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## The influence of individual differences on consumer's selection of online sources for health information

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### ABSTRACT

Online sources for health information are becoming increasingly diverse, and these sources impact healthcare decision making. However, little is known about the factors influencing people's selection of online sources. Using the survey method, this study investigated how the individual characteristics of users influence their selection of five internet sources (search engines, social Q&A sites, online health communities (OHCs), social networking sites (SNSs), and crowdsourcing sites), for three distinct types of health search tasks (factual, exploratory, and personal experience). We found that individuals' source experience consistently predicted the selection of the four established sources (search engines, social Q&A sites, OHCs, and SNSs) for all types of tasks, whereas the selection of the comparatively new source, crowdsourcing sites, for all task types, was consistently predicted by race and preference for information. Health literacy was positively associated with the selection of search engines for all three types of search tasks, the selection of social Q&A sites for personal experience tasks, and the selection of OHCs for both exploratory and personal experience search tasks. Individuals with better health status were more likely to use SNSs for factual tasks. We also found some influence of personality. The findings suggest a need for interventions to reduce the divides in information access among user groups and for the development of technological innovations to tailor information delivery based on individual differences.

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### 1. Introduction

The internet has become the first or the preferred source for consumers seeking health information (Case, Johnson, Andrews, Allard, & Kelly, 2004; Hesse et al., 2005; Marrie, Salter, Tyry, Fox, & Cutter, 2013; Prestin, Vieux, & Chou, 2015). It offers a wide variety of sources for health searches, including search engines, health websites, social networking sites (SNSs) like Facebook and Twitter, social question and answer (Q&A) services, and many forms of online health communities (OHCs) (Fox & Duggan, 2013; Fox & Purcell, 2010). These sources have different intentions or agendas, and offer different levels of interactivity, with some only allowing information access and others allowing user participation. As a result, their content varies, not only in nature (e.g., evidence-based vs. experience-based), diversity, and quantity, but also in quality. A recent systematic review revealed that information on consumer health websites varies greatly in accuracy and

comprehensiveness (Zhang, Sun, & Xie, 2015). Studies of social media also point to information quality as a major concern (Madathil, Rivera-Rodriguez, Greenstein, & Gramopadhye, 2015; Moorhead et al., 2013).

Sources, as containers of health information, help shape consumers' health beliefs and their mental models of diseases, which in turn influence health behaviors and decisions (Kealey & Berkman, 2010). The impact of sources becomes more significant as consumers are increasingly being encouraged to empower themselves to actively participate in their own health care (Anderson & Funnell, 2005; Seçkin, 2010). Given the popularity of the internet as a channel for health information and the varying quality of information on it, it is important to understand how individuals select sources when searching online for health topics. Several categories of factors have been identified as potential influencers: the nature of information needs (e.g., acute vs. chronic conditions), source attributes (e.g., accessibility and ease of use), user-source relationships (e.g., familiarity and perceived trustworthiness), and the characteristics of individual users (e.g., habits and domain knowledge) (Zhang, 2014a).

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For health information needs, based on interviews or analyses of search queries and user-posted requests, studies have found that users are more likely to use search engines to seek information concerning serious conditions (e.g., cancer, multiple sclerosis, and diabetes), disabilities (e.g., autism), and highly stigmatized conditions. SNSs, particularly those built on known social ties like Facebook and Twitter, are more likely to be used to share benign symptoms and conditions (e.g., headache, stress, and cough), as well as inconveniences associated with those conditions (De Choudhury, Morris, & White, 2014; Zhang, 2012).

In regard to source attributes, search engines, to mention one example, are preferred for their convenience, their ability to pull information from multiple sources, and their perceived privacy (De Choudhury et al., 2014). Wikipedia is often selected because it provides collectively curated introductory and easy-to-understand information for hard-to-comprehend health topics (Zhang, 2014a). SNSs, however, due to people's concerns about privacy and the desire to manage social impressions (Newman, Lauterbach, Munson, Resnick, & Morris, 2011), are sometimes considered an inappropriate venue for discussing health problems (Zhang, 2014a). OHCs, also social platforms, appear to be different. They attract the participation of many people with chronic or stigmatized conditions because of the anonymity they offer (Newman et al., 2011). At the same time, their participatory nature enables people to access personalized information not otherwise available, including recommendations, advice, opinions on treatments, accounts of disease management experience, and social support (Eysenbach, Powell, Englesakis, Rizo, & Stern, 2004; Hartzler & Pratt, 2011; Newman et al., 2011).

User-source relationships are users' perceptions of a source resulting from user-source interactions (Zhang, 2014a). For example, some users reported that they began searches with Google or WebMD because of familiarity, and with MedlinePlus because of perceived trustworthiness (Zhang, 2014a). User-source relationships can be moderated by culture. A multi-site survey by Song et al. (2016) revealed that Koreans and Hong Kongers show more trust in experience-based sources, specifically blogs and SNSs, and use them more frequently for health information than Americans, whereas Americans show a stronger preference for using expertise-based information sources (e.g., WebMD and CDC).

As for the characteristics of individual users, age, gender, and education were found to predict the selection of different social media sources. Adults with less than a high school diploma have lower odds of participating in online support groups than those with at least a college degree (Prestin et al., 2015). Young consumers, women, those highly educated, those with a regular health care provider, and those who have chronic diseases are more likely to use SNSs for health-related activities (Prestin et al., 2015; Tennant et al., 2015; Thackeray, Crookston, & West, 2013). Age, gender, and education also predict the use of blogs for health. Being young, being female, or being highly educated is associated with a greater use of blogs (Prestin et al., 2015; Tennant et al., 2015). The relationship between gender and the use of OHCs may be moderated by age. An analysis of the National Cancer Institute's Health Information National Trends Survey (HINTS) found that men were equally likely as women to participate in OHCs to seek support (Prestin et al., 2015), but another survey of Baby Boomers and older adults found that women reported greater use of OHCs (Tennant et al., 2015).

This review suggests that studies have begun to identify factors that influence people's selection of internet sources for health information. Some studies are based on interviewing participants or analyzing user-generated queries or requests; however, due to their qualitative nature, they have limited power to illuminate how specific factors influence source selections on a larger scale. Some

studies use the survey method, which enables researchers to statistically test the influence of specific factors on source selection, but these studies often elicit users' overall use of a source, largely ignoring the influence of specific health information seeking contexts. To advance the current understanding of the selection of online sources for health information, we embedded hypothetical health information search scenarios in an online survey to study the impact of individual differences on consumers' selection of online sources for different types of health information needs. In practical terms, the results can contribute to a reduction of health communication disparities among different user groups (Kontos, Emmons, Puleo, & Viswanath, 2012) by providing guidance to public health professionals for selecting the proper internet sources for their interventions and to web designers for tailoring information delivery to individual users.

## 2. Conceptual framework

Fig. 1 shows the conceptual framework that guides our study. The framework was drawn from three major theoretical sources: (a) the comprehensive model of information seeking (Johnson & Meischke, 1991), which postulates that demographics and direct health experience impact people's health information-seeking actions, (b) the integrative model of e-health use (Bodie & Dutta, 2008), which posits that personality, demographics, health literacy, and source use history affect people's online health behaviors, and (c) the stress and coping theory (Lazarus & Folkman, 1984; Miller, 1987), which suggests that preference for information, as a trait, influences people's health information seeking. Based on this framework, we explore the impact of the following individual characteristics on the selection of internet sources: demographics (including age, gender, education, and income), health status, personality, preference for information, health literacy, and source experience.

People's information search behavior is affected by the nature of search tasks (Vakkari, 2005); thus, we treated task as a moderating factor. Three types of tasks were defined: tasks that seek factual information (factual tasks), tasks of an exploratory nature with no definite answers (exploratory tasks), and tasks that seek accounts of personal experiences (personal experience tasks). Factual and exploratory tasks were chosen because they have been widely studied in the information-searching literature (Marchionini, 2006; Wildemuth & Freund, 2012), and they show a consistent impact on information search behaviors, including health information search behaviors (Zhang, 2013a, 2014b). Personal experience tasks were chosen because they represent a distinct type of information need (Westbrook, 2014; Zhang, 2013b), and people have different perceptions of them, as opposed to factual and exploratory tasks. They also have a different impact on health-related decision making (Entwistle et al., 2011).

Based on this conceptual framework, our specific research question is: How do individuals' demographics (including age, gender, race, education, and income), health status, personality, preference for information, health literacy, and source experience affect their selection of internet sources (search engines, social Q&A sites, OHCs, SNSs, and crowdsourcing sites) for three types of health search tasks (factual, exploratory, and personal experience)?

## 3. Methods

We used the survey method. This section reports on the survey instrument, the data collection procedure, and the analysis of the data.

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