Online Health-Information Seeking Among Older Populations: Family Influences and the Role of the Medical Professional

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Abstract

There are myriad technological devices, computer programs, and online information sources available for people to manage their health and the health of others. However, people must be technologically and health literate and capable of accessing, analyzing, and sharing the information they encounter. The authors interviewed middle-aged and older adults about their online health information seeking behavior and discovered that technology and health literacy are influenced by a collective ability to manage the health and technological needs of a family. We used information management theory to frame participants' experiences of their self-efficacy using technology to manage the health of loved ones. Findings suggest that health can be co-managed if at least one person in a family unit is technologically "savvy" and able to effectively share health information. However, individuals' confidence in their own literacy often depends on others, usually family members who tend to "do" instead of "teach."

Mediated and technological influences permeate everyday tasks in western culture, and health is no exception (see Qin, Qiang, & Kanliang, 2011 or Tarafdar, Qiang, Ragu- Nathan, & Ragu-Nathan, 2007 for discussion of "techno-invasion"). Health education researchers have been using the Internet and new media applications in interventions in order to increase efficacy (Bernhardt, Chaney, Chaney, & Hall, 2013). For instance, Boulos, Wheeler, Tavares, and Jones (2011) reported the existence of more than 7,000 apps, and by June of 2015, this number had increased to 1.5 million ("Statista," n.d.). The Department of Health and Human Services implemented the federal electronic medical records (EMR) mandate requiring health care providers to adopt and use EMRs by 2015 to provide their patients with access to their medical information online ("U.S. Department of Health and Human Services," 2015). With EMR, patients may monitor and manage their personal health, provided they have the competence necessary to access and use the resources online (Baker, Wagner, Singer, & Bundorf, 2003). Online health information access represents an important component of the day-to-day management of family health, because patients and their physicians can use technology to communicate through mediated channels; patients practice self-care away

from the doctor's office through multiple methods, such as augmenting or supplementing information provided by physicians through information seeking, joining online support groups, or downloading an application (app) with medication reminders.

Technological advances provide a viable and affordable means of helping people of all ages manage their health care needs and concerns, but not all adults are comfortable using technology to manage and monitor their own health or the health of their family members. Information of all kinds, including health, is available via multiple types of media providing resources for health scholars and individuals in their daily lives. However, these potential benefits are tempered by disparities, especially individuals with access to fewer resources (e.g., technology, training) and those managing chronic illness. Further, most research on health co-management has focused on terminal illness or major chronic illness, with less attention focused on common illnesses and information about diet and exercise. In this study, we were interested in how middle-aged and adults use new communication technologies (NCTs)—technological equipment, such as computers, tablets, or smartphones, which one uses for communicating via access to websites, blogs, e-mail, and texting—to seek and use health-related information, and how these processes may be impacted by literacy.

We considered different types of middle-aged and older Americans (e.g., power users, well-to-do, and older men), and their health attitudes and behaviors (e.g., health traditionalists, health technologists), as they relate to the types of health- related websites they access and their motivations for going online, drawing from the model of seniors online health interactions (SOHI model; Macias & McMillan, 2008; McMillan & Macias, 2008). We were interested in SOHI's concepts of the "health situation," defined as "the degree of healthiness" and how the model uses these variables to predict health-information-seeking behaviors (McMillan & Macias, 2008). Using information management theory as a frame, we explored the nuances of how middle-aged and older adults seek health information online and negotiate that information in their relationships.

Technology use and access across the lifespan

Health information is available online outside of medical offices, but disparities exist in access and self-efficacy across populations related to identity, age, and socioeconomic status (Czaja et al., 2006). Adults 65 and older are increasingly using technology but still lag behind adults 18 to 64 in NCT and new media adoption (Kennedy & Funk, 2016); in 2014, Internet usage by seniors increased by 6%, but usage trailed all adults 18 and older by 27% ("Pew Research Center," 2014). Two years later, Kennedy and Funk (2016) noted continued generational differences among adults 50 and older who fell behind younger adults in "trying new technology products" (para. 6). In addition, older adults "face unique issues related to physical and cognitive functioning that can make it difficult for them to find and use appropriate health information" ("Centers for Disease Control," 2009, p. 2). Age is a factor in considerations of technology, especially in later stages in the lifespan. Lifespan perspectives inform health communication research, in areas such as cancer communication research (Sparks, 2003), research investigating social support, physical health, and illness (Uchino, 2009), and how digital stress affects psychological health (Reinecke et al., 2016).

Thus, we were interested in how individuals later in the lifespan use (or do not use) technology to manage health, especially online information seeking and the impact of their technological (il) literacy on their online health seeking behaviors.

Literacy

Using NCTs for health requires multiple types of literacy. *Technology* and *technological literacy* describe competency with physical devices such as computers or tablets and refers to "the ability to responsibly use appropriate technology to communicate, solve problems, and access, manage, integrate, evaluate, and create information to improve learning in all subject areas and to acquire lifelong knowledge and skills in the 21st century" ("State Educational Technology Directors Association," 2007, p. 1). The main requirement for media literacy is understanding a media message by evaluating, analyzing, and questioning content (Schrock, 2015).

Definitions of new media literacy are narrower in scope and device specific (see Bunz, 2004; Safar & Alkhezzi, 2013), but these types of literacy commonly refer to the ability to critically utilize technology and new media to accomplish a goal. eHealth literacy is a concept that addresses the multiple type of literacies necessary for searching for health information online, such as using NCTs, problem solving, and critical examination (Eysenbach, 2001).

The need to fluidly engage in both critical thinking and problem solving with new mediated platforms can be challenging and a source of anxiety. One criterion of health literacy is the ability to obtain health information (Ratzan & Parker, 2000). Individual's ability to obtain health information may be augmented or compromised by personal resources related to technology and new media, in terms of both device access and skill. Additionally, studies support a generally negative association between age and literacy skills related to eHealth literacy. For example, age moderates technology acceptance (Venkatesh, Morris, Davis, & Davis, 2003) and trust (Zulman, Kirch, Zheng, & An, 2011) such that older audiences are less accepting and trust technology less. Thus, we argue that adults as young as 50 contend with varying degrees of technology/ new media anxiety and literacy, which may be a reason that they are often appraised as less technologically literate than younger cohorts (see Zhou, Rau, & Salvendy, 2012). Tennant et al. (2015) found evidence of increasing utilization of "web 2.0" (defined as Internet and social media) for health purposes among baby boomers and older adults. They recommended in-depth interviews with older participants to better understand web-based health information seeking and sharing. Thus, we were interested in aspects of information seeking as well as information sharing.

Health co-management

Interpersonal communication plays an important role in health management through physician patient communication, social support, and/or social capital (Ackerson & Viswanath, 2009). Social networks act as conduits for shared resources (Ackerson & Viswanath, 2009; Berkman & Glass, 2000), especially in terms of health management. Health that is co-managed by social network members is a shared stressor that requires

effective interpersonal communication (see Revenson & Lepore, 2012 for review). Researchers have primarily focused on chronic illness management, as chronic illness requires dyadic management of the stressors associated with the illness as well as the condition itself (Revenson, Kayser, & Bodenmann, 2005). Effective communication is central in helping relational partners adapt, negotiate, and manage a chronic illness (Magsamen-Conrad, Checton, Venetis, & Greene, 2015; Steuber & Solomon, 2011). Berg and Upchurch (2007) illustrate how chronic illness management within a dyad affects both individuals and their partners. One assumption of dyadic chronic illness management is that both partners should be motivated to engage in a joint effort to manage stressors associated with the illness (Bodenmann, 2005), although dyadic illness management is not always symmetrical (Miller & Caughlin, 2013; Revenson & DeLongis, 2011).

Most health co-management research has focused on terminal illness or major chronic illness, with less attention given to common illnesses and information about diet and exercise. We were especially interested in how middle-aged and older individuals and families use technology to manage common illnesses and conditions that are often overlooked. This focus extends the work on the co-management of health by suggesting that health issues such as diet, exercise, and chronic but historically manageable diseases such as herpes, diabetes, and heart disease occur in family contexts (Berg & Upchurch, 2007; Bodenmann, 2005; Revenson et al., 2005) and are managed outside of doctors' offices by patients themselves.

Additionally, health issues such as chicken pox, strep throat, plantar fasciitis, and the common cold are not chronic but can be temporarily intense, increasing the importance of the "health situation" (as described in the SOHI model; Macias & McMillan, 2008; McMillan & Macias, 2008). In the family context, health situations often necessitate multi-person negotiation and management of health information and treatment and do not always result in direct interaction with the medical field, especially if the information needed is online (Macias & McMillan, 2008).

Health co-management requires sharing personal and private information with others. When families and relational partners experience technological illiteracy, individuals may have to alter their information management preferences. For example, individuals who are not technologically literate may be forced to share information that they would rather keep private in order to obtain health information. An example is when health records are only available online. Information related to health is generally considered personal and private by its very nature, and therefore this investigation is framed by information management theory. We were interested in the communicative aspects of health situation management and negotiation in the process of online health information seeking.

Information management theory

Information management theories such as the Disclosure Decision-Making Model (DD-MM, Greene, 2009) describe the process of individuals' disclosure of health information to others. Individuals' perceptions of how others will respond to their disclosures, and their confidence in their own abilities to share information, affect the likelihood of disclosing

(Greene et al., 2012). Efficacy is also salient in terms of ongoing health information management. In a dyadic study of individuals managing cancer and their partners, Magsamen-Conrad et al. (2015) found that both cancer survivors and their partners' perceptions of their ability to talk about cancer directly affected survivors' perceptions of their ability to manage cancer and their general health. Little existing research examines the potential influence of technological literacy, including devices such as computers and NCTs and aspects of new media literacy, such as how to navigate the Internet and find reputable health information sources, on disclosure and/or mediated information on relational communication (e.g., McMullan, 2006). Further, existing research tends to focus on how technology literacy can affect interactions with medical professionals, such as the ability to access information in order to direct diagnoses and receive desired medications, rather than how technology literacy may affect how couples/families communicate about, and co-manage, health (Wagner, Howard, Bentley, Seol, & Sodomka, 2010). Thus, we interviewed adults about their use of technology for information seeking related to health management. The following questions guided our study:

RQ1: How do middle-aged and older adults use technology to seek health information?

RQ2: How do middle-aged and older adults communicate with others about health and technology?

RQ3: What role does literacy play in the process of using technology to seek health information?

Method

Participants

IRB-certified students in a communication research methods class conducted face-to-face, semi-structured, in-depth interviews about technology and health with 55 men ($n = 19$) and women ($n = 36$) who ranged in age from 41 to 98 ($M = 63.01$, $SD = 16.48$). Participants were recruited using a convenience sampling strategy. Initially, we asked students to interview people 50 years of age or older, but recruitment proved to be a challenge. To engage with more participants, the study was extended to allow participants as young as 40. Forty-seven participants were White, seven were African American, and one participant was Hispanic. The majority were U.S. citizens (96.4%), one participant held dual citizenship in the US and Mexico, and one participant was from Guyana. Most had a high school ($n = 26$) or college education ($n = 18$), some held advanced degrees (e.g., MA, JD; $n = 9$), and others had completed up to the 10th grade ($n = 2$). Of those who had college degrees, most were business ($n = 8$), or education majors ($n = 10$). Because of our interest in understanding everyday health management in the context of health and technology literacy, we did not sample for people managing a specific type of illness. Instead, we sampled based on age, as previous research suggests technology-related disparities in middle-aged and older populations.

Procedure

We used multiple field sites and multiple interviewers to establish investigator triangulation and domain validity to increase confidence in the data (Begley, 1996; Guion, Diehl, & McDonald, 2011). Student interviewers received one week of interview training, both general and specific to the semi-structured interview protocol developed by the authors and utilized in this project. Students met multiple times during the subsequent two-week period during which the interviews were conducted to discuss the interview process. In following the protocol, students noted where they conducted their interviews (e.g., in homes), whether the student was alone with the interviewee or if there were others in the room, and if anything happened during the interview that researchers should know about. The students recorded the interviews and, after further training, transcribed their interviews; the authors reviewed the recordings and transcriptions for accuracy, as well as reviewing students' notes for potential problems (there were none). The interviews ranged from 12 to 74 minutes (M = 36.89). We used pseudonyms to protect participants' privacy.

The interview protocol contained a mix of open-ended and scaled questions grounded in research on health and technology literacy (e.g., Donovan-Kicken et al., 2012) and health information management theory (e.g., DD-MM, Greene, 2009). As part of the interview protocol, interviewers explained that they were trying to understand "adults and their technology use, their perceptions of support, and how they might use technology for health." Technology, particularly NCTs, was defined for participants as part of the protocol:

> We are going to focus on new communication technologies. New communication technologies are, broadly, technological equipment that is used for communicating, such as computers, tablets, or smartphones that you can use to access personal websites, blogs, e-mail, and texting. New communication technology does not include inventions that have been around for many years, such as the telephone.

As a part of a larger study, the interview protocol included scaled questions designed to gauge participants' current levels of engagement in online health information seeking, as well as open-ended questions designed to help develop a better understanding of participants' individual experiences. We primarily focus on the open-ended data (e.g., probes that followed scaled questions, such as "Why or Why not?") in which participants described their feelings about the Internet as a health tool in their own words. For example, after telling participants "some people might use technology such as a computer, tablet, or smartphone to look up information online. I'm especially interested in how you might use technology to look up health-related information online," we asked "have you ever used technology to look up health related information online" and asked participants to talk about that experience. Of interest to us in this paper were open-ended questions we used to gather more detailed information about technology support and the usefulness and accuracy of online information, and we asked questions such as "In general, how useful do you think the Internet is in finding health-related information?" to assess these ideas.

Analysis

The interview audiotapes were transcribed, and computer files were made of the data, so that we could use word-processing and Excel programs to manage coding (see Morse, 1991). We

gave each interview a code number, and responses to each question were given subheads (e.g., Q1, Q2a) to facilitate categorization of responses. To address the first research question, we used inductive analysis to describe the process of how middle-aged and older adults use technology for health (Charmaz, 2014).

The first author began to identify overarching themes (e.g., efficacy, incongruences in couples' technology literacy, stigma, and relational health) in her ongoing analysis of data about emerging, middle-aged, and older adults and technology use (e.g., Magsamen-Conrad, Dillon, Hanasono, & Valdez, 2016) by listening to audiotapes of the interviews. These themes related to NCT literacy and information management served as "sensitizing concepts" that guided the types of questions asked and the ideas pursued during our analysis (Charmaz, 2014, pp. 30-31). The second and third authors then immersed themselves in the data through line-by-line readings and re-readings of the interview transcripts (Charmaz, 2014). They reviewed transcripts separately and then discussed potential categories they had noted in the transcripts in an inductive and iterative process via email and one face- to-face meeting. The email exchanges between the first three authors generated theoretical properties of categories (Glaser & Strauss, 1967). All authors engaged in a process of memo writing to expose potential codes and categories to scrutiny, explore potential code and category meanings, and to compare them against one another (Charmaz, 2014). The authors then explored how their categories were linked, in a process similar to one described by Charmaz (2014). Through discussion, the authors agreed that three broad categories (i.e., seeking and using online information, outside influences, and health co-management) represented the data, and further readings of the data revealed no further insight into the categories, thus reaching data saturation. The fourth author reviewed the analysis as an audit check.

Findings

The goal of this study was to investigate elements of adults' use of technology to manage health via online information seeking not described in existing models (e.g., SOHI model; Macias & McMillan, 2008; McMillan & Macias, 2008). We wanted to know how middle-aged and older adults communicate with their family about online health information and the role that technological (il)literacy and/or self-efficacy plays in middle-aged and older adult's use of NCTs to seek online health information for themselves and others. As we sought to understand how middle- aged and older adults seek and use online information, three themes emerged: 1) seeking health information about family members' conditions, 2) the *supplemental* role of participants' use of technology for health purposes, and 3) prioritization of the health care professional. We also found that friends and family members affect how and why middle-aged and older adults use the Internet to find health-related information but these same people were both sources of help and a hindrance for middle-aged and older adults seeking information (see outside influences on literacy and efficacy, Table 1). Finally, our analysis of participants' experiences revealed one category of co-management in which participants' health information seeking motivations, (il)literacy, and efficacy coalesced to influence how couples dyadically negotiated their engagement in online health information seeking (see Table 1).

Seeking and using health information online

As we sought to understand how middle-aged and older adults use technology to seek health information (RQ1), our data analysis revealed three themes; *supplemental information seeking, prioritizing the professional,* and *uncertainty reduction and face.* First, two-thirds of our study participants indicated that they used the Internet for supplemental health purposes, which we call *Supplemental Information Seeking* (see Table 1). Participants did not use the Internet to diagnose or treat a condition unless it was something minor, such as a cold.

However, our participants did frequently talk about using the Internet to determine if they needed to see a medical professional (consistent with the SOHI model "prior to a medical visit"; Macias & McMillan, 2008; McMillan & Macias, 2008), while others talked about seeking health information online "after a visit." In contrast with the SOHI model, our participants utilized technology for supplemental information seeking regardless of if they were an "advanced/power user." For example, a 59-year-old, White female with a Master's degree said, "I probably go to the doctor and have it checked out and then I might go to the Internet to find out treatment alternatives and that sort of thing, but I wouldn't try to self-diagnose my condition or symptoms via the Internet." Some participants, such as this 57-year-old, White female with a high school education, talked about information on the Internet as something they used prior to a visit in order to direct their communication with a doctor (e.g., "during a visit"; SOHI model; Macias & McMillan, 2008; McMillan & Macias, 2008):

> I think you can find just about anything you want to on the Internet and there's a lot of information out there that may not be quite accurate, but it at least gives you the opportunity to form questions to ask your doctor or whatever, you know whoever you're talking to. So you know I, I just think there's lots of information that you can use in other capacities to help learn what you really wanna know.

Prioritizing the professional

The number of Americans who do not have a primary care physician and/or have not visited a medical professional in the last 12 months ranges from 28 to 47% (The Henry J. Kaiser Family Foundation, as reported in Finnegan, 2017; the problem is more pronounced in minority populations), and 80-93% report delaying or forgoing medical care (Zocdoc, 2015). We wanted to explore how online resources might fill this gap. Participants often explained their health seeking processes as a critical examination of the credibility of online sources and the health information gathered. They considered online information a good supplemental source, but it could not replace a healthcare professional. Our analysis revealed that many participants regarded visiting with a medical professional as necessary to manage their health. We labeled this *Prioritizing the Professional* (see Table 1). For example, a 65- year-old, White female participant with a bachelor's degree said, "I think that's stupid" [using the Internet as the sole source of health information; not discussed in the SOHI model, Macias & McMillan, 2008]." However, while our analysis highlights participants' belief that health care professionals are crucial to their personal health management, several participants described the Internet as a useful tool for getting more information about health, "not really treated or cured but more informed for informational purposes only" (59-year-

old, White female participant with a Master's degree) to guide a discussion with a doctor. For instance, "It gives you an opportunity to question your doctor on things that, maybe aren't just so routine for them that they wouldn't even think about telling you" (75-year-old retired political science professor). Online health information can also supplement what doctors discuss with patients. A 65-year-old, White female participant with a bachelor's degree said, "I have a low foot problem called planter fasciitis and… I've looked at information online… about some additional exercises and treatments I can use in addition to what the doctor has suggested." Additionally, some participants shared that they go online for health information at the recommendation of their physician: "In fact, doctors will say… to check out this website, it'll give you more information." Participants described the Internet as tool for when the medical professionals cannot "figure out what's wrong" with them.

Adults in our sample used online health information access through NCTs as something of a bookend — before and after going to see a doctor, which is consistent with the SOHI model; however, these themes were represented across user types beyond the power or advanced user identified in Macias and McMillan (2008). We did not see evidence of middle- aged and older adults using online resources to replace the medical professional. Instead, they used information online to supplement health management, not for diagnosis and treatment. This prioritization of the professional reinforced the position of institutionalized medicine as a *required* component of middle-aged and older adults' lives, as one White, 75- year-old participant explained that for him, the Internet could not enable him to have full *control* over his health "because control of my health would only be through a medical profession - a doctor, hospital, surgeon."

Uncertainty reduction and face

Finally, the participants in our sample talked about using online resources to investigate the health of their social network members. We labeled this final theme *uncertainty reduction and face* (see Table 1). For example, a few participants talked about using the Internet to get information about a loved one's health condition, because they wanted to learn more about a diagnosis but did not want to ask directly, consistent with previous research (e.g., Macias & McMillan, 2008). This was frequently with a less proximal relative; however, we also found evidence of online information seeking as an uncertainty reduction strategy, separate from active comanagement of another's health.

Analysis of our data revealed that participant's purposes for seeking health information online were often motivated by a desire to reduce their uncertainty regarding a close family member's condition. For example, one participant explained that "I want to understand what they're going through and what we can anticipate in the future." Thus, participants would engage in online health information seeking for a family member as a means to gain information regarding their health without having to ask that family member directly. Utilizing the Internet as a health-information-seeking mechanism enabled participants to reduce uncertainty regarding their family member's condition without having to ask questions they felt might be perceived as overwhelming or face-threatening in the context of difficult diagnoses. For example, one 55-year-old female participant explained that when a

family member had been "diagnosed with cancer, I looked up the, what it was called to see, you know, everything I could about it." Her health-information-seeking behaviors helped her better understand the diagnosis; they were not an attempt to influence the health of her family member. A 56- year-old high-school educated female participant explained that after receiving information about their family member's chest pains, they looked online to help better understand the diagnosis. "I couldn't get their explanation and I looked it up to see if there's anything new in the MS field and that type of thing." This is also true when our participants described family members' health conditions and their desire to learn more about that condition without directly asking the person.

"Computer" literacy and outside influences

As we examined the role literacy plays in the process of using technology to seek health information (RQ3), we found evidence of Norman and Skinner's (2006) original conceptualizations of computer literacy. Although described as "computer" literacy, the concept refers to the ability to adapt to the myriad new technologies and software people may use to access the internet, and/or to manage health. Our analysis revealed that online health information seeking necessitated "computer" literacy, and that family members play an important role in managing literacy, including access. Middle-aged and older adults talked about computer literacy (e.g., how to use a mobile device or computer) and "new media" literacy (e.g., how to use the Internet or social media) beyond just using these devices or media for health. That is, they talked about using the Internet for health, but they also talked about just getting to the Internet and their struggles with technology, in general: "It is kind of complex to access it and to work it" (58-year-old Black man with a high school education). However, the middle-aged and older adults in our sample also described information assessment (related to one of the literacies Norman & Skinner, 2006, described) in ways that were very astute. Our participants' statements reflected competency in critically analyzing sources of information in spite of struggling with "computer" literacy. For example, Connie, a 55-year-old, White woman who majored in psychology and completed law school discussed the accuracy of the information online rating it a zero out of ten "Because you know, who knows who's writing that? They can say they're doctors or whoever got their doctorate at you know, Harvard, but they could be you know, Joe Shmoe, and they don't know what they're talking about, so, you really can't believe anything anyone says on there."

Rather than focus on the type of literacy (e.g., computer, media, or information) in our analysis, we focused on how our participants described how outsiders influence technology literacy and access. For example, several people talked about their spouses and children when they talked about how they get access to NCTs. Most people talked about family members, such as children and grandchildren, teaching them to use NCTs. We labeled this *Outside Influence on Literacy* (see Table 1).

In general, we found that communication with family members and sometimes friends was a driving factor in the development and perception of individuals' own technology literacy, whether in terms of needing help from others in order to utilize NCTs or wanting to learn to utilize NCTs in order to connect with others. Regardless of socioeconomic status, middle-

aged and older adults cited relationships, especially with family members, as an impetus for why they would want to use NCTs (i.e., for "interpersonal communication", a behavior associated only with "the well to do" in McMillan & Macias, 2008). Bertha, 71, a White female with a 10th grade education told us she uses NCTs "because I'd like to communicate with my grandkids and see them because they're so far away. I can see how they're growing and their personalities and stuff, and I'd like them to know me, too." Thus, family members and friends influence the literacy (knowledge and skills) of our participants as well as motivations.

Stigma and efficacy

We found that participant's interactions with technology often necessitated managing stigma and feeling confident. Efficacy is an important concept in health literature and reflects a confidence in one's ability to perform a desired action. Self-efficacy (Bandura, 1982) applies to a number of different circumstances and describes individuals' confidence in their ability to do something, for example, to adopt healthy behaviors such as joining and maintaining active participation in an exercise program (Sniehotta, Scholz, & Schwarzer, 2005). When analyzing how people manage health using online information sources, we found efficacy related both to information seeking and information sharing. For our participants, "online information seeking efficacy" — confidence in their ability to search for information on the Internet — was often discussed in the context of others' appraisal of their abilities. We call this *Outside Influences on Efficacy* (see Table 1).

Individuals presented stories in which they seemed confident in their ability to use the Internet to access information, but their efficacy diminished when they went on to talk about their family members' influence. For example, Lateesha, 45, a Black female with 1.5 years of college who studied business, described a high level of self-efficacy when it came to online information seeking despite the frustration her son communicates when helping her use technology. Like several participants who discussed how social network members wanted to "do" instead of "teach," she explains:

> Well sometimes my son is not as patient with me when it comes to um showing me something technology wise… and I just need him to sometimes show me. So I can do it sometimes. He just wants to do it for me or set it up for me, and I rather he just show me you know that kind of frustrates me, frustrates him too but I just want to be shown more than like I'll do it.

Family members' communication strategies can exacerbate adults' experience of anxiety or frustration about online information seeking, as we see in Lateesha's story, affecting how confident they feel in their abilities.

Unfortunately, people within and outside of an individual's social network engage in communication that negatively affects efficacy and perpetuates self-stigmatization. Many participants described their experiences with technology negatively sharing how others made them feel or look "stupid" in the context of their technology use. They also expressed anger because of how others, usually individuals outside of their social networks, treated their less technologically literate partners. For example, one 58-year-old, White female participant

with a high-school education shared the following regarding her partner's discomfort during a shopping experience at a department store when they asked for his email address:

> "We can email you the coupons." 'I don't have a computer. I don't use a computer' is his answer. And they kind of look at him like he is stupid. He is nowhere near stupid, it's just not his era… If you don't have an email or computer or whatever … you should be able to tell them. I don't think they should try to embarrass you or belittle you and make you feel stupid because you don't have it.

Thus, family members, friends, and even outsiders influence middle-aged and older adults' efficacy through their communication and also provides insight into how middle-aged and older adults communicate with others about health and technology. Exploration of participants' communication about health and technology revealed experiences of frustration with technology, literacy, and efficacy continued to surface in participants' stories, especially as they talked about communication with their social network members about technology and health. This aspect of online health-information seeking has been explored less, if at all, in previous research.

Co-managing health, information, and technology

In our examination of the communicative processes associated with middle-aged and older adults' experiences with online health information seeking (RQ2), our analysis revealed a dyadic negotiation (i.e., co-management) of technological literacy and health needs highlighting *how* communication facilitates this process. Our participants discussed how a "health situation" (Macias & McMillan, 2008; McMillan & Macias, 2008) necessitated co-management among multiple communicators (labeled *Health Co-management,* see Table 1). Although seeking health information is discussed as a motivator in other research, less research describes the nuances of how that communication unfolds. For example, Erika, a 43-year-old Hispanic woman with a master's degree in education expressed an awareness of her lack of knowledge related to diabetes. Erika stated that "my husband just got diagnosed with diabetes so we were finding out what you know like what he needed to eat or what he needed to do," and so she uses resources available on the Internet (such as YouTube) for health information. These aspects of online information seeking are different from those in the *uncertainty reduction and face* theme of Seeking and Using Online Information as we turn the focus to action- oriented information seeking and how it affects communication and relational processes. For example, Erika described how looking for health-related information online helps her feel in control of managing her husband's health because "It helps me to figure out what we can do." Donna, a 57-year-old woman who has attended some college, uses technology to manage both her own health condition (diabetes) and her husband's gallbladder condition. She echoed other participants' sentiments about the Internet as an information source that supplements traditional medical care. She states:

> I have diabetes, so I can read articles about it. And Fred's starting to have problems with his gallbladder so I mean like yesterday I was thinking what can I make for dinner that wouldn't bother his gallbladder well you're not gonna call the doctor's office and be like 'hey what kinds are food helpful' so I went to the Internet.

Additionally, managing health is iterative and requires communication between multiple sources, with the Internet potentially playing an information source role. Consider the following example that includes a grandmother, granddaughter, mother, physician, and the Internet. Nancy, 62, a White female with a high school education, illustrates the iterative nature of co-managed health, interpersonal communication, and technology.

> My granddaughter has had what you might diagnose as pre-asthmatic, and she started out with breathing difficulty, so a before we [mother and I] went to the doctor, before we say specialists we looked up just to understand some symptoms of asthma to see if we were even in those categories or see if we were in the right line of a of what to do next. That was helpful to know how to separate symptoms… they always send you to a doctor, general med doctor, before you see a specialist. Then the information you get from there are so helpful again things you can look up. And be sure and look up information [they] are giving you and find your options to see how you could kinda correct whatever situations or help whatever situations you're in.

Our participants talked about online health information seeking in ways that illustrated how the information sought and gained informs and directs both communication with others (from family members to physicians) as well as action- oriented health management behavior.

As we analyzed the role literacy and communication processes play in seeking health information, we found that how middle-aged and older adults use technology and their technological (il)literacy contributes to how they both communicate about and (co) manage their everyday health. The ability to use technology to find health information does not always translate into feelings of self-efficacy or technology literacy for people who feel stigmatized by their limited abilities to use technology, especially when the source of that stigma is within their social networks. Our participants described how they use the Internet to co-manage health despite social network members who diminish feelings of efficacy. Donna describes her interactions with family using words such as "frustrated" and "annoyed" with her technology literacy. Another participant, Barbara, a 55-year-old, White woman with a degree in education, is fairly confident in her technology literacy but her efficacy diminishes during interactions with her husband, age 59, "because he is a computer person and he gets frustrated when I don't know what I am doing." Experiencing her husband's frustration often makes her "feel like I want to quit." However, Barbara, like many of the women in our sample, is the individual primarily responsible for her family's overall health information management, which is consistent with research that identifies women as more likely to search for health information online than men (Fox, 2006). Accessing, interpreting, and applying health information that can be found online can improve understanding of and ability to manage health. Our findings indicate that middle-aged and older adults' technology literacy may especially depend on communication competencies of family and friends, as processes of seeking, sharing, and applying information intersect.

Discussion

We sought to understand how middle-aged and older adults use technology for health, as well as the role literacy plays in how middle-aged and older adults communicate with others about technology and health. We discovered that our participants use technology for health information seeking with some participants displaying more confidence than others, which is consistent with the SOHI model (Macias & McMillan, 2008; McMillan & Macias, 2008). Although McMillan and Macias (2008) furthered general understanding of types of online health-information seekers by identifying distinct types of older Americans, and they focused less on the related roles of literacy, friends, and family members. Middle- aged and older adults are unlikely to replace traditional medical advice with information they can find online. When middle-aged and older adults seek information online, it is primarily for the purpose of supplementing what they would have learned through more traditional methods, and often for family members (e.g., learning more about a loved one's condition). Many women, for example, talked about using online resources to help manage the health of a loved one. These nuanced and overlapping processes become more complicated when considering the multiple types of literacy and efficacy necessary to seek and share information gleaned online. Family members are described as a primary source of help as well as a primary source of stigma. Although family members are described as the people from whom middle-aged and older adults seek help in navigating technology, family members are also described as impatient, engaging in behaviors that make middle-aged and older adults feel stupid and ignored, and reducing middle-aged and older adults' efficacy.

As more information moves online and technology continues to "invade" personal life (Tarafdar et al., 2007), the need to successfully use technology to access and manage information, including health information, is more pressing (Xiao, Sharman, Rao, & Upadhyaya, 2014). In this study, we sought to assess and understand technological access and management of health beyond chronic illness. To meet this goal, we focused on the online health information seeking patterns of middle-aged and older adults within the general population, not individuals who would have a heightened need to research their health (Ayers & Kronenfeld, 2007). We also sought to establish a deeper understanding of barriers to online health information seeking (e.g., accessibility) and how that information is used in conjunction with the medical field (both concepts in the SOHI model, Macias & McMillan, 2008; McMillan & Macias, 2008). Our research revealed that many middle-aged and older adults question their ability to effectively access needed information, even as they find themselves responsible for understanding and managing the role of technology in personal health management for themselves, their partners, and/or other members of their families; their efficacy is affected by those around them.

Research indicates that age is a factor in eHealth literacy. Our research suggests that is also the case with the assessment of online health information. However, we frequently found that concepts of literacy, ability, and assessment were somewhat conflated. That is, some participants' evaluation of the Internet as an information provider centered around their own personal limitations and concerns about their ability to use technology. Many others, however, assessed online health information sources in ways that demonstrated eHealth literacy, such as when they discussed source quality and accuracy even while they struggled

with their personal limitations using their technological devices (e.g., tablet, laptop) to access online health information sources. Several participants in our study questioned the quality of information found online, which can be used to provide more nuanced understanding into levels of eHealth literacy established in previous quantitative research. For example, Sillence, Briggs, Harris, and Fishwick (2007) found that participants' trust in online health information sources was impacted by their appraisal of the individual or organization that posted the information. Most of the participants in our study represent the Boomer (individuals born between 1946 and 1964; see Oblinger & Oblinger, 2005) and Builder (born 1900-1946) generations. At first glance, our findings seem incongruent with previous research about age and eHealth literacy, which generally suggests that middle-aged and older adults are not eHealth literate unless they are "power users" (McMillan & Macias, 2008). However, when we consider the items in the eHEALS scale (e.g., if individuals know "how to find helpful health resources on the Internet"; see Table 1 in Norman & Skinner, 2006), many of our participants may answer that question based on their confidence that helpful information actually exists, rather than on their ability to find the information. This reticence may manifest in quantitative analyses, as indicating less *literacy* among the Boomer and Builder generations when it could really be indicating the middle-aged and older adult's distrust of health information online. This lack of trust is consistent with previous research that older Americans are less trusting of information found on the Internet than younger Americans (e.g., emerging adults, Zulman et al., 2011).

Although information, media, and computer literacy as described by Norman and Skinner (2006) address aspects of the challenges our participants articulated, technology has changed so significantly since 2006 that future research might address how the competencies themselves have changed in order to better reflect the subtler nuances of these distinct yet interrelated competencies. Norman (2011) addresses this challenge in an article about the challenges and opportunities with eHealth as an evolving concept. Since then, scholars have made great strides in addressing eHealth challenges related to operationalization (e.g., Chung & Nahm, 2015), and even specifically related to "internet skills" (Van Deursen & Van Dijk, 2011), but less has been done conceptually with the core components. "The fundamental collection of skills that comprise eHealth literacy have not likely changed" (Norman, 2011, p. 5); however, "the Internet has changed" (p. 4) especially with the advent of social media, and we need more work that addresses this knowledge gap. Thus, our investigation of online health information seeking among middle-aged and older populations helps clarify phenomena potentially overlooked in survey- based research; what may manifest as "low eHealth literacy" as measured numerically may actually be a reflection of middle-aged and older adults' skepticism/trust. Scholars should work to determine the distinctions between elements of eHealth literacy that represent a lack of skill or knowledge and the element of rigorously evaluating available information and finding it lacking.

Our findings also suggest that adults as young as 40 encounter health and technology literacy-related stigmatizing events that have long been associated with adults over 50. In our study, people in their forties indicated that they experienced high levels of anxiety and frustration as they tried to use new technologies if they felt that they were less technologically literate than others. We also found that communication about technology skills and abilities within the family unit has the potential to have a significantly negative

impact on relational and individual efficacy. Participants managed their own anxieties and frustrations regarding their technological illiteracy, but they also experienced diminished efficacy as a result of social network members' stigmatizing communication patterns. Future research should continue to explore social network members' communication about technology, especially as it has important implications for reducing disparities in accessing online health resources. When done properly, communication in social networks actually helped our participants build their technological literacy.

Communication regarding the technological (il)literacy of partners and family members can serve as a catalyst for refining one's technological literacy and information seeking skills. Our participants emphasized that "demonstrating" approaches, or engaging them in the information seeking and learning process, were most effective in helping them learn new technology skills. Participants expressed distress, however, when family members completed the technological processes for them as it perpetuated their reliance on their family members rather than giving them the tools to seek out information for themselves in the future. Technology acceptance and use theory advises that the degree to which the technology seems easy to use and the degree to which people feel they have resources available for help are important predictors in adoption (Venkatesh et al., 2003). Future research should investigate communication/teaching strategies for the average person who wants to help others learn technology while minimizing harmful teaching strategies that can cause increased self-stigmatization, and a decrease in information seekers' efficacy and eHealth literacy. Practitioners could advise family members on how to find programs in the community that create facilitating conditions for better learning. For example, Sánchez, Kaplan, and Bradley (2015) refer to Generations United, a database of organizations in Washington, D.C. that run intergenerational programs to positively affect multiple generations of people. Magsamen- Conrad et al. (2016) discuss a program in the Midwest where college students receive class credit for teaching free technology classes to middle-aged and older adults at a local senior center. Woodward et al. (2013) investigate a peer-to-peer technology program in which more technology literate older adults teach less adept older adults.

Co-management

The idea of co-managing health emerged from our interviews, especially as participants discussed their perceptions of the usefulness of seeking information online. Individuals frequently shared that they sought health information for others in their family. In health co-management, individuals are often engaged in an overlapping and iterative process of information seeking, assessing, and sharing. Ackerson and Viswanath (2009) state "forms of interpersonal communication that may impact health are many and include information seeking, uncertainty management, and mediated social interaction" (p. 6). Our work supports this claim and shows evidence of information sharing processes: an individual may share information about a health concern with a loved one, prompting that loved one to seek information about the health concern (potentially online) and then share that information with the individual. This process necessitates coordination of multiple communication practices, efficacy, and competent communication underscoring the importance of examining these processes from a lifespan perspective, as this perspective provides context

for change in communication and use of new communication technologies beyond just "age."

We argue that technology literacy affects individuals' ability to manage personal and family health (e.g., information seeking, apps that help manage health). Despite the usefulness of technology in both personal and co-health management, many technological advancements are not accessible to low health literate and/or low technology literate individuals (Choi & DiNitto, 2013; Kontos, Blake, Chou, & Prestin, 2014). In some instances, only one member of a couple or family may be able to operate current technology and/or adapt to technological innovations in the future, which may necessitate information sharing. We know from existing research that both information seeking and sharing processes have implications for both health and relational outcomes (e.g., see communication privacy management theory, Petronio, 2002; DD-MM, Greene, 2009; theory of motivated information management, Afifi & Morse, 2009). We know less about how these processes are affected by technology use, adoption, and literacy, for example, as informed by unified theory of acceptance and use of technology, and how these processes may intersect (Venkatesh et al., 2003).

Our findings suggest that co-management of health requires successful navigation of multiple processes related to information seeking, including assessment, ability, efficacy, and information sharing. Efficacy is an important component of the information sharing process (Greenberg & Smith, 2016; Greene, 2009). However, information theory focuses more on individuals and their assessment of the information and the receiver, with feelings of efficacy about sharing personal/private information stemming both from aspects of the relationship as well as of the individual (Greene, 2009; information management; see Venkatesh et al., 2003; authors, for efficacy as related to technology). When considering the intersection of dyadic health management and technology, there are additional challenges beyond literacy that are accomplished through communication, for example, the *ability* to accurately share health-related information with others, and individuals' confidence in that ability, which we call Health Information Disclosure Efficacy.The ability to accurately and effectively communicate health-related information to loved ones should not be underestimated in terms of individuals' and families' health management. Individuals must often manage their collective health information on multiple levels. First, they must communicate with people in their social network(s) about their health and then manage their health utilizing information seeking strategies. They must then continue on to communicate competently and share the health information they have learned. This process is further complicated by incongruence in technology literacy, especially when e-health or m-health management strategies are expected, and when the person who is generally responsible for health management is not the person who is most technologically literate.

The health management challenge for families in which the individuals who are typically tasked with family health management but lack efficacy and/or ability is only one such context. However, this may be especially salient in situations where individuals assume the role of "family health manager" because they happen to be technologically literate. U.S. women, for example, have significant need of literacy in this context because of cultural expectations that they act in ways that support the family, a norm that often makes them

more likely to serve as the primary decision maker regarding their and their family's health issues (Nussbaum, 2000). In light of the gendered nature of family care and women's active leadership in family health decisions, we argue that the need to co- manage the health of family members may further their motivation to seek health information online and make technology literacy, information seeking efficacy, and information sharing efficacy particularly important for women.

Sharing medical information competently is a skill that even medical professionals find challenging (Wittenberg, Goldsmith, Ferrell, & Platt, 2015), so it is not surprising that this also presents a significant hurdle to individuals as they co-manage health. These processes are likely further complicated by the anxiety and uncertainty generally surrounding illness communication (e.g., Mishel & Clayton, 2008). Future research needs to investigate the ways that these theoretical frameworks can be understood and integrated to better explain communicating about health in relationships, especially in the context of technology. Teaching your significant other or another family member to engage with technology themselves can serve as a way to mitigate the pressure and stress associated with being the sole provider of technological support, but this process comes with its own challenges as previously discussed.

Limitations and future implications

Previous work and observation indicated evidence of older adults being "treated differently," and we struggled with how to capture this experience without leading participants. Although the interview questions that directly assess potential stigmatization are at the end of the protocol, and we found evidence throughout interview transcripts to support themes of stigmatization and differential treatment, it would have been better to find a more neutral way to ask if participants had stigmatizing experiences.

Participant recruitment was difficult, and therefore, more work with older populations is warranted. This project was also limited in that we only interviewed one member of a family unit and did not collect a dyadic perspective on health-informa- tion co-management. Future research is needed to explore how communication and caring roles related to health management emerge in families and how these roles are impacted by technology. More specifically, research could explore if individuals with higher literacy in a dyad are also expected to communicate better, and if they are responsible for not only accessing information online but also translating it to their less literate family member. Questions could be posed regarding the intersections of everyday health co-management and technological literacy that include: What is the relationship between the roles of "communicator" and "the literate?" What is the relationship between technology literacy and the individual's skills as a communicator? What happens in terms of both health management and family communication dynamics if "the communicator" lacks skills necessary to adopt both roles?

Importantly, the conversation about health co-management is slightly different from the conversations about care-givers managing a loved one's chronic illness, an area where copious research exists. In that context, people have a dual role of both caregiver and partner that affects their information seeking habits. Our study demonstrates how individuals

navigate the challenges presented by technology literacy when attempting to manage the health of their loved ones. Previous literature has already established that informal caregivers, those who care for ill or aging adults, can experience significant psychological stress (Noonan & Tennstedt, 1997). However, little research has examined how technological literacy impacts how couples attempt to co-manage health and how this process impacts the informal caregiver, the person who helps daily to manage serious health issues that are sometimes chronic, sometimes temporary but intense, and perhaps should be handled by a doctor but are instead managed in the home. Further research about how families negotiate the learning and management of new technology and health skills within their family roles and daily lives can provide more nuanced insight into this co-management process. There are indications that this research will be important in health management. A recent PEW study, for instance, found that caregivers search for health-related information more than patients and find that information useful as they attempt to care for their loved one (Fox, Duggan, & Purcell, 2013). Technology provides an immense range of options that can help caregivers better manage the health of their loved ones. However, our research indicates that the primary and every day caregiver may not possess the necessary technological literacy to use these resources, requiring couples to rely on one another to adequately address both technological and health needs.

Acknowledgments

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Table 1.

Information seeking, efficacy, stigma, and health co-management.

Categories	Illustrative Interview Quotes Themes	Quote
Seeking and Using Online Information	Supplemental Information Seeking	When I go to a doctor and something new is brought up, I always try to find additional information to find out as much as I can or if there's a procedure that I have to undergo, I always try to look it up to get an idea of what to expect … breathing difficulty so a before we went to the doctor, before we saw specialists, we looked up just to understand some symptoms of asthma to see if we were even in those categories or see if we were in the right line of a… of 'what to do next that was helpful to know how to separate symptoms
	Prioritizing the Professional	I wouldn't go to the computer to check out [my condition]… I would go to a doctor to have it checked out. I wouldn't want to listen to another person other than a medical source. Or a company, a drug company or something Control of my health would only be through a medical profession. A doctor, hospital, surgeon
	Uncertainty Reduction and Face	I always try to look it [illness] up to get an idea of what to expect and if I have a family member that's ill, because it's not happening directly to me I want to understand what they're going through and what we to, what we can anticipate in the future.
Outside Influences	Outside Influences on Literacy	Um, It was frustrating because when I got this it was my smartphone, I got it I thought I would be able to use it right away just like the old phone, umm it was a little aggravating, but uh I was treated fine because it was one of my kids, I had no problem and he was very patient to a point with teaching me how to use the different apps and how I needed to get to where I needed to be. I think some [family members] are very busy, don't have time to answer questions, some of the ya know maybe children and grandchildren think that I should know this and don't want to take the time to listen and deal with my frustrations with it.
	Outside Influences on Efficacy	My kids and in-law kids- if we are all in a discussion about some part of technology and if I even interject something it's just ignored like I'm not even there. I think there's just this um, kind of an attitude that because I'm older that I can't possible understand it… [there] may be some truth to that (chuckles) um per- from a personal stand point, not generally speaking but, you know I think, I think sometimes young people think that we're just you know too old and dumb to understand how it works That's kinda a common thing when I can't remember my passwords to things… I feel like I get treated like im not very bright (laughter)
Health Co-Management		My husband's having—Monday-some knee surgery done, and it's an experimental surgery. We did a lot of lookin that up online to see how safe it was and how successful it was and so it was good to be able to do that. Recently my husband has had these coughing attacks and it's something he has dealt with for a long time and it's something we had looked up to further our information as it arises is how we use it. Not necessarily how often. My husband just got diagnosed with diabetes so we were finding out what you know like what he needed to eat or what he needed to do.