

Social capital and health information seeking in China

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ABSTRACT

In the past decades, researchers worldwide have endeavoured to learn more about the relationship between social capital and health. However, not many such studies were conducted in China. We examined the association between different types of social capital and health information-seeking behaviour (HISB) in the Chinese context. The different types of social capital were primarily bonding and bridging, as well as cognitive and structural ones. Our analysis is based on a total of 3090 cases taken from the HINT-China 2017 survey. Some aspects of social capital emerged as positive predictors of HISB: information support (standing in for the cognitive component of social capital) predicted health information seeking, organization memberships (standing in for the structural component) promoted cancer information seeking, and both the use of the internet and of traditional media for gaining health information were linked with bridging networks and organization memberships (both structural). Bonding networks were not correlated with any other of the key variables and the emotional support aspect of social capital (cognitive) was consistently associated with all health information-seeking indicators negatively. In conclusion, structural social capital, especially the bridging aspects, increased HISB in China while emotional support as cognitive social capital damaged it.

Keywords: Social capital, Social support, Health information seeking

Introduction

The Potential of Health Information Seeking

A patient who decides to go and see her physician has come to the conclusion that she cannot help herself in her present state and needs the expert's training, experience and competence. Her decision, however, is not only a consequence of her medical state, but also of her personal experience, her inclinations and habits, her family and friends, and many more. An alternative decision would be, in our times, to seek information on the Internet and still try to help oneself, on

the basis of the newly learned medical knowledge. The question of whether to see a doctor or seek help on the Internet is largely an academic one. Most people actually do not consider the Internet as an alternative to a doctoral visit; they rather think of it as a complementary option (Caiata-Zufferey & Schulz, 2012). Once you have decided to see your doctor, you will enter a process of anamnesis, tests, diagnosis, treatment, and hopefully curation. If you wish to intervene in this process, you are back to the web, where you can find information and accounts of experiences to give you a basis for approaching health professionals with your needs, preferences and questions. In analytical terms, you could say that you employ or enhance your health literacy and claim the empowerment you are granted for the purpose of contributing to the professionals' decisions. We can state that there are good motives and ample occasion for seeking health information when you are ill.

Improvements in technology, especially the development of the internet, have dramatically changed health information seeking behaviour (HISB). People are exposed to diverse and easily accessible information channels (DiMaggio, Hargittai, Neuman, & Robinson, 2001; Rains & Ruppel, 2016), and they use them (Dutta-Bergman, 2006).

Health information-seeking affects people's health in many ways. In the context of behaviour change, information-seeking can potentially affect people's attitudes and beliefs towards certain health behaviours and motivate individuals to change their behaviour in a health-serving way (Shi, Nakamura, & Takano, 2004). It also functions as a coping strategy in dealing with health-threatening situations (Lambert & Loiselle, 2007), enhancing people's understanding of their health, illnesses and related challenges (Clark, 2005). In particular, HISB has become an essential means for patients to gain the health knowledge they need to join their physician in patient-collaborated medical care, the current ideal for doctor-patient communication (Henman, Butow, Brown, Boyle, & Tattersall, 2002). Also, HISB creates in people a feeling of control and releases uncertainty-related emotions such as anxieties (Flattery, Pinson, Savage, & Salyer, 2005; Shiloh, Ben-Sinai, & Keinan, 1999). However, very few studies have investigated social capital and HISB, in particular, the influence of social capital on the frequency of people's seeking health information and the diversity of sources they consult (Y.-C. Kim, Lim, & Park, 2015; Song & Chang, 2012). Although we have seen studies on social networks and HISB, they heavily focused on seeking information from human resources such as health professionals (Pescosolido, 2006; Song & Chang, 2012).

Seeking medical health information has become an option in many situations, and the motives to do it are now an important subject for health communication research. On balance, HISB has favourable health consequences, but many associations are as yet unexplored. This article is concerned with one of the antecedents of health information-seeking behaviour: social capital. The data come from China. In the remainder of this Introduction, we will address the questions why this concept, social capital; and why this country? The question why studying HISB in this context has just been treated at some length.

Our observations and analyses are based on a few given trends, which provide a background. The availability of health information was just described, and we should be aware that the growth in digital health information has not only expanded and accelerated the information flow, but given it a completely new quality. The second given is the increasing insight that health is more than keeping pathogens in check, slowing down degenerative or sclerotic diseases, mostly those that come with age, and repairing accidental damage. Prevention and mental causes of illness have long been recognized, and finding information levels among the causal forces that impact diseases, does not come as a surprise. The third given is the modernization of China, in the progress of which some valuable things were lost, and some treasures found. A sure loss concerns the tight social bonds within families and among neighbours (Li, Zhu, & Li, 2013; Y. Wang, 2006). Modernization creates new functions to be filled, or destroys older ones, and institutions find new functions. That can also describe information searching.

Social capital

Social capital refers to the relationships of an individual or organization to other individuals or organizations. The relationships are resources which, if used properly, can lead to the development and accumulation of capital in the classic sense (Machalek & Martin, 2004). The model can easily be imagined with health as the outcome. Social capital has become an exceptionally wide and successful term. It serves as an umbrella term containing many different concepts (A. Ehsan, Klaas, Bastianen, & Spini, 2019), three of which are to be found in most definitions: social networks, norms of reciprocity, and trust (Ferlander, 2003; Putnam, 1995). Putnam (1995) defined social capital as a combination of these three main elements: "features of social organization such as networks, norms, and social trust that facilitate co-ordination and co-

operation for mutual benefit (p. 67).” The underlying idea states that people’s social networks and associated reciprocities have value (Putnam, 2001).

Over the past decades, social capital has received a lot of attention from scholars in the field of health. Social capital has been shown to promote people's physical and mental health (Coll-Planas et al., 2017; Putnam, 2000; Rodgers, Valuev, Hswen, & Subramanian, 2019). It also affects individuals’ health-related behaviours including alcohol consumption, diet, cigarette smoking, physical exercises and HISB (e.g., Giordano & Lindström, 2011; Legh-Jones & Moore, 2012; Song & Chang, 2012; Tofani, Lamarca, Sheiham, & Vettore, 2015; Weitzman & Kawachi, 2000).

Social capital can affect peoples’ health through several mechanisms, e.g., by providing individuals’ tangible benefits through social support, diffusing information and reciprocities along with people’s social networks, and enhancing health norms and efficacy facilitate health actions (Kawachi, Takao, & Subramanian, 2013). Therefore, an individual may be encouraged to find health information due to enhanced efficacy, group pressure or aroused interests by others. This is reason enough to ask, as this study does, whether evidence can be found on an association of social capital as the independent and HISB as the dependent variable.

Components of Social Capital

Social capital can be grouped into different types or components, depending on the criteria one uses to define the components. That social capital can be typified was noted by early research already. Much-used types do not suggest to be based on systematic thinking. Structural considerations can lead to distinguishing networks with de facto many or few social interactions, tied and loose bonds, diverse or homogeneous members, high or low participation (K McKenzie & Harpham, 2006; Kwame McKenzie, Whitley, & Weich, 2002). In contrast, cognitive criteria may distinguish good or bad social interactions (K McKenzie & Harpham, 2006), feelings, values, attitudes and beliefs, as well as those attributed high or low reciprocity (A. M. Ehsan & De Silva, 2015). The commonly used indicators are trust and social support (Islam, Merlo, Kawachi, Lindström, & Gerdtham, 2006). Any two types or components of social capital can influence health in different ways. Components defined according to cognitive criteria are primarily captured at the micro level and shape individuals’ behavioral norms through controlling health risk and provision of social help. Structural capital is on the other hand shaped by organization, institutions and culture which are more on the macro level (Cullen & Whiteford, 2001; Islam et al., 2006).

Cognitively and structurally defined social capital demonstrate different relations with people's health and health behaviors (e.g., Firouzbakht et al., 2019; Murphy et al., 2014; Pronyk et al., 2008). In mental health, cognitive components showed strong evidence of disorders and contributed to better well-being. However, structural capital is much less beneficial and even demonstrated harmful consequences on mental health (De Silva, McKenzie, Harpham, & Huttly, 2005; A. M. Ehsan & De Silva, 2015). A similar situation also appeared in health behaviors, with cognitively defined social capital protecting people from excessive drinking and cigarette smoking while structural components, on some occasions, may result in more drinking and smoking behaviors (Murphy et al., 2014; Takakura, 2015). Regarding HISB, we noticed that prior studies on health information seeking and social capital drew primary attention to structural components (Basu & Dutta, 2008; Y.-C. Kim et al., 2015; Song & Chang, 2012). Social capital was estimated through group or community participation, as well as the Name Generator which centers on the instrumental resource embedded in social ties and fails in capturing cognitive social capital such as emotional support which is also valuable in health (Kawachi & Berkman, 2014). Besides, all these structural components showed positive association with people's health information seeking, actual action or antecedents including self-efficacy and orientation. It seems structural social capital encourages HISB, which might be inferred to Chinese populations.

Social capital can also be classified into bonding, bridging and linking social capital (Ellison, Steinfield, & Lampe, 2007; Woolcock, 1998). We will not include linking, but the choice between bonding and bridging remains as one of the most critical distinctions (Coffé & Geys, 2007; Putnam, 2001). Bonding social capital is based on networks (therefore also called bonding networks) in which people share similar social backgrounds, such as religious belief, social class, and income (Murayama, Fujiwara, & Kawachi, 2012). Therefore, people involved in bonding ties are highly homogeneous. Typical bonding ties are such as family relations or close-knit friends (Islam et al., 2006). Bonding networks are intrinsically rich in providing emotional and instrumental support (refers to practical help, such as life caring and monetary support) (Ferlander, 2007). At the same time, bonding capital can potentially be problematic (Berkman, Kawachi, & Glymour, 2014; Portes & Landolt, 1996; Villalonga-Olives & Kawachi, 2017), leading to exclusion of outsiders, excess claims on group members and restrictions on individual freedoms (Portes, 1998). Bonding capital affects people's health through psychological approaches (Ferlander, 2007). It helps people maintain a sense of self-control (Pilcher & Bryant, 2016), relief

stress (Lee, Arozullah, & Cho, 2004) and enhance self-efficacy in performing certain health behaviours including HISB (Y.-C. Kim et al., 2015).

Bridging capital relies on more heterogeneous social networks and often involves people from different social groups (Murayama et al., 2012; Uphoff, Pickett, Cabieses, Small, & Wright, 2013; Woolcock, 2001). The heterogeneous bridging networks can provide individuals with a wider range of information support (Ferlander, 2007). People are more likely to encounter others across different groups in bridging networks, and gather broader information as well as resources in dealing with health issues (Ferlander, 2007; Y.-C. Kim et al., 2015).

We must assume that bridging and bonding capital affect HISB in different manners. However, the existing literature does not provide any conclusive evidence of this difference (Y.-C. Kim et al., 2015), also and especially for China, and particularly for HISB in China. Yet, there are studies that focused on other health aspects of bonding and bridging capital with relation to perceived general health and lifestyle behaviours in China. Not many differences emerged (H. Chen & Meng, 2015; Fu et al., 2017; Yang et al., 2020). For mental health, there were negative or no effects of bridging in comparison with bonding capital (Norstrand & Xu, 2011; Zhang & Jiang, 2018). It recalls the aforementioned psychological value of strong bonding ties and implies that different consequences may be brought from bonding and bridging social capital on HISB.

Chinese Culture

As briefly mentioned, the data for our analysis come from China. That is because several of the authors have a natural interest in studying their country. Another reason for choosing China is the country's unique cultural history. Strong social ties have traditionally been more firm than, for example, in Western cultures, and weak ties are found seldom only in China. If you map all individuals and their ties in the whole society, social structure in China can be visualized as a variety of dense clusters that scatter all over society but with very few external connections, and each cluster represents a social group (Boissevain, 1974; Lin & Si, 2010). To this day, Chinese people still prefer to rely on close social relations instead of weak ones in their social life (Lin & Si, 2010). Besides, a strong tradition of familyism is ingrained in Chinese society (Xing, 1995). Family ties are considered more trustworthy and reliable than ties in any other group an individual might join (Chu & Ju, 1993). Family ties provide a feeling of security, unconditional protection and dependable obligations (Hwang, 1987). Chinese culture is moreover deeply formed by

Confucianism, which tends to regulate individuals' behaviour through social norms and emphasizes reciprocity in social contacts (Wei, Liu, Chen, & Wu, 2010). In spite of the import of social ties in Chinese culture, only a few studies on social capital have been conducted there.

Still, there is evidence from China also that social capital promotes self-perceived health status (e.g., H. Wang, Schlesinger, Wang, & Hsiao, 2009; and Y. Zhang & Jiang, 2018) and life satisfaction (Lu, Spencer, Sun, & Lou, 2020; Palmer & Xu, 2012), and weakens feelings of loneliness (Bai, Wang, Shao, Qin, & Hu, 2021) and depression (Bai et al., 2020; R. Wang, Xue, Liu, Chen, & Qiu, 2018). Social capital also encourages healthy diets and physical exercises (W. Chen et al., 2019; Fu et al., 2017; Xue & Cheng, 2017; Yang et al., 2020), and it impedes consumption of alcohol and cigarette smoking in China (Gao et al., 2013; Xue & Cheng, 2017; Yang et al., 2020).

Basu & Dutta (2008) found people with higher community participation reported higher levels of information orientation (indicating the willingness to seek health information) and efficacy (referring to respondents' perceived ability to seek health information they needed). In another study, social capital (measured by participation in a variety of social groups) was positively associated with health information seeking intention and self-efficacy, as well as scope of used information sources. Social capital also acted as a buffer attenuating negative impacts of poor health literacy on seeking intention and efficacy (Y.-C. Kim et al., 2015). Still another study focused on real information-seeking behaviour (Song & Chang, 2012). Authors applied the Name Generator to measure individuals' social capital by educational level of individual network members. They found a positive relationship between social capital and the frequency of information seeking, usage of both personal and impersonal sources (internet, medical experts, family and friends), as well as source diversity. Results also showed that network size (measured by the number of alters in respondent's networks) was positively associated with information seeking (Song & Chang, 2012). Based on our knowledge, there is no Chinese study that examined social capital as an independent and HISB as the dependent variable.

Research Questions

As we do not know much yet on the subject, we focus on antecedents of HISB. First and foremost, we are interested in social capital and its influence. The research question is: does social capital affect the intensity or frequency of HISB? (RQ 1). Generally, we expect persons who make

use of one type of communication channel to be interested and use other channels as well. That would produce positive measures of association. The background of the expectation is a traditional finding in communication research, which saw an inclination in people to communicate intensively in all (or many) channels. A person who watches a lot of health stories on TV will also read many health stories in the newspaper and talk much about health with friends and family.

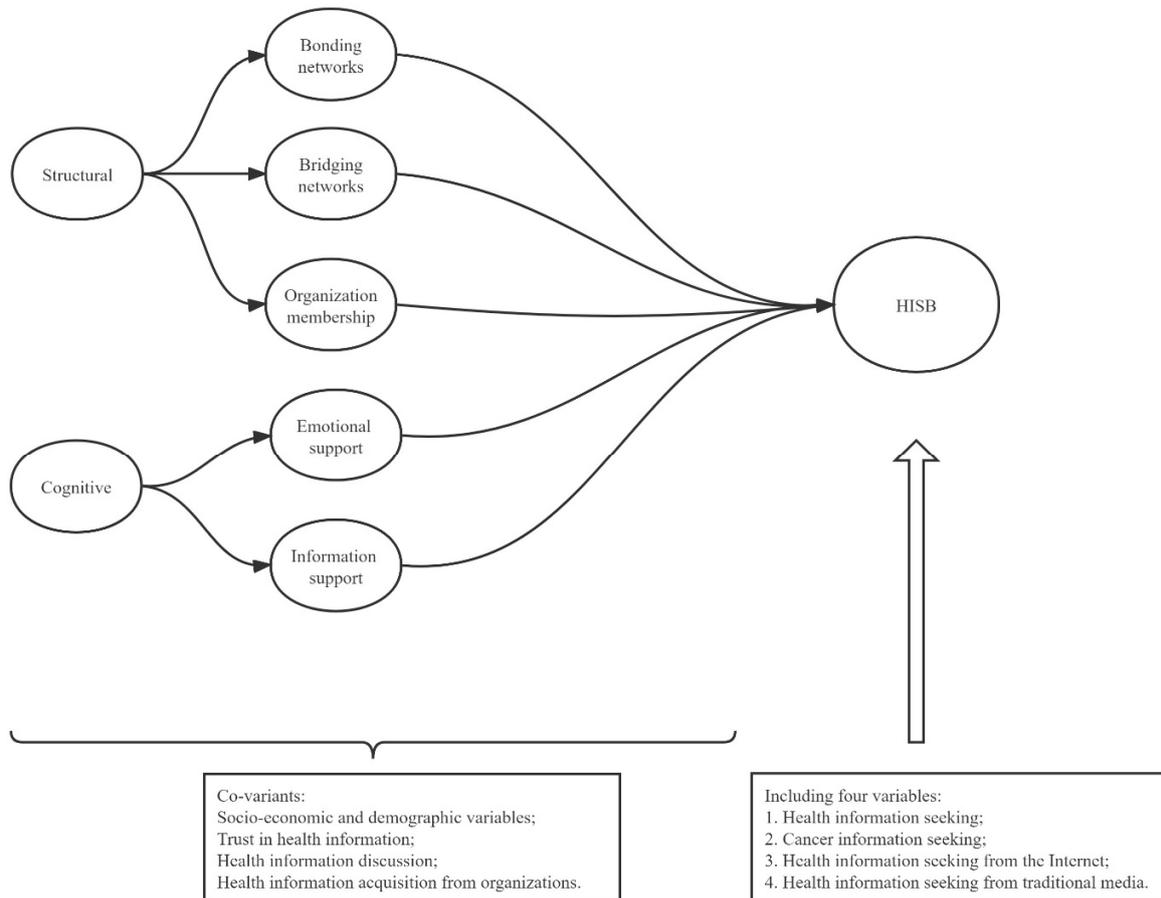
A second research question asks whether different components of social capital produce different reactions in the search for health information (RQ 2), see Figure 1. And a third question will be concerned with turning to possible other antecedents of information seeking, which will demand other explanations (RQ 3).

Method

Sampling

The data used in this analysis originate from HINTS-China 2017, which was initially designed to understand Chinese people's information seeking behaviours and contains indicators reflecting individual social relations. Inspired by the U.S. Health Information National Trends Survey (HINTS), China developed its own HINTS survey with a similar instrument structure as the U.S. HINTS. The previous HINTS-China was administered in 2012, and the current one adopted the same methodology. HINTS-China is a cross-sectional survey based on nationally representative samples from two Chinese cities: Beijing and Hefei. In each city, respondents from urban and subsidiary rural areas were included. The survey questionnaire included seven sections: HIBS, cancer information seeking and perceptions, food safety information seeking and perceptions, medicine information seeking and perceptions, personal health status and behaviour, healthcare experiences, as well as background information and social networks. A multistage stratified random sampling technique was applied, and data was collected by door-to-door visits. The detailed survey methodology has been published by Zhao et al., (2015). A total of 3,090 adults aged from 18 to 60 years have completed the survey.

Figure 1. A simplified model linking social capital components to HISB.



Measures

There were four measures for the dependent variables (HISB), Health information seeking, Cancer information seeking, Health information seeking from the internet, Health information seeking from traditional media. All asked frequencies as mentioned in the variable name. Answers to the first two questions were dichotomous (ever sought information on own initiative) with either yes (coded 1) or no (coded 0). The latter two measures asked whether respondents had been exposed to a number of communication channels, four traditional (health or medical information from newspapers, magazines, TV, and radio) and eight online sources including Web, News APP, medical health or food APP, other Apps, Baidu and other search engines, Microblog, WeChat, as well as Blog and forum. Four-point frequency scales, ranging from never (= 1) to always (= 4)

were used. Respondents' answers were averaged as one index (traditional: $\alpha = .874$; online: $\alpha = .903$).

The independent variables included as measures of structural social capital were assessed separately with single items, inquiring about the number of people living in your current residence for *bonding networks* and the number of daily contacts for *bridging networks* (Table 1 for complete wording). We acknowledge that the single questions in both cases might fail to capture the picture adequately. A measure of bonding networks that should include very close friends. However, China still attaches significant importance to familyism (Xing, 1995). Therefore, families' ties play an essentially more important role in Chinese people's bonding networks than friends' do. Also, family members living in the same household are essential sources of social support (Lee et al., 2004). Thus, we argue that the number of people who share the household with the respondent is still able to reflect a critical part of bonding networks.

The measure of *bridging networks*, we admit, might contain very close friends which had better been counted as bonding. However, around half of the respondents answered that they usually contact more than 10 people (except for family members) within a day, and more than 20% of respondents even have contact with more than 20 people on a daily basis. Therefore, we consider the bridging networks as adequate also.

Organization memberships was used as another indicator to represent bridging social capital (Norstrand & Xu, 2011; P. Wang, Chen, Gong, & Jacques-Tiura, 2014).

Apart from these structural social capital components, two cognitive components were included, emotional and informational support. The former asked respondents: whether they had anybody to rely on for *emotional support*. *Information support* inquired about respondents having friends or family to discuss health issues. We chose health as the focal information support as, unlike other topics such as travel, study or entertainment, discussing health issues requires a certain level of familiarity and intimacy. During the discussion of health issues, people gain advice and information from their family members and friends (Pilcher & Bryant, 2016).

Covariates of HISB were used as independent variables, mainly for control purposes in order to minimize confounding effects. Among these are *Trust in health information* from various sources such as websites, newspapers or family and friends. Trust often influences people's seeking behaviour from that source. An exploratory factor analysis was conducted on the 24 trust items with orthogonal rotation (Varimax). Based on that, we retained five trust factors by using Cronbach's

Alpha measures internal consistency between items in a scale. It represented trust in health information from the internet ($\alpha = .903$), traditional media ($\alpha = .877$), interpersonal channels ($\alpha = .795$), official institutes ($\alpha = .857$), and informal organizations ($\alpha = .838$) respectively (see Appendix). Table 1 shows the question wording and details on scaling for all variables.

Table 1. Overview of variables.

Variable	Questionnaire	Scaling details
<i>Dependent variable (HISB)</i>		
Health information seeking	“Have you ever searched for health information on your own initiative?”.	Single item, yes/no
Cancer information seeking	“Have you ever searched for cancer information on your own initiative?”.	Same as above
Health information seeking from the Internet	“Have you encountered health or medical information from [media source] in the past 12 months?”	4-category frequency scale
Health information seeking from traditional media	Similar to above	Same as above
<i>Independent variables: Social capital</i>		
<i>Structural components</i>		
Bonding networks	“How many people live in your current residence, including yourself?”.	Single item
Bridging networks	“Apart from your family and relatives, how many people do you usually contact within a day?”.	7-point scale was used ranging from None (= 1) to 100 or more persons (= 7).
Organization memberships	Number of community groups or organizations they are currently	3-point scale
<i>Cognitive components</i>		
Emotional support	“When you need emotional support (e.g., need to discuss problems or make difficult decisions), is there anyone you can rely on?”	Single item, yes/no or I am not sure
Informational support	Respondents have friends or family members to discuss health issues	Same as above
<i>Co-variants</i>		
Trust in health information	“What’s your degree of trust in the health information provided by [media source]?”.	24 items (= information sources), each rated by a 5-point scale from very untrustworthy (= 1) to very trustworthy (= 5).
Health information discussion	frequency of discussing health-related issues with their family members or friends,	Single item, 4 answer categories from 1 = never to 4 = always
Health information acquisition from organizations	If any joined organizations or groups can provide them health information	Single item, yes/no or I am not sure

In addition, two questions from the survey provided information about respondents' social networks and were heavily related to health information. Given that they somewhat deviate from the theoretical definition of social capital and reflect people's HISB intention more, we decided to treat them as covariates also instead of social capital indicators. They are *Health information discussion* and *Health information acquisition from organizations* (Table 1).

We have included a series of socio-economic and-demographic variables to control the confounding effects. Details are shown in Table 2. *Age* was measured in years. *Gender* was represented by a dummy variable for female = 0 and male = 1. *Education* was measured as the highest grade completed (1 = primary school and below; 2 = junior middle school; 3 = high school; 4 = junior college; 5 = bachelor degree; 6 = bachelor degree above). *Marital* and *occupation* status were both dummy variables (1 = married, 0 = other; 1 = employed, 0 = retiree, student or the unemployed). *Personal monthly income* was categorized into eight groups with an 8-point scale: 1 = no income; 2 = below 500 Chinese yuan; 3 = 500—999 Chinese yuan; 4 = 1000—1499 Chinese yuan; 5 = 1500—2499 Chinese yuan; 6 = 2500—4999 Chinese yuan; 7 = 5000—9999 Chinese yuan; 8 = 10000 Chinese yuan or above. *Chronic diseases* were also controlled as a dummy variable, and respondents without any listed chronic diseases were coded as 0. *Residence* was coded as a dummy variable for rural (coded 0) and urban areas (coded 1).

Statistical Analysis

All statistical analyses were operated in SPSS version 26. We first used Cronbach's alpha coefficient to evaluate the internal consistency and reliability of all scales. Besides, exploratory factor analysis (EFA) was conducted to understand the underlying structure of the original trust index in health information, which generated five trust factors: trust in health information from the internet, traditional media, interpersonal channels, official institutes, and informal organizations. Hierarchical multiple regression analyses and binary logistic regression tests were operated to investigate the relationship between social capital and HISB indicators. Before the final analysis began, the dataset was weighted due to overrepresentation of female respondents (61.1%). The percentage of females in the weighted data set corresponds to the female proportion in the entire country, as should be (48.8%) according to the Seventh National Census¹. Outliers were also cleaned before running inferential statistics, regressions in our study, to improve the statistical

¹ The detailed information about the Seventh National Census is announced in <http://www.stats.gov.cn/english/>

power. We found in bonding networks, 17 respondents had seven or more people (including themselves) living in his/her residence, and all the rest answered less than seven. Therefore we decided to treat these seventeen people as outliers accounting for 0.6% (17 out of 3090) of the total sample. We used a 95% confidence level for the confidence interval (CI) in all analyses.

Results

The descriptive statistics are presented in Table 2. The major independent variable, social capital was operationalized in five indicators. The average bonding network size (family who shared living quarters) was 3.20 with a standard deviation of 1.17. In bridging networks, 47.8% of residents have daily contact with more than 9 people, and in particular, 4.9% of respondents said that they usually meet more than 49 people every day. However, 2.8% (87 out of 3090) people had no external contacts apart from family ties. Concerning group memberships, a large part of people (68.3%) had not joined any organization, and only 16.9% of them reported membership in a single organization, and the rest of 14.7% took part in multiple groups. As to social support, the majority of respondents (85.6%) believed they had someone to rely on when emotional support was needed, and 73.5% of people answered that they had family members or friends to discuss health issues (information support).

Concerning the dependent variable HISB, only 31.3% of participants have ever searched health information on their own initiative, even less (16.9%) had searched for cancer information. Comparing with traditional media (the mean value is 2.01 with a standard deviation of .76), people encounter health information more through the internet (the mean value is 2.12 with a standard deviation of .70).

Table 2. Descriptive statistics (unweighted, uncleaned).

Variables	n = 3090
<i>Social-demographic</i>	
Age (M/SD)	35.13/11.54
Gender (%)	
Female	61.1%
Male	38.9%
Education (%)	
Primary school and below	2.2%
Junior middle school	15.8%
High school	27.1%
Junior college	26.1%
Bachelor degree	23.1%

Bachelor degree above	5.7%
Marital status (%)	
Currently married	70.6%
Unmarried	29.4%
Employment (%)	
Employed	74.8%
Unemployed	25.2%
Personal income (%)	
Less than ¥ 1,500	16.5%
¥ 1,500-2,499	13%
¥ 2,500-4,999	40.9%
¥ 5,000-9,999	23.8%
¥ 10,000 and above	5.7%
Chronic diseases (%)	
Have	17.2%
Do not have	82.8%
Residence (%)	
Rural	50.8%
Urban	49.2%
<hr/>	
<i>Covariates of health information-seeking behavior</i>	
Organizations providing health information (%)	
Yes	17.6%
No	82.4%
Health information discussion frequency (M/SD)	2.52/.83
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<i>Trusts in health information (M/SD)</i>	
Internet	2.76/.77
Traditional media	2.91/.88
Interpersonal channels	3.86/.77
Official institutes	3.23/.94
Information organizations	2.62/.79
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<i>Social Capital</i>	
<i>Structure</i>	
Bonding network (M/SD)	3.20/1.17
Bridging network (%)	
None	2.8%
1-4 persons	12.0%
5-9 persons	37.5%
10-19 persons	26.7%
20-49 persons	16.2%
50-99 persons	4.3%
100 or more persons	0.6%
Organization memberships (%)	
None	68.3%
A single organization	16.9%
Two or more organizations	14.7%
<i>Cognitive</i>	
Emotional support (%)	
Yes	85.6%
No	14.4%
Information support (%)	
Yes	73.5%
No	26.5%
<hr/>	
<i>Health information-seeking behavior</i>	
Health information seeking (%)	
Yes	31.3%
No	68.7%

Cancer information seeking (%)	
Yes	16.9%
No	83.1%
Health information seeking from the internet (M/SD)	2.12/.70
Health information seeking from traditional media (M/SD)	2.01/.76

Table 3 presents the results of binary logistic regression tests of two of the HISB dichotomous variables, as well as multiple linear regressions of health information seeking on the internet and traditional media, which were available as scales.

We found being older was positively associated with health information seeking (OR = 1.020, $P \leq 0.001$) and seeking through traditional media ($\beta = .014$, $P \leq 0.001$), the first and last model of HISB, but negatively associated with seeking through the internet ($\beta = -.009$, $P \leq 0.001$). Males were less engaged in the internet search ($\beta = -.060$, $P \leq 0.05$). Education was negatively associated with cancer information seeking (OR = .894, $P \leq 0.05$), while positively with the internet usage ($\beta = .054$, $P \leq 0.001$). People being employed are more likely to search for cancer information (OR = 1.458, $P \leq 0.05$), while, higher personal income decreased the probability of cancer information seeking (OR = .890, $P \leq 0.01$). Having chronic diseases was positively associated with both cancer and health information seeking (OR = 1.517, $P \leq 0.01$; OR = 1.859, $P \leq 0.001$, respectively), as well as the frequency of traditional media usage ($\beta = .122$, $P \leq 0.001$) and the Internet ($\beta = .079$, $P \leq 0.05$). Urban citizens were overall more active in HISB than rural citizens, and all HISB variables were positively associated.

With respect to two covariates, people who reported having organizations to provide them with health information are more likely to search for health information (OR = 1.522, $P \leq 0.001$), cancer information (OR = 2.208, $P \leq 0.001$), as well as use traditional media to get health information ($\beta = .093$, $P \leq 0.05$). Similarly, the more frequently people talk about health issues with family or friends, the more likely they adopt HISB. Health information discussion frequency was positively associated with four information seeking variables.

Concerning the five trusts in health information, they generally promoted Chinese people's HISB. However, trust in health information from informal organizations was a negative predictor of both health (OR = .753, $P \leq 0.001$) and cancer (OR = .729, $P \leq 0.001$) information seeking, as well as the frequency of using the internet to get health information ($\beta = -.103$, $P \leq 0.05$). Besides, trust in interpersonal channels was also negatively associated with health information seeking via traditional media ($\beta = -.044$, $P \leq 0.05$).

Except for an occasional socio-demographic variable and covariates, we have not yet addressed associations between dependent and independent variables. We come to that now. Five indicators for social capital as the independent variable were combined in a brief look at suitable bivariate analyses with four measures of information seeking as the dependent variable. Of 20 relationships, half showed significant differences from 0.

Components were associated, in the regressions, the strength of bridging networks was positively associated with the use of the internet ($\beta = .048, P \leq 0.001$) and traditional media ($\beta = .050, P \leq 0.001$) to seek health information. Besides, the finding for organizations encouraged Chinese went along with searching for cancer information (OR = 1.221, $P \leq 0.05$), to seek information through old and new media (the internet: $\beta = .084, P \leq 0.001$; traditional media: $\beta = 0.063, P \leq 0.01$). The analysis also provides results in quite different directions: bonding networks remains insignificant. A person will make an effort to search for health information if he or she will get something in return, knowledge we call it in our case. That reward might be something one gets through the activity, but it can also be the activity or social bonds themselves.

Comparing the cognitive division, the results were clear-cut. Emotional support was constantly associated with all HISB variables in a negative way. So people who have someone to rely on when facing life difficulties are less likely to search for health information (OR = .657, $P \leq 0.001$), cancer information (OR = .613, $P \leq 0.001$), seeking through the internet and traditional media ($\beta = -.106, P \leq 0.01$ respectively $\beta = -.092, P \leq 0.01$).

Stopping here to look back for a short moment, we can say people with many or stronger bridging social connections search the internet more often than other people, but the same is true of traditional media channels. The higher attention paid to the potentials of the new information device is not contingent on whether the channel is new or has been around for a while, and the attention difference is displayed only if the comparison is made for the bridging rather than the bonding component of peoples' social networks. This and a wide array of other results confirm that bridging social capital components in general do matter when antecedents of the search behaviour are wanted (Basu & Dutta, 2008; Y.-C. Kim et al., 2015). RQ 1 receives some answer expressed in the form: "yes, but not everywhere." So does RQ2 when it finds that people has emotional support does not go find health or cancer information on their own. The accessibility of information sources does not make a difference that emotionally supported people were less use both traditional media and the internet to get health information.

Table 3. Binary logistic regression and multiple linear regression of health information-seeking behaviour (weighted, cleaned).

Variables	Health information seeking	Cancer information seeking	Seeking from the internet	Seeking from traditional media
	Model 1	Model 2	Model 3	Model 4
<i>Social-demographic</i>				
Age	1.020*** (1.008,1.032)	.996 (.983,1.010)	-.009***	.014***
Gender(male)	1.117 (.937,1.330)	1.203 (.974,1.486)	-.060*	-.027
Education	.990 (.904,1.083)	.894* (.803,1.022)	.054***	.009
Marital status(married)	1.147 (.899,1.480)	.887 (.659,.1.194)	-.007	-.028
Employment(employed)	.773 (.579,1.033)	1.458* (1.021, 2.084)	.047	-.032
Personal income	.970 (.908,1.037)	.890** (.822,.964)	-.007	-.001
Chronic diseases(have)	1.859*** (1.485,2.326)	1.517** (1.170, 1.968)	.079*	.122***
Urban or rural(urban)	1.489*** (1.237,1.792)	1.411** (1.128,1.766)	.136***	.160***
<i>Covariates of health information-seeking behavior</i>				
Organizations providing health information	1.522*** (1.173,1.974)	2.208*** (1.654,2.946)	.068	.093*
Health information discussion frequency	1.614*** (1.433,1.827)	1.816** (1.566,2.105)	.079***	.098***
<i>Trusts in health information</i>				
Internet	1.710*** (1.447, 2.021)	1.473*** (1.209,1.795)	.288***	.054*
Traditional media	1.090 (.954,1.245)	1.370*** (1.167,1.609)	.078***	.286***
Interpersonal channels	1.204** (1.055,1.375)	1.046 (.894, 1.224)	-.023	-.044*
Official institutes	1.127* (1.002,1.267)	1.096 (.952, 1.262)	.045**	.015
Informal organizations	.753*** (.646,.877)	.729*** (.610,.871)	-.103***	-.024
<i>Social capital</i>				
<i>Structural</i>				
Bonding networks	1.061 (.981,1.147)	1.091 (.994, 1.197)	.001	.002

Bridging networks	1.041 (.965,1.122)	1.014 (.927,1.110)	.048***	.050***
Organization memberships	1.121 (.973,1.292)	1.221* (1.038,1.434)	.084***	.063**
<i>Cognitive</i>				
Emotional support	.657*** (.511,.845)	.613*** (.460,.818)	-.106**	-.092**
Information support	1.564*** (1.233,1.983)	1.091 (.814,1.461)	.012	-.033
R ² _{adjusted}			.190	.241

*** $P \leq 0.001$; ** $P \leq 0.01$, * $P \leq 0.05$

Conclusion and Discussion

This study examined the association between social capital and HISB including general health information seeking, cancer information seeking, and the frequency of using the internet and traditional media as information sources in Chinese populations. We found that social capital, especially structural components, generally entices Chinese people to adopt HISB; on the other hand, cognitive components of emotional support appeared as the only negative predictor that damages Chinese people's interest in seeking for health information and cancer information. It also impeded people from using the internet and traditional media to get health information. Below, we highlight three major findings that contribute to the existing literature.

First, our study confirmed structural social capital, including networks and group memberships promotes HISB. Exposure to health information may drive other members (apart from active seekers) inside the network to search for health information due to peer pressure or enhanced social norm of health (Basu & Dutta, 2008). As shown in the current study, we found group memberships positively associated with all health information-seeking indicators regardless whether the organization can provide them with health information. We also found a higher number of bridging social ties associated with the search for health and cancer information. This somehow corroborated the findings of Song & Chang (2012) that showed the network size (indicated by the number of alters in the respondent's network) was a positive predictor of health information-seeking.

Second, we found a significant difference between bonding and bridging social networks. On the one hand, family members and close friends (namely bonding relations) are often consulted first when a person faces health issues, they provide assistance that helps handle tough situations (Lee et al., 2004). These social ties serve as information sources that provide health information

as well as a validation tool to encourage people to search for relevant health information, so that the person can better cope with difficulties (Echlin & Rees, 2002). However, the context of our study is based on everyday life. If we conducted the study among newly-diagnosed cancer patients, the insignificant results of bonding networks might be different. Bridging networking on the other hand promotes HISB in the current study, as it may open wide ranges of information and intrinsically rich in information support (Ferlander, 2007; Murayama et al., 2012). Chinese residents with denser and more diverse bridging networks are thus more likely to come across health information, which may awake their health awareness and further encourage health information seeking behaviour.

Lastly, literature usually suggests that social support could improve people's capacity in finding and understanding health information (Lee et al., 2004). Emotional support can practically improve people's self-esteem and self-confidence that help cope with personal limitations (Lee et al., 2004). However, our study surprisingly found significant negative relations between emotional support and all health information search indicators. This was already interpreted by Shaw and his colleagues (2008) who found individuals perceived to be with a worse condition including lacking social support are more likely to search health information online. The reason is the person surrounded by strong supportive social relations such as family and close friends might not realize the necessity to gather information from impersonal media. Instead, they tend to rely on their personal networks. Therefore, such a relation between media and interpersonal venues are complementary. A few previous studies, though, have also shown low social support predicts more active health information search behaviour (S. C. Kim, Shah, Namkoong, McTavish, & Gustafson, 2013; Shaw et al., 2008). Considering that Chinese people heavily rely on strong ties and attach great importance to the concept of familyism (Chu & Ju, 1993; Lin & Si, 2010), the person who has emotional support in China might have a stronger sense of dependency than their counterparts in Western societies. This strong feeling of having someone to rely on might explain the negative relation between emotional support and HISB in China. We call for future research to better understand underlying mechanisms of this negative association. Besides, only little difference found between new and old media that Chinese people's social relations do not affect their choice of different impersonal media for health information.

This study presents a major advance as the first empirical study that draws attention to Chinese people's social capital and their health information seeking behaviour. Nevertheless, it

also has limitations. Our study was based on cross-sectional surveys, it is inevitable that some unobserved confounders might magnify or diminish the true effect of our measurements and lead to biased results. Besides, the current study solely looked at individual-level social capital, while, social capital is often conceptualized at both individual and collective levels (Putnam, 2000; Villalonga-Olives & Kawachi, 2015). It would be ideal to include the collective-level social capital in our study. We also used a self-report single question to measure each component of social capital, it might lose power in detecting respondents' real levels of social capital and result in justification bias and misclassifications. Future research based on longitudinal data and applying multilevel social capital measurements is needed.

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Appendix

Exploratory factor analysis of trusts in health information: rotated factor loadings.

Item	The internet	Traditional media	Informal organizations	Official institutes	Interpersonal channels
<i>“What’s your degree of trust in the health information provided by [media source]?”</i>					
Doctor or health specialist					.712
Family member					.884
Friend or colleague					.834
Newspaper		.785			
Magazine		.777			
Television		.725			
Radio		.715			
Book		.537		.533	
Official government agency		.312		.763	
International organization				.792	
Academic research institution				.796	
Business organization			.682		
Religious organization or leader			.783		
Community or neighborhood committee			.579		
Charitable organization	.336		.665		
Telephone hotline	.388		.671		
Website	.615		.356		
News APP	.654				
Medical health or food APP	.639				
Other APP	.664				
Baidu and other search engines	.732				
MicroBlog	.756				

WeChat	.673				
Blog and forum	.759				
Eigenvalues	4.646	3.347	3.080	2.796	2.315
% of variance	19.359	13.947	12.833	11.650	9.647
α	.903	.877	.838	.857	.795

Eigenvalues smaller than 0.30 are suppressed; Items with the bold eigenvalue represent the factor it subordinated to.