiliar with any online or offline medical or health-related institutions or brands, except for Blue Shield Blue Cross, the provider of student insurance plan that is mandated for all international students at the University of Texas at Austin. Only 1 participant recalled using WebMD. "During the time when I was suffering from urinary infection, I spent hours searching on Google and remembered clicking into WebMD for several times." 2 other participants indicated they heard about the names of WebMD and MedlinePlus but not were very sure if they had ever visited the websites.

Friends and family are the second most trusted sources for the participants of this study, especially family members and friends with professional expertise or medical background who

could have a significant impact on their information seeking behaviors. "I consulted a friend who is major in nursing. She said there is no need to go to a hospital for this. So I didn't go." Another participant whose father is a health professional said:

> I felt I need some anti-inflammation pills for my toothache and I had some of my own that I brought from China. But I was not sure which one I should use, since I had thrown away all the instruction papers. They all looked very alike. So I asked my dad. He is working in a large hospital and he also asked some of his colleagues for me and he told me which one I should take for how many times and how long.

Even if they might not have any health-related expertise, friends' recommendations on medical products they tried before and the information seeking experience they shared with the participants are still powerful and highly trusted, showing the strong influence of social ties. "That product for period pain, my friend insisted I should try. I tried and it indeed works like magic."

In terms of performing search online, all the participants said, for the most of the time, they used search engines, either Google or Baidu, to initiate the process and to access online information. Some participants mentioned that they would also enter the URL address of University Health Service website to get direct access. This heavy dependence on search engines, which is also discussed in other studies of college students as well as Chinese international students, indicates a lack of knowledge of quality sources and a lack of searching skills and competency, which might limit their ability to access health information and make health decisions (Ivanitskaya, O'Boyle, & Casey, 2006; Pan, 2012).

Participants of this study generally considered online sources and information found on the Internet less trustworthy, compared to health professionals and friends. One participant put: "It is an important reference, but when there is a problem, you should still believe what the doctor said." As is shown in the Table 2, online information could not directly lead to problem resolution for most health information-seeking contexts. But many of them indeed used online sources for so many purposes at different steps of health information seeking, and quality evaluation was still applied to the variety of online information and content providers.

The factors or attributes of online properties that were evaluated as indicators of source quality by the participants of this study include

- Content quality: topicality, use of professional tone and language, authentic user generated reviews or discussions, frequently updated content, citations, no spam-like ads, less sponsored content or links, readability and clarity, information completeness, and congruency with other pieces of online content are indicators of good quality.
- System attributes: good layout and professionally designed web pages, clearly presented and easy-to-find owner or contributor information, and system response time are indicators of good quality mentioned by participants.
- Platform attributes: websites that serve user-generated content, especially made by general online users, including social network sites, online communities, discussion forums, and Q&A websites, are perceived less trustworthy. "Everyone can post their opinions there. It could not be very reliable." Health-related communities organized around self-claimed health professionals or experienced users are comparatively reliable, but some participants commented that it was still hard for them "to know these people's real identities." Websites associated with universities, governmental

agencies or other authoritative institutions like insurance providers would be considered as high quality sources, as was pointed out by the participants.

Many of these factors and quality evaluations are also identified and examined by other related studies on online health information seeking (Cline & Haynes, 2001; Eysenbach & Köhler, 2002; Zhang, 2014).

Despite of the factors claimed by participants that they would use for quality evaluation, the fact is that most of the online information retrieval is made from search engines and that they hardly directly access any quality online sources but rather "just browse the first or the first 2 pages of search results."

Hence, in reality, whether or not quality information is attainable is still largely dependent on the capabilities of search engines in serving quality health-related information. As bilingual information seekers with generally good English language proficiency, all participants of this study reported that they had used both Google and the Chinese search engine, Baidu, to access health information. Except for 1 participant who would search Google in both English and Chinese, all the rest participants said that they only used these search engines in the way of monolingual search. That is, only using Google to enter English queries and retrieve English information, and using Baidu to enter Chinese queries and retrieve information in Chinese. Participants (n=8) expressed their different quality perceptions and evaluations towards the 2 search engines. 6 out of 12 said they generally perceived English websites and content Google returned to be more trustworthy and of higher quality than Chinese websites and content returned by Baidu and they were more likely believe and try out information they found out on Google. The reasons the participants gave not only encompass the evaluations of the above-mentioned

factors in which Chinese websites performed poorly, but also other factors more related to subjective feelings and attitudes.

First, participants have the belief that a stricter and more legitimate editorial process is taken by English websites and online information providers and that English-speaking users are less likely to spread harmful or fake information online. One participant commented:

> The Chinese websites and people over there, they are not serious about what they are talking about. They allow a lot of false ads and fake information, and you should always look out for quacks...English websites have more authentic information and users comments. They are not trying to trick you.

Second, participants expressed the preference of Google and negative affection towards Baidu. As was indicated by one participant,

> Google is really good at prioritizing those authoritative quality websites... But on Baidu, the first several pages are full of spam-like, poorly designed medical websites and webpages from Baidu-owned platforms. You don't know who is behind that and paying for that. You know, Baidu is notorious for manipulating search results and colluding with pharmaceutical companies.

A scandal about Baidu selling fake medicine ads and allowing for-profit organizations and pharmaceutical companies to control and moderate its discussion bulletin "Baidu Tieba" seems to foster the participants' negative attitudes towards this largest Chinese search engine platform (Wildau, 2016). But they still relied on Baidu to perform search in Chinese, either out of habit or because of the perceptions that Google, exited Mainland China in 2010, "is not good at supporting simplified Chinese search."

Availability. Source availability within certain distance and time frame (Fidel & Green, 2004), is a source accessibility dimension that is found in the data to affect source selection decisions. Since online information is always available in most cases, it generally does not constitute a cost dimension for online sources. As was mentioned by participants who first resorted to online sources, they were looking for a readily available answer or advice.

The availability cost is more distinct for interpersonal sources, especially in regard to health professionals. Most of the participants only access health professionals at University Health Services by making appointment in advance. Only 2 participants used to call the UHS 24 hour nurse advice line to get medical advice, while 5 participants had never heard about the existence of the nurse line.

6 Participants mentioned that at the initial stages of information seeking, they had thought about going to University Health Services but failed to find an available time slot within the next 1 or 2 days, and thus didn't proceed to make an appointment. Participants expressed that they wished to see a doctor within the same day or the next day, otherwise they would rather try self-care methods by using their owned medicine or asking friends for help:

> I knew I need a type of antibiotics and I wanted to go there [UHS] and thus doctors could prescribe me some. But I remembered it was a Thursday or a Friday and I could only make an appointment for next Monday. So I thought there was no need and I just obtained some from my friends.

Especially coupled with their experience with Chinese healthcare systems and procedures, busy schedule at school and life, as well as acculturation problem and stress, participants expressed a higher demand for availability and lower expectation of overall healthcare availability in U.S, which impedes their information and help seeking from health professionals.

"As a PhD student, I was very busy almost every day and only could take one or two afternoons off, but I could not find an available time that suited my schedule." "I just took my own pills. I didn't want to take the trouble scheduling a meeting with doctor. And very likely, I would have already gotten better or recovered by that day [of appointment]. It was meaningless."

Most participants have all their family members back in China. Although the physical distances can be eliminated to some degree thanks to the Internet and dynamic modes of real-time communication, information or helps from family members were not sought in most of the occasions due to "time differences" and because they "didn't want them to be worried." Friends, typically those who attend the same university or live in the same city, can be more readily available in terms of time and distance. "Having friend right with me at the moment" and "asking my roommates for help" are commonly mentioned reasons for seeking information from friends. Participants also expressed the belief that friends would always be supportive whenever there was a need and their dependence on friends for being available to help, especially for urgent situations. "I didn't know what to do but called my friend and asked him to drive me to the nearest hospital." "If that [urgent health condition] happens to me, I guess I will first call my friends. I know some of my friends go sleep without shutting down their cell phones."

Understandability. The evaluation of source understandability emerges in the data as an important cognitive and affective dimension that is factored into cost-benefit analysis and is reflected in the information seeking behaviors and source and language preference. Understandability is discussed in the context of both interpersonal and impersonal sources and can be termed as the extent to which the information content retrieved or received from the information source is perceived by users as easy to read or easy to follow, clear in meaning, and easy to understand (Xu, Tan & Yang, 2005; Xu & Chen, 2005).

Source understandability and its evaluation by the participants of this study have strong cultural and language implications and pertain to the cognitive cost that hinders the source and information access.

With online information retrieval, although use of professional language and tone is perceived as a source quality indicator suggesting high authority and reliability, it shows in the data that the use of medical terminologies, jargons, medical abbreviations, and difficult sentence structure could in fact impede the understandability of the information content. The participants as Chinese-English bilingual users but not equally competent in both language reported that understandability with English content is more of a problem. "I searched the drug name in Google and looked at the Wikipedia page. In the very first paragraph, there were so many unknown words that I have to give it up and looked it up again in Baidu Baike [online encyclopedia operated by Baidu]."

This is a quite intriguing factor considering that they generally consider English content are of better quality but have difficulty understanding it. Source quality, though can be assessed against system and platform attributes, is also indicated by the content attributes. If they don't actually read or comprehend the content, it is very likely that their evaluation of English content is performed on a superficial level without touching on the substance of the content and they attribute the bad readability and low clarity to their own insufficient language capacities, but not to the problems in source reliability.

Even if the literal meaning of an English word can be obtained by performing "a quick search" or by "looking up in dictionary," participants could still find its definition and actual meaning quite ambiguous due to the contrast with their existing knowledge of medical concepts

and typology rooted in Chinese medical beliefs and operations. 2 participants mentioned a similar problem they had with making appointment online using the UHS website:

> I clicked into women's health and then I had to choose from a list of different women's health problems before I could make an appointment. I couldn't tell the differences between these items and they didn't provide definitions. I searched each of the words on Google but it was still confusing. I remembered I spent a very long time figuring out but at the end, although I made the choice, I was still not very sure.

However, the understandability issues that were usually coped online with extensive search, Chinese-English cross-reference, and the use of translation tool were found to constitute a higher accessibility cost for interpersonal sources. Most participants mentioned that although they didn't have very critical difficulties understanding and communicating with doctors, they did have problem understanding or they cannot very accurately catch certain words that imply medical concepts and terminologies, body organs, drug names, disease and problem names, and medical abbreviations, especially in the verbal and synchronous communication settings. One participant had problem capturing even non-medical related words and the language used by the doctor because of his strong accent, and one participant complained about the doctor speaking too fast and he was unable to follow.

Half of the participants mentioned that the doctors they met would talk slowly and avoid using very difficult words or explain in easier language after they noticed their difficulties in understanding. However, this does not eliminate the needs for further explanation in easier-to-understand terms and the desire for the Chinese counterparts for a thorough understanding. "The doctor explained what a stye was to me. But I only had a very vague idea. It was not until I went back home and searched online for the Chinese word that I realized what it exactly was."

Understandability problem could also stem from the unfamiliarity with the word pronunciation. Most participants agreed that they had a better English language capacity in written format than in verbal communication. Especially for medical and health-related words, though some of the words they might encounter in the reading, they were never used in daily life setting. 2 participants mentioned that they immediately recognized the meaning of certain words while doctors wrote it down on a piece of paper. 1 participant, after coming back home from the doctor's office and reading the paper materials given by the doctor, realized that she actually knew some of words that sounded "familiar" to her but she was unable to comprehend and think of the meanings on the spot.

The dissatisfactory understandability evaluated by participants in terms of help-seeking from health professionals, coupled with the low language proficiency, poor English health literacy and low perceived self-efficacy that are discussed in previous sections, plays a significant role in source choices. Participants of this study expressed a preference for self-care methods with the help of friends, family and online sources to address their health and information needs first, because either learning and finding the right words before the visit, or describing symptoms, expressing health needs, understanding and following what the doctors say during the visit is a cognitively demanding task perceived by the participants. "The first thought came to my mind whenever I got sick was to deal with it on my own to get rid of it, so I could avoid the trouble talking with a doctor. But if all methods failed, I would have to see a doctor." Another participant said that seeking help from the counseling services when she was under high pressure could cause more stress: "I would not consider seeking help from the University Counseling Service. It would cause me even more stress if I had to talk with them about my problems in English."

To avoid inducing negative emotions and negative self-regard is another reason for the avoidance of interacting with health professionals. When the 2 participants who spent long time figuring out the online appointment were asked why not just call the nurse line for help, they again gave similar answers:

> I am afraid I am not able to describe my condition very clearly and accurately to them and I might have problem capture what they say, you know, especially over the phone, sometimes you cannot hear it very clearly. If the nurse uses some words I don't understand, she needs to explain that to me but I might still not understand the explanations. It could be very embarrassing and make me feel like an idiot.
>
> I would feel very awkward and disconnected if I could not understand what they say. I also feel it could somehow irritate them. They would think why this person couldn't understand English. I would rather spend time doing my own research online.

Other participants were also found to be susceptible to external factors like "afraid of being looked down upon," "afraid of being seen as a weird or ignorant person," and "don't want to cause trouble," which implies the collectivist rather than individualist mindset and behavior patterns embedded in the Chinese culture (Oyserman, Coon & Kemmelmeier, 2002). The negative emotional responses and self-evaluation triggered by problems in understandability impedes help seeking from and effective communication with health professionals.

Most participants indicated that their communication with doctor is more of a one-way communication. They described symptoms or health concerns and then listened to what the doctors said and answered their questions accordingly. When there were words or terms they didn't quite understand, most participants said that they would not actively ask the doctor to explain unless it was very critical to the health problems, such as the name of the disease and the

use of the drugs. Feeling reluctant or too "embarrassed" to express one's confusion or overly ask doctors to explain, participants would instead perform search online to obtain more information and/or Chinese translations after their doctor visits.

Although most of them also conducted some kind of search online before their visits, despite of the degree and the type of information they obtained online, they would not bring it up in the conversation with doctors, even if the information contradicted with what the doctors said. 4 in 12 participants heard from friends or read posts on Chinese social network platforms WeChat or Weibo about the misdiagnosis and mistreatment incidents happened to some Chinese international students in the U.S. All but one participant said they still believe in doctors' medical professionalism and judgment regardless of the communication difficulties and would still go seek help from health professionals for health problems and concerns. However, one participant said that she would avoid interaction with health professionals in the U.S. to stay away from communication problems and possible negative outcomes unless it was a life-threatening situation, and she would rather go through a complete body check every winter or summer holidays when she went back to China.

Cultural sensitivity. Cultural sensitivity is another evaluative criterion that affects the source preferences and choices made by the participants of this study. It can be defined as the degree to which the information source is capable of understanding the information seekers in the acculturation context or resolving the special information needs stem from the acculturation context. It is a peculiar dimension that has correlates with user's self-efficacy and self-evaluation, source quality, source understandability and the evaluation of source relevancy and utility. But here, it is discussed separately in order to provide insights for the special information seeking needs of the Chinese international student subgroup in the acculturation process.

Such information seeking needs, as were mentioned in the first section of this chapter, encompass acculturation stress, health problems derived from the imbalance of yin-yang, and other health-related culturally embedded concerns such as the efficacy and side effects of western medicine as opposed to traditional Chinese medicine (TCM), ethnic differences in response to medication, and the difference between the U.S. and China in medical practices.

Health professionals, though being highly trusted for their professionalism, were considered by the participants as incapable of understanding the cultural subtleties and backgrounds and thus unable to offer helps for these special needs. One participant commented on seeking help from University Counseling Services: "the doctors at counseling services, despite that they are professional people, they are still local Americans. I don't think they can understand my cultural background and sympathize with my situations."

Participants also expressed their concerns about western medicine being too powerful on them that could give rise to harmful side effects in the long run, and their desire for TCM or Chinese patent medicine that would help them generally and harmlessly restore the inner balance though they are not attainable. As was commented by one participant,

> The doctor prescribed some pills for me. It was too strong and my symptoms almost disappeared in one day... There could be some differences between the body mechanisms of western people and Asian people... I would prefer to use some Chinese patent medicine that was not that strong but would not do harm to my body.

However, participants mentioned that they wouldn't discuss this kind of concerns with health professionals because of lower language proficiencies as well as the belief that "doctors just couldn't understand" and that there is "no way out," so "better not to make trouble."

Instead, they would avoid seeking help from health professionals and use self-care methods they thought would be helpful, or simply comply with what the doctors say without raising questions. However, non-compliant behaviors such as not using the prescribed medicine or changing the dosage frequency without doctor's advice were also seen in the group of participants as a result of absence of cultural understanding. "The doctors asked me to get a certain ointment and apply it to my body. But I suspected this kind of stuff might contain hormone-laden chemicals. So I didn't go get it." "Since the pills were too strong, I just took it once or twice a day for a few days." Such practices could likely induce health risks.

Similarly, all but one participant refused to consult local American friends for health-related information, because they believed people from another ethnic group have different physiological mechanisms, lacking in understanding of their situations and culturally embedded information needs, and usually possess stronger social support from family and society and thus would not emphasize with them or offer relevant and feasible solutions.

In order to meet the culturally embedded needs and deal with special needs in the acculturation process, they sought help from Chinese international students with similar experience or longer years of study in the U.S. and performed very specific search online for solutions and recommendations typically developed by and for Chinese international students. One participant searched on Baidu for "Chinese students in the U.S. menstrual disorder," believing that the problem derives from the problems and stress during the acculturation process. Most participants also followed certain social media accounts on Weibo or WeChat that are devoted to Chinese international students and that offer curated tips and recommendations covering all aspects of life of Chinese international students studying oversea.

Relevancy and utility. Source relevancy and utility is the information seekers' judgment of the strength of relationship between the information source and information needs that reflects a person's intention and expectation of information seeking (Saracevic, 1975; Johnson & Meischke, 1993; Xu & Chen, 2005). Previous studies have established that the evaluation of source quality, topicality, and understandability is positively associated with relevancy judgment, and it is also affected by user-related factors including direct experience, perceived salience and beliefs, as well as the information seeking context (Xu & Chen, 2005; Johnson & Meischke, 1993), which is also indicated in this study.

Cultural sensitivity is also found to be a construct of relevancy judgment, as participants did not expect health professionals and friends of a different culture to relate to or help with special health needs in the acculturation context.

At the early stages of information seeking, with the intention of self-care, non-professional information sources such as friends, family and online sources that offer high level of understandability and cultural sensitivity seemed to have a stronger connection to the participants' information needs. While performing search online, different types of information were examined and bilingual language capacity was leveraged as a method and consequence of relevancy judgment. Some participants reported using Chinese search engine or translation tools to obtain the English translation, and use both languages in the problem formulation, learning, cross-referencing and validating process. Sometimes they would mainly perform search in Chinese for culturally embedded health needs. But when the information needs and information seeking context were more related to factors in the environment (e.g. skin problems, bug bite, locally obtained drugs), or the information seeking was aimed towards facilitating doctor

communication or validating information after doctor visit, searching in English was seen as of higher relevance and thus took up most of the time of the information seekers.

However, lack of knowledge of quality sources and problems related to understandability negatively affect the search outcomes. In addition to "self-care failure," "difficulties in obtaining answers online," "too many possibilities and different voices I found out online," and "couldn't find a friend with knowledge or similar experience" are also reasons that lead up to professional consultation. At this later stage, obtaining quality and authoritative help becomes more salient. Although due to the problems with understandability and cultural sensitivity, the interaction with doctors sometimes could not very well meet the information needs. Participants were found to search online again after the doctor visit, yet the possible misunderstanding involved in the process could possibly lead up to future health risks.

Decision Criteria

Generally speaking, the least-effort principle is supported. Source accessibility or the access cost plays a dominant role in source choices and cross-source movement decisions. It is considered before source quality, whereas source quality is discounted at the initial phrase of information seeking and only become more salient at a later stage.

The access cost that was found in this study pertains to both source availability and source understandability. Health professionals were evaluated negatively against both source availability and understandability, but the cognitive and socio-cultural-psychological cost underlying the evaluation of understandability was presumed to be a more significant barrier and weighted higher in the cost-benefit analysis. Even if readily available method of communication was provided, i.e. 24-hour nurse line, it was not fully utilized due to the low evaluation of understandability and the underlying cultural implications.

Health professionals were considered of higher quality in providing professional help, and were perceived to be a trustworthy and reliable source to deal with and resolve some health concerns and problems. Participants mainly relied on doctors at University Health Services for professional treatment and advice, and expressed their mistrust towards urgent care clinics not associated with the University due to the lack of awareness and gaps in knowledge. If severe and urgent health problems arise, while UHS is not available or suitable to go, participants are more likely to head to emergency center within a large-size hospital that they believe to be more qualified. Problems with understandability and the resulting communication difficulties could compromise the quality of the services and the information seeking outcomes, despite of the perceived authoritativeness of professional healthcare sources.

Online sources were generally considered less trustworthy and of lower quality, compared to health professionals and friends, due to diverse types of information and the open source environment. Participants did report evaluations of source and content attributes to differentiate information provided online in terms of quality and credibility; however, the actual usage pattern showed a single focus on search engines. Lack of knowledge of quality sources and lack of search skills could limit their ability to access quality and relevant information.

Online sources are associated with the least access cost, which appears to be one of the major reasons for them to perform search online at various stages of information-seeking process for different purposes. However, searching online does entail access difficulties because of the understandability problem with online information written and presented in English, which further impedes the retrieval of quality and relevant information. But it is suggested that its superior availability, the relevancy of content to the information needs, and the comparatively higher access cost associated with health professionals, seem to override understandability

difficulties associated with online sources. Participants also developed coping strategies by leveraging bilingual search capacities and translation tools. As was illustrated by one participant:

> I spent 2-3 hours searching online, intermittently in several days. At first, I didn't feel satisfied with what I found and it didn't answer my questions. Because initially I didn't have a good definition of the problem on my own and I typed into wrong keywords and checked out wrong pages. But by searching more in both English and Chinese, you could gradually obtain more information and a deeper understanding of your problem, and the problem became clearer to you. You became your own doctor.

Friends are perceived to be of high reliability and low access cost in all dimensions. Thus seeking information and help from friends is very common in the participants of this study. Friends from same cultural background, speaking same language, having the same studying abroad experience, appear to be largest social support they could rely on when health problems and crises occur. However, friends might have limited influence over the information seeking results in terms of fulfilling the information needs because they might have no experience or knowledge for a specific health concern or problem, and thus don't have much to offer. Similarly, family is considered trustworthy and accessible, although their availability could not be ensured due to time differences. Besides, family member as an information source might be of low relevancy to the subject matter problem, and due to other socio-cultural-psychological reasons, some participants would prefer not to bother family members or to make them feel worried.

In regard to the information seeking behaviors and source selection movements along the timeline, self-diagnosis as well as self-care methods were first tried out for most information seeking contexts discussed in this study. It is not only the consequent of the play of least-effort principle but is also affected by a cultural dimension that mediates cost-benefit analysis by

affecting relevancy judgment. Participants expressed their culturally embedded information seeking needs and their belief that health professionals in the U.S. are incapable of relating to and helping with the needs. To obtain a higher cultural relevancy, they consulted friends from the same cultural background and obtained information and recommendations online that were specially developed to suit their special needs and situations.

Moreover, given that quality was sacrificed for accessibility and they were lacking in knowledge and skills to obtain quality information, self-care measures taken by participants without a good support of quality information could cause health risks and have a negative impact on their health conditions.

Chapter Five: Discussion

Guided by the theoretical framework of Comprehensive Model of Information Seeking (CMIS), one-on-one in-depth interviews were conducted with 12 participants recruited to the study. The interview transcripts were analyzed using template analysis method and the results and discussions were presented above. In this section, the research findings are summarized and discussed in relation to each research question.

RQ1: How do Chinese international students make source choice decisions in the process of health information seeking?

RQ1a: What sources do they choose?

RQ1b: What factors and criteria do they use to make source choices?

The source choices and cross-source movement described by all 12 participants were detailed along a timeline in Table 2. Self-care, as a theme that emerges in the data, is common among all participants and is presumed to have significant impact on the source choice decisions along the information seeking process. Thus self-care was added as an additional dimension for a better understanding of the process. Avoidance of help-seeking from health professional and a delayed usage, which was also demonstrated in previous research of international student (Mori, 2000; Zhang & Dixon, 2003; Fallon & Barbara, 2005; Ang & Liamputtong, 2008; Russell, Thomson, & Rosenthal, 2008), was also found in the data. Thus whether or not information from health professionals was sought and the time lag for information seeking were also illustrated in the table.

It is found that family, friends, online sources, and health professionals at University Health center, were the most commonly used information sources. Only a single occasion of usage of urgent care clinic (not associated with UHS) and of hospital emergency room was

reported. Friends and online sources were heavily used during the initial phase of information seeking, whereas doctors at University Health Services were consulted at the later stages. However, there were 4 information-seeking scenarios where no professional advice was obtained at any stage and self-care became an end itself. The time lag for some health problems also appeared to be alarmingly long.

Online sources serve more purposes and provide a lot of functions at the different stages of information seeking. For example, it could be the starting point of the information search process and also could play a supplementary role after the doctor visit.

In line with the conceptual framework, factors and criteria that were identified in the previous literature were discussed if they were found in the data, and new factors and evaluative criteria that emerged from the data were also added and explained.

Information seeking contexts and needs were first discussed to provide a context. The relationship between acculturation stress and negative health conditions was implied, which had an impact on how and when information was sought when needs were perceived. The inconsistency between perceived urgency or severity of the health problem and the use of professional sources implies the greater influence of other user or source-related factors. Participants also expressed peculiar information needs that have strong cultural implications, which distinguished them from the general U.S. consumer segment that was more extensively studied in the existing literature.

Factors related to information seekers' characteristics and psychological needs were explored, and the findings can be summarized in the following 4 points:

- Direct experience: Treatment plan and medical products were prepared by the participants for previously experienced common health problems to facilitate self-

care. Participants would like to seek similarity or shared experience from others, either online or in one's personal network, for reassurance.

- Saliency: Participants were not exposed to ads through traditional media and thus these pieces of information from TV, newspapers and magazine ads were of very low salience to their health problems.
- Knowledge and awareness: Participants were lacking in knowledge and awareness of other information sources that are available to use. Especially, they expressed negative attitudes towards urgent care clinics due to the lack of knowledge.
- Locus of control and self-efficacy: Participants of this study showed an internally oriented locus of control, but due to difficulties in language and English health literacy, they experienced a low self-efficacy to interact with health professionals.

Factors related to sources attributes and the evaluative criteria were discussed as follows:

- Quality: Quality was evaluated for different information sources in different ways. Health professionals at UHS were the most trusted sources, followed by friends/family and online sources. Brand name was not influential in source quality evaluation due to low brand awareness. Various factors of online sources were evaluated as indicators of source quality. But participants that mainly performed search on search engines and relied on webpages retrieved by search engines were lacking in awareness of other quality and reliable sources. Also, they generally had a higher quality evaluation of online information in English returned by Google than Chinese content returned by Baidu.
- Availability: Availability constituted a significant access barrier for professional healthcare sources due to problems with making appointment. Online sources, on the

contrary, are readily available and thus were preferred by participants of this study.

- Understandability: Participants had problems understanding medical terminologies, jargons, medical abbreviations and difficult sentence structure in English. The cognitive and socio-cultural-psychological cost underlying the evaluation of understandability was found to be a more significant barrier to seeking help from health professional. The problem with understandability could also trigger negative emotions and self-evaluation and thus impedes effective communication with health professionals. Participants also had difficulties with English medical words while searching online. However, it was not seen as a very significant access barrier and could be coped with by performing bilingual searches and using online translation tools.
- Cultural sensitivity: Cultural sensitivity is a new dimension added to the discussion that has correlates with users' self-evaluation and self-efficacy, source quality, source understandability and the relevancy judgment. Participants evaluated information sources against their capacities of understanding the special information seeking needs that stem from the acculturation process. Self-care methods were preferred over seeking advice from health professionals who were considered to be incapable of relating to and helping with this kind of problems.
- Least-effort principle: Least-effort principle was supported. Quality was discounted in order to minimize access cost. Self-care measures and the general underutilization behavior could be interpreted using the framework.

RQ2: How do cultural and language factors affect information seeking process and source choices?

Language and cultural factors manifest their impact in nearly all steps and facets of the information seeking process. They can be summarized as follows:

- The information seeking needs and problems could arise from the challenges and difficulties that they were confronted with in the acculturation process, including language barrier, lack of social support, loneliness, homesickness etc., which could insert negative impact on the scope and outcomes of their health information seeking process.
- Being part of the sojourner group staying in the U.S. for a short-term period, they uphold medical values and concepts rooted in Chinese culture, such as the internal yin-yang balance, and were more used to medical procedure and treatment performed in Chinese healthcare system. Such beliefs gave rise to unique health information seeking needs and affected their source evaluations and the resulting source choice decision-making that seemed to prioritize self-care methods.
- Poor English health literacy and health communication skills in English resulted in lower self-efficacy and higher cognitive cost using interpersonal English-speaking sources. Low health literacy and lack of knowledge of available sources also limited their ability to access quality sources and to find reliable and relevant information to fulfill information needs.
- Collectivist mindset and behavioral patterns affected their self-evaluation and self-efficacy while interacting with health professionals, which contributed to a higher access cost and hindered an effective communication with health professionals.

- Bilingual capacity was leveraged. They searched online on both Chinese and English search engines to cope with understandability problems and to locate relevant information for their information needs.

Chapter Six: Limitations and Suggestions for Future Research

The study has several limitations that should be noted. First, the sample size is relatively small. Only 12 participants were recruited into the study, and they are all students enrolled in the University of Texas at Austin and may not be representative of the Chinese international student population in the U.S. Future study could involve a greater number of participants attending different public and private universities in different states.

Second, the study, using semi-structured interview method, is qualitative in nature. The participants self-reported their source selections and usage patterns based solely on the recall of a past event, which might not truthfully reflect their actual information seeking behaviors. Future study could integrate other research methods, such as diaries, web search logs, observational methods of interpersonal communication, etc.

Source selection factors and criteria were analyzed and conclusions were drawn based on the themes emerge in the data, but the results were not able to empirically testify the relationship or establish the strength of the connection. Future study could draw on the constructs and items explored in this study and employ quantitative research methods such as survey methods to empirically test the suggested relationships.

Chapter Seven: Conclusions and Implications

Previous studies have documented the challenges that international students in the U.S. are faced with during their studying abroad period. The acculturation stress they experienced and its negative impact on international students' health conditions were brought to attention. It was evidenced in the previous studies that international students underutilize University Health and Counseling services, while the gap between perceived needs and consequent actions were found more significant in the Chinese international student subgroup. Lower awareness of available sources they can use for help and dissatisfaction with University Health and Counseling services were also observed in this subgroup. Considering the increasing number of international student population in U.S. universities and the financial and social contributions they made to the host country, such problems need to be tackled with and reflected in the services and helps offered to this group that is especially lacking in social support.

This is the first study that looked into health information seeking behaviors by examining the time-line sequence of source selection behaviors and the influencing factors and decision-making criteria. It also tied cultural and language implications to the examination and sought to give a more comprehensive understanding of the impact of their cultural background, the complexities facing international students in the studying abroad period, and the coping strategies they developed.

The study employed qualitative semi-structured interview method to elicit their motives, responses and opinions during the information seeking process, which was then examined under the constructs of Comprehensive Model of Information Seeking. Information seeking contexts, source selection, cross-source movement, and the user and source-related factors, and decision criteria were discussed in previous chapters.

It is shown in the data that when health problem occurs and gap is perceived, Chinese international students seek to address it using self-care methods and delay the help seeking from health professionals, even if urgent or serious health problem arises. However, inappropriate self-care measures could induce health risks and the delayed usage could intensify the symptoms. Especially, Chinese international students are not aware of quality sources and lacking in necessary health literacy and language capacity to find relevant and useful information. Certain language training program especially in relation to commonly used health and medical vocabulary and concepts could be developed to overcome the language difficulties. Participants in the study also expressed the desire for guidance on where to obtain quality information, where and how to use professional healthcare sources within and outside the university system, as well as what is covered by the student health insurance. They would welcome messages delivered in the forms of information session, direct email, handout, or video. Supplementing the information with clear and easy-to-understand definitions or the corresponding Chinese translations is considered to be "of great help" by the participants.

The issue related to understandability and cultural sensitivity was seen as the biggest barrier for them to access University Health and Counseling Services. Although the problem might not be very well addressed due to the limit of resources, it would be helpful if health practitioners could work on to improve the effectiveness of communication by using more layman's terms, creating a less stressful medical environment, taking into consideration the international students' special health needs, and encouraging students to ask questions and use translation tools and other supplementary methods to facilitate their understanding. Participants also expressed their problems navigating the University Health Services website and online appointment system. It is suggested to simplify the process and offer clear guidance in various

languages. Telecommunication methods and technologies, such as online chatting, could also be utilized, which allows students to stay in a more comfortable environment and use other online and interpersonal sources to facilitate the communication.

Appendix A: Screening Survey

Default Question Block

IRB EXEMPT DETERMINATION ON: 01/25/2016
EXEMPT DETERMINATION EXPIRES ON: 01/24/2019

IRB PROTOCOL #2016-01-0022

Study: Where You Go And Whom You Ask? A Study of Source Selection and Usage in Chinese International Students' Health Information Seeking Behavior.

Researcher: Yi Xin (Email: yxin14@utexas.edu; Phone: 512-924-1799)
Faculty Sponsor: Dr. Lee Ann Kahlor

By filling out and submitting the survey, you are indicating that you are interested to participate the one-on-one interview for the purpose of this study and that you agree the researcher to contact you for interview scheduling and follow-up information. You have the right to withdraw the study and choose not to participate at any time, without receiving any negative consequences. Submitting the survey does not promise your participation in the study.

Only the researcher will have access to this information and it won't be shared with any other parties. Upon finishing the research process, any identifying information collected will be destroyed including electronic and hard-copy data. The research results will not be linked to you personally in any way.

If you have any questions about your rights as a research participant, please contact the Institutional Review Board by phone at (512) 471-8871 or email at orsc@uts.cc.utexas.edu.

If you accept and agree to participate, please press the arrow button at the bottom right of the screen, otherwise use the X at the upper right corner to close this window and disconnect.

Thank you.

1. Is your nationality and country of citizenship the People's Republic of China?

Yes

No

2. What is your gender?

Male

Female

Other

3. What is your age?

4. How long is your accumulated stay in the U.S ?

less than a year

1 year

2 years

3 years

4 years

5 years

6 years

7 years

8 years and more (please specify)

5. What is your year of college at The University of Texas at Austin?

Freshman

Sophomore

Junior

Senior

Graduate student

Doctoral/Post-doctoral student

6. Did you have any health-related problems and concerns (ailment/ illness/ diseases *excluding fitness and diet*) in the past year?

If Yes, please give a brief description of the situation and how you sought health-related information and help?

Yes

No

7. Please offer the Email address you want to be contacted for interview scheduling and follow-up information related to the research.

This ends the survey!

Please submit your answers by clicking on the button at the bottom of the page.

Appendix B: Recruitment Text

Past studies suggest that International students underutilize the university health and counseling services. Typically, Chinese international students exhibit signification gap between their perceived health needs and consequent health-information seeking actions. In order to further address the issues and provide valuable insights, I am doing a research study that specifically focuses on Chinese international students' health information seeking and source selection behaviors. So if you fulfill the following requirements:

- You are an international student from China, and can express yourself in either Mandarin Chinese or English.
- You are enrolled at The University of Texas at Austin as a full-time student.
- You are between 18-29 years old.
- Your accumulated stay in the U.S. is less than 8 years.
- You have something to say about your health information seeking experience.

You are the person I am looking for!

Your participation in the study consists essentially of one face-to-face personal interview, which will last about an hour. The interview will be scheduled at The University of Texas at Austin main campus at a convenient time for you. During the interview, you will be asked questions about incidents of your health information seeking experience, your usage of different information sources including the university health and counseling services and factors that influence your source selection decisions. You will be offered a digital gift card upon the completion of the interview process.

If you are interested, please click on the following link to fill out some basic information.

Help us increase knowledge in this domain!

Researcher: Yi Xin, The Stan Richards School of Advertising, The University of Texas at Austin (email: yxin14@utexas.edu).

Faculty Sponsor: Dr. Lee Ann Kahlor, The Stan Richards School of Advertising, The University of Texas at Austin.

This study has been approved by The University of Texas at Austin Institutional Review Board.

Appendix C: List of Health Information Sources

1. Health professionals (doctors, nurses, pharmacists) at University health services
2. Health professionals outside university health services
3. Family members
4. Acquaintances or friends
5. Traditional print media (books, journals, newspapers, magazines, pamphlets)
6. Traditional TV
7. Online:
    a. Search Engine
    b. Blog posts
    c. Health/medical websites (hyperlink-based websites)
    d. Forum/Online discussion group
    e. Q&A sites
    f. Wikipedia
    g. Social network sites
    h. Online video

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