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The Influence of eHealth Literacy on Perceived Trust in Online Health Communication Channels and Sources

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Abstract

Disparities in online health information accessibility are partially due to varying levels of eHealth literacy and perceived trust. This study examined the relationship between eHealth literacy and perceived trust in online health communication channels and sources among diverse socio-demographic groups. A stratified sample of Black/African Americans ($n = 402$) and Caucasians ($n = 409$) completed a web-based survey that measured eHealth literacy and perceived trustworthiness of online health communication channels and information sources. eHealth literacy positively predicted perceived trust in online health communication channels and sources, but disparities existed by socio-demographic factors. Segmenting audiences according to eHealth literacy level provides a detailed understanding of how perceived trust in discrete online health communication channels and information sources vary among diverse audiences. Black/AAs with low eHealth literacy had high perceived trust in YouTube and Twitter, while Black/AAs with high eHealth literacy had high perceived trust in online government and religious organizations. Older adults with low eHealth literacy had high perceived trust in Facebook but low perceived trust in online support groups. Researchers and practitioners should consider the socio-demographics and eHealth literacy level of an intended audience when tailoring information through trustworthy online health communication channels and information sources.

Keywords

Perceived Trust; eHealth Literacy; Health Information Seeking; Audience Segmentation

Equitable access to health information is a priority in the United States (Lustria, Smith, & Hinnant, 2011). Greater health information accessibility enhances health-related knowledge

(Benigeri & Pluye, 2003) and decreases costs associated with overuse of expensive healthcare services (Cline & Haynes, 2001). The Internet is an invaluable tool to facilitate access to health information, engage the public, and disseminate health information. Approximately 90% of U.S. adults have Internet access (Pew Internet and American Life Project [Pew], n.d.a). However, Internet access alone will not eliminate disparities in online health information accessibility (Overton & Bodie, 2014).

Disparities in online health information accessibility exist, partially due to variability in eHealth literacy, or the skills needed to seek, find, appraise and evaluate health information from electronic sources to address health concerns and make health decisions (Norman & Skinner, 2006a). For example, health consumers regularly consult the Internet to supplement health information provided by their physicians, who are viewed as a trusted source for health information (Hesse et al., 2005; Hu et al., 2012). Low skills in navigating and evaluating online health information may result in misinterpreting health behavior recommendations or inaccurately evaluating the quality of health information resources (Benotsch, Kalichman, & Weinhardt, 2004). Also, difficulties locating and understanding online health information may negatively influence health consumers' perceived trust in and access to potentially valuable online health information resources (Thiede, 2005; Ye, 2011).

There is a limited understanding about the relationship between perceived trust in online health information and health literacy (Diviani, van den Putte, Giani, van Weert, 2015), as well as eHealth literacy. It is also unknown how perceived trust in health information from specific online health communication channels (e.g., Facebook, diaries/blogs) and sources (e.g., healthcare providers, peers) varies by socio-demographic factors (e.g., race, age) that have been traditionally associated the digital divide. This study explores how socio-demographic factors interact with eHealth literacy to influence perceived trust in online health information. Attention was given to exploring which specific channels and sources were most and least trusted among diverse audiences with low and high eHealth literacy.

LITERATURE REVIEW

The convenience and efficiency of the Internet is particularly popular for patients who desire quick answers and feedback, such as information on common health remedies and emotional support to cope with day-to-day medical challenges (Fox, 2011). Social media is used by 75% of Internet users (Pew, n.d.b.) to review health information webpages, navigate to social media pages on specific diseases and disorders, and evaluate health information posted by lay health advisors, peers, and medical providers to supplement healthcare advice (Amante et al., 2015; Li, Orrange, Kravitz, & Bell, 2014). The use of personalized social media is also associated with perceptions of enhanced social support (Chou, Hunt, Beckjord, Moser, & Hesse, 2009; Neiger et al., 2012). However, the skills required to effectively use the Internet are dynamic and sometimes complex, which may deter health consumers from locating credible Internet sources and channels for health information available online (Ye, 2011).

Perceived credibility of online health information is based on the trustworthiness of the information source and the accuracy of the content provided (Freeman & Spyridakis, 2004).

Perceived trust in online health information is positively associated with the level of ease to access, locate, and understand the information (Ye, 2011). Individuals with high eHealth literacy evaluate the accuracy and quality of online health information with great scrutiny (Neter & Brainin, 2012; Norman & Skinner, 2006a). Also, those health information seekers with low eHealth literacy typically have a distorted perception of the credibility of online health information, often rating low-quality information as being high-quality (Benotsch et al., 2004).

The Internet is hybrid in nature, as it is comprised of various channels and sources that operate in varying contexts (Mittman & Cain, 2001). Defining the Internet without accounting for the heterogeneity of online channels and sources oversimplifies the Internet as a tool to provide health education to diverse populations. Perceived trust in the Internet as a health information tool has been examined (Hesse et al., 2005; Zulman, Kirch, Zheng, & An, 2011), but perceived trust in specific online health information sources and communication channels is largely unknown, especially among individuals with low and high eHealth literacy.

Health communication channels are mediums by which messages are disseminated to an audience. These channels include mass and social media, such as newspapers, YouTube, blogs (Robinson & Goode, 2014). Health information sources are considered the person, organization, or entity that is responsible for designing and delivering health messages (Fox & Duggan, 2013b). Health communication channels are distinct from health information sources, yet they both work together to disseminate health information among healthcare consumers (Rimal & Lapinski, 2009). Understanding which health communication channels and sources are most trusted among diverse groups with low and high eHealth literacy can assist health communication specialists and healthcare providers to better reach priority populations to optimize behavioral outcomes.

Older adults have less trust in the Internet for health information (Hesse et al., 2005) and lower eHealth literacy than their younger counterparts (Neter & Brainin, 2012; Tennant et al., 2015). However, older adults who use the Internet have greater perceived trust in the Internet for health information than their offline counterparts (Miller & Bell, 2012). Zulman and colleagues (2011) further reported that older adults distrust the Internet as a health resource, yet the association between older age and Internet use for health information became non-significant after controlling for confusion/frustration using online health information and self-reported inexperience and technical difficulties using the Internet. This finding suggests that eHealth literacy may significantly affect perceived trust in online health information among older adults.

Women typically have greater health literacy than their male counterparts (Corrarino, 2013; National Center for Education Statistics, 2003) and racial/ethnic minorities generally have lower health literacy than Caucasians (Paasche-Orlow & Wolf, 2007; U.S. Department of Health and Human Services, 2008). While women and Caucasian adults are most active online health information seekers (Cohen & Stussman, 2010; Fox & Duggan, 2013a; Lorence, Park, & Fox, 2006; Manierre, 2015), current evidence suggests no significant racial or gender differences in eHealth literacy (Neter & Brainin, 2012; Robb & Shellenbargar,

2014; Tennant et al., 2015) or perceived trust in online health information (Hesse et al., 2005; Smith, 2011).

High eHealth literacy (Neter & Brainin, 2012) and perceived trust in health information resources (Thiede, 2005) are indicators of health information accessibility. Currently there is a fundamental gap in the literature examining the relationship between eHealth literacy and perceived trust in health information among audiences with diverse socio-demographic backgrounds. Exploring the relationship between eHealth literacy and perceived trust in health information from specific online and offline channels and sources may help health education and communication practitioners understand how to best communicate health messages to audiences with low and high eHealth literacy (Kontos, Blake, Chou, & Prestin, 2014).

Audience segmentation is used to identify homogenous groups in a given population (Noar, Harrington, & Aldrich, 2009). Dutta-Bergman (2003) state that, “online health consumers are not a homogeneous entity and should not be treated as such...[i]nstead, they should be clustered into groups...” (e21). Segmenting diverse online audiences based solely on socio-demographic factors has limited use (Noar et al., 2009). However, using diverse socio-demographic factors to determine the relationship between perceived trust in health information and eHealth literacy can further confirm how perceived trust and eHealth literacy are indicators of health information seeking and accessibility (Divani et al., 2015; Thiede, 2005; Ye, 2011). Moreover, greater understanding of these relationships may allow health communication practitioners to reach and engage more homogenous audiences with trusted health information (Forthofer & Bryant, 2000).

Currently, little is known about how low- and high-eHealth literate adults perceive the trustworthiness of health information located from online health communication channels and information sources. Therefore, this study aimed to understand the relationship between eHealth literacy and perceived trust in online health information sources and communication channels based on diverse socio-demographic characteristics.

H1: The relationship between eHealth literacy and perceived trust in online health information will be moderated by socio-demographic characteristics.

H1a. The relationship will be stronger among female than male respondents.

H1b. The relationship will be weaker among Black/African American than Caucasian respondents.

H1c. The relationship will be attenuated as age increases.

RQ1. Among respondents with low or high eHealth literacy, does perceived trust in health information from specific online health communication channels and health information sources vary by socio-demographic characteristics?

METHOD

Sample & Procedures

In May 2015, a stratified sample of Black/AA ($n = 402$) and Caucasian ($n = 409$) Qualtrics Panelists completed an opt-in 15–20 minute online survey. All respondents reported accessing the Internet for health-related information at least once in the past 12 months. Institutional Review Board approval was obtained before data collection began.

Measures

Socio-demographics—The following socio-demographic characteristics were measured: (a) gender (male, female, other); (b) age (in years); (c) race (Caucasian or Black/AA); (d) annual income (less than \$20,000, \$20,000–\$34,999, \$35,000–\$49,999, \$50,000–\$74,999, or \$75,000 or more); and (e) highest level of education (less than a high school degree, high school degree/GED, some college, bachelor's degree, master's degree, advanced graduate degree). Respondents answered (yes or no) whether or not they located or shared health-related information in the last 12 months from the following: (a) Facebook; (b) Twitter; (c) Pinterest; (d) Blog/diary; (e) Support group; and (f) YouTube.

eHealth literacy—eHealth literacy was measured using the eHealth Literacy Scale (eHEALS), a rating scale that assesses individuals' perceived self-efficacy and knowledge to seek, find, understand, and apply health-related information obtained from electronic sources to solve health problems and make health decisions (Norman & Skinner, 2006b). The scale includes 8-items measured on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). To test H1, a composite score (min = 8; max = 40) was computed, where a higher score indicates greater perceived eHealth literacy. The internal consistency of data collected using the eHEALS in this study was high ($\alpha = .90$). To answer RQ1, a mean-split of the eHEALS scores was computed.

Perceived trust in online health communication channels—Items were adapted from the Health Information National Trends Survey (HINTS, n.d.). Respondents were asked to rate on a scale from 1(not at all) to 4 (a lot), “In general, how much would you trust information about health topics available from: (a) Facebook; (b) Twitter; (c) Pinterest; (d) Online blog; (e) Online support group; (f) YouTube; and (g) General online newspaper. Data collected for these items demonstrated adequate internal consistency ($\alpha = .88$). To provide internal validity evidence of the scale, an exploratory factor analysis supported that items measure a single construct (eigenvalue = 4.02) with significant factor loadings (.55-.84) that explained 57.50% of the principal component. To answer H1, a composite score (min = 7; max = 28) of perceived trust in health communication channels was computed, where higher scores indicated greater perceived trust. To answer RQ1, response options for each item were dichotomized to “low trust” (responses 1 *not at all* and 2 *a little*) and “high trust” (responses 3 *some* and 4 *a lot*).

Perceived trust in online health information sources—Items were adapted from HINTS (n.d.). Respondents were asked, from 1(not at all) to 4 (a lot), “In general, how much do you trust information about health topics on the Internet from: (a) Government agencies;

(b) Charitable organizations; (c) Religious organizations; (d) Healthcare providers; and (e) Family/friends. Data collected for these items demonstrated adequate internal consistency ($\alpha = .76$). According to the results of an exploratory factor analysis, items in this scale measured a single construct (eigenvalue = 2.57) with significant factor loadings (.67-.86), and explained 51.43% of the principal component. To test H1, a composite score (min = 5; max = 20) of perceived trust in health information sources was computed, where a higher score indicated greater trust. To answer RQ1, perceived trust in health information sources was dichotomized into “low trust” (responses 1 *not at all* and 2 a *little*) and “high trust” (responses 3 *some* and 4 a *lot*).

Statistical Analyses

SPSS v23.0 (IBM Corp, n.d.) was used to compute descriptive statistics on demographic characteristics, eHealth literacy, and perceived trust in health information from communication channels and information sources. Statistical significance was detected at $p < .05$.

To test H1, two hierarchical linear regression analyses were conducted. In the first regression analysis, perceived trust in health communication channels served as the dependent variable and eHealth literacy was entered as the primary predictor variable. In the second analysis, perceived trust in health information sources served as the dependent variable. In both analyses, income and education were entered first as covariates, because of their statistically significant associations with perceived trust in health information (Kwon, Kye, Park, Oh, & Park, 2015). Also, use of each health communication channel was entered as a covariate, as online health information seeking is associated with greater trust in the Internet (Hou & Shim, 2010). Next, Race (0=Caucasian; 1=Black/AA), gender (0=Male; 1=Female), and age (mean-centered) were entered and served as moderating variables to test the interaction with eHealth literacy (mean-centered). Prior to interpreting regression outputs, tolerance and VIF cutoffs were examined to ensure low multi-collinearity. To answer RQ1, a series of chi-square analyses were conducted among individuals with low and high eHealth literacy to determine if differences in perceived trust (0=low trust; 1=high trust) in specific channels and sources existed by race, gender, and age.

RESULTS

Respondent Characteristics

Respondents were 18 to 84 years old ($M = 46.3$ years, $SD = 17.2$ years); 72.6% ($n = 589$) were women; 50.4% ($n = 409$) were Caucasian and 49.6% ($n = 402$) were Black/AA. Almost half of the respondents ($n = 357$; 44%) earned \$50,000 or more annually. Approximately 75% ($n = 607$) reported at least some college education. Respondents reported using Facebook ($n = 451$; 55.6%), YouTube ($n = 237$; 29.2%), support groups ($n = 214$; 26.4%), Twitter ($n = 149$; 18.4%), Pinterest ($n = 123$; 15.2%), and blogs/diaries ($n = 101$; 12.5%) to locate or share health information. Table 1 shows that being younger ($p < .001$), Black/AA ($p < .05$), and with higher education ($p < .01$) was associated with high eHealth literacy.

Perceived trust in online health communication channels—Perceived trust in health communication channels ranged from 7 to 28 ($M = 14.57$, $SD = 5.12$), indicating relatively low perceived trust. Over 60% of all respondents had low perceived trust in each health communication channel. However, almost half of participants had high perceived trust in YouTube ($n = 355$; 43.8%) and support groups ($n = 396$; 48.8%).

Perceived trust in online health information sources—Perceived trust in health information sources ranged from 5 to 20 ($M = 14.18$, $SD = 2.98$), indicating moderate-to-high perceived trust. Over 50% of respondents had low perceived trust in each health information source except healthcare providers, in which approximately 55% ($n = 442$) of respondents had “high trust.”

eHealth literacy—eHEALS scores ranged from 8 to 40 ($M = 30.41$, $SD = 5.19$). Over half of respondents “agreed” or “strongly agreed” that they knew what health resources are available online ($n = 580$; 71.6%), where to find helpful health resources online ($n = 624$; 77%), how to use ($n = 658$; 81.2%) and find ($n = 679$; 83.8%) online health resources to answer health questions ($n = 647$; 79.8%). Although 75.6% ($n = 613$) reported having skills to evaluate online health resources, fewer had confidence to evaluate its quality ($n = 490$; 60.4%) and make health decisions ($n = 492$; 60.7%).

H1: The relationship between eHealth literacy and perceived trust in online health information will be moderated by socio-demographic characteristics

Perceived trust in online health communication channels—The hierarchical multiple regression model to evaluate predictors of perceived trust in health communication channels was statistically significant ($F(15, 797) = 28.58$, $p < .001$), with $R^2 = .35$ ($R^2_{adj} = .34$). Table 2 shows that greater perceived trust was positively predicted by more education ($b = .52$) and using Facebook ($b = 1.98$), Twitter ($b = 2.63$), Pinterest ($b = 1.90$), blogs/diaries ($b = 2.42$), support groups ($b = 1.98$), and YouTube ($b = 1.30$). Controlling for socio-economic status and social media use, greater eHealth literacy significantly predicted higher perceived trust ($b = .25$), and Black/AAs reported greater perceived trust in health communication channels than Caucasians ($b = .99$).

A significant interaction between eHealth literacy and gender was detected ($b = -.35$). Figure 1 shows the results of a post hoc simple slope analyses depicting that the relationship between eHealth literacy and perceived trust increased at a greater rate for males ($b = .33$) than females ($b = .21$). Also shown in Figure 1, the relationship between eHealth literacy and perceived trust was buffered by age ($b = .01$), which was stronger among younger adults ($b = .28$; $SE = .03$; $p < .001$) than average age ($b = .25$; $SE = .03$; $p < .001$) and older adults ($b = .23$; $SE = .03$; $p < .001$).

Perceived trust in online health information sources—A hierarchical multiple linear regression examining the predictors of perceived trust in health information sources was also statistically significant ($F(15, 796) = 10.31$, $p < .001$), with $R^2 = .17$ ($R^2_{adj} = .15$). Table 3 shows that greater perceived trust was positively predicted by more education ($b = .25$), and using Facebook ($b = .49$), Twitter ($b = .85$) and support groups ($b = .63$). When

controlling for socioeconomic status and social media use, Black/AA ($b = .70$) and high eHealth literacy ($b = .16$) was associated with higher perceived trust in health information sources.

A significant interaction between eHealth literacy and gender on perceived trust in health information sources was detected ($b = -.13$). Post hoc simple slope analyses in Figure 2 show that the relationship between eHealth literacy and perceived trust increased at a greater rate for males ($b = .25$; $SE = .04$; $p < .001$) than females ($b = .12$; $SE = .02$; $p < .001$). Figure 2 also shows that the relationship between eHealth literacy and perceived trust was also buffered by age ($b = .01$). However, the relationship was stronger among older adults ($b = .18$; $SE = .02$; $p < .001$) than average age ($b = .16$; $SE = .03$; $p < .001$) and younger adults ($b = .14$; $SE = .02$; $p < .001$).

RQ1. Among respondents with low and high eHealth literacy, does perceived trust in health information from specific online channels and sources vary by socio-demographic factors?

Perceived trust in online health communication channels—Table 4 shows that older adults (50+ years old) are less likely than younger adults to have high perceived trust in Twitter, $\chi^2(3, N=795) = 26.20$, $p < .001$, Pinterest, $\chi^2(3, N=794) = 28.43$, $p < .001$, and YouTube, $\chi^2(3, N=796) = 53.74$, $p < .001$, for health information. Among respondents with low eHealth literacy, the proportion of adults with high perceived trust in social support groups declined with age, $\chi^2(3, N=353) = 12.08$, $p < .01$. Interestingly, among respondents with low eHealth literacy, the proportion of older adults with high perceived trust in Facebook increased with age, $\chi^2(3, N=354) = 16.41$, $p < .01$.

Table 4 shows more Black/AAs than Caucasians reported high perceived trust in YouTube for health information, $\chi^2(1, N=811) = 28.99$, $p < .001$. Among respondents with low eHealth literacy, more Black/AA than Caucasians reported high perceived trust in online blogs/diaries, $\chi^2(1, N=358) = 4.25$, $p < .05$. Also, more Black/AAs than Caucasians with low eHealth literacy had high perceived trust in Twitter, $\chi^2(1, N=358) = 6.61$, $p < .01$. Finally, among respondents with high eHealth literacy, Black/AAs than Caucasians were more likely to trust support groups, $\chi^2(1, N=452) = 4.18$, $p < .05$.

Perceived trust in online health information sources—Table 5 shows that, among high eHealth literate respondents, perceived trust in online health information sources varied by socio-demographics. As age increased, the proportion of respondents with high perceived trust in healthcare providers, $\chi^2(3, N=442) = 9.94$, $p < .05$, friends and family members, $\chi^2(3, N=442) = 10.05$, $p < .05$, and government organizations, $\chi^2(3, N=442) = 8.22$, $p < .05$, decreased. Further shown in Table 5, more Black/AA than Caucasian respondents reported high perceived trust in government organizations, $\chi^2(1, N=452) = 6.32$, $p < .01$, charitable organizations, $\chi^2(1, N=451) = 4.98$, $p < .05$, and religious organizations, $\chi^2(1, N=452) = 10.18$, $p < .001$.

DISCUSSION

This study explored how eHealth literacy influences perceived trust in online health information among diverse audiences. Findings suggest there are significant socio-demographic disparities in perceived trust in online health communication channels and information sources that exist at varying levels of eHealth literacy. Results support the use of audience segmentation to tailor online health information through various trustworthy online channels and sources, according to diverse audiences' socio-demographic and eHealth literacy level.

One key finding is that gender differences in perceived trust in online health communication channels and information sources were only detected when eHealth literacy level was considered. Similar to previous research (Neter & Brainin, 2012), eHealth literacy did not differ by gender. Also, gender did not predict perceived trust in online health information. However, at lower eHealth literacy levels, females reported higher perceived trust in online health information than males. The opposite relationship occurred at higher eHealth literacy, where females reported less perceived trust in online health information than their male counterparts. Women are considered active health information seekers and are more likely than men to consult more types of health information sources (Rowley, Johnson, & Sbaffi, 2015), which is suggestive of high eHealth literacy (Norman & Skinner, 2006a). Future research should explore why women with high eHealth literacy have less perceived trust in online health communication channels and sources, yet seek information at a greater rate than men.

Unlike previous research (Kwon et al., 2015), age did not significantly predict perceived trust in online health information. However, findings suggest that age predicted perceived trust in online health information when considering participants' eHealth literacy. At lower levels of eHealth literacy, older adults had higher perceived trust in online health communication channels and lower perceived trust in online health information sources than their younger counterparts. Interestingly, at higher eHealth literacy, the disparities in perceived trust among age groups attenuated. This finding suggests that, among respondents with low eHealth literacy, older adults are more likely to consider how information is disseminated (channels), while younger adults are more likely to consider who is disseminating the information (sources). Differences in perceived trust in online health information should be further examined to understand disparities in health information accessibility among younger and older adults with low eHealth literacy.

Contrary to our initial hypothesis, race did not significantly moderate the relationship between eHealth literacy and perceived trust in online health information. However, unlike previous research, results of this study suggest that Black/AAs reported higher eHealth literacy (Neter & Brainin, 2012; Tennant et al., 2015) and greater perceived trust in online health information than Caucasians (Hesse et al., 2005), even while controlling for social media use, socioeconomic status, gender, and age. This novel finding should be further explored to better understand which factors contribute to higher eHealth literacy and perceived trust in online health information among Black/AAs.

Another key finding is that perceived trust in specific online health information sources varied among younger and older adults with high eHealth literacy. Online healthcare providers and family/friends were perceived as highly trustworthy sources of health information; however, older adults with high eHealth literacy were more likely to report low perceived trust in these sources than younger adults. For-profit online healthcare providers are becoming more common (Dutta-Bergman, 2003), and older adults are often targeted for financial exploitation (James, Boyle, & Bennett, 2014). Because lower literacy is associated with greater susceptibility to financial exploitation (James et al., 2014), older adults with high eHealth literacy may be better able to evaluate the credibility of online healthcare providers and peers to avoid exploitation and make an informed perception of trustworthiness. Because increasing age was associated with low eHealth literacy, older adults should continue to be trained to effectively evaluate the credibility of online health information from emerging technologies.

Perceived trust in specific online health communication channels also varied among younger and older adults with low eHealth literacy. Facebook is the most popular social media website among Internet users over 50 years old (Duggan, 2015), and is used to facilitate chronic disease self-management education and support groups for older adults with limited mobility and access to healthcare (Greene, Choudhry, Kilabuk, & Shrank, 2011; Mamun, Ibrahim, Turn, 2015). Older adults with low eHealth literacy reported high perceived trust in health information from Facebook, but reported low perceived trust in online support groups. Online support groups have the potential to enhance health-related quality of life and self-efficacy to engage in self-management behaviors (Rains & Young, 2009). However, perceived trust in information exchanged through online social support groups may inhibit their use and interest among older adults, a population that experiences physical immobility and social isolation and could potentially benefit immensely from online support groups (Pfeil, Zaphiris, & Wilson, 2009). To enhance older adults' perceived trust in online support groups on social media, future research should explore which Facebook features (e.g., information sharing processes, private or public support groups) enhance perceived trust in online health information among older adults with low eHealth literacy.

Results of this study also found that more Black/AAs than Caucasians, regardless of eHealth literacy level, perceived YouTube as a trustworthy channel of health information. YouTube is a popular social media platform among Black/AAs, as 75% of YouTube users are Black/AAs (Anderson, 2015), and is gaining popularity as a platform to disseminate patient education videos (Backinger et al., 2011; Stellefson et al., 2014). High perceived trust in health information from YouTube is concerning, because the content is generally not monitored for accuracy and quality (Gabarron, Fernandez-Luque, Armayones, & Lau, 2013). Therefore, researchers and practitioners should disseminate high-quality messages to the Black/AA community and continue to enhance the potential of YouTube for patient education.

Among Black/AAs with low eHealth literacy, Twitter and online blogs/diaries were perceived as highly trustworthy health communication channels for health information. Twitter is used by more Black/AA (22%) than Caucasian (16%) social media users (Smith, 2014), and it is considered a popular micro-blogging website, primarily because it is easy to

use, updated in real-time, and consists of brief, 140 character messages (Boulos, Maramba, Wheeler, 2006). Therefore, micro-blogging social media platforms may be effective to reach Black/AAs with low eHealth literacy. However, because the accuracy of non-official health organization messages on Twitter is questionable (Alnemer et al., 2015), criteria should be designed to assist users with low eHealth literacy to evaluate the credibility of health content on Twitter and blogs/diaries.

Finally, Black/AAs with high eHealth literacy had high perceived trust in health information from online religious organizations and online government organizations. An abundance of research exists to support that Black/AAs have low trust in government entities (Kennedy, Mathis, & Woods, 2007) but high trust in faith-based institutions (Swanson, Crowther, Green, & Armstrong, 2004) for health information and services. By segmenting these audiences according to their eHealth literacy level and race, results suggest that not all Black/AAs have high perceived trust in religious organizations and low perceived trust in government entities; rather, those with high eHealth literacy generally have higher perceived trust than Caucasians, although this difference does not exist at low eHealth literacy.

Strengths and Limitations

Racial/ethnic minorities are significantly underrepresented in the literature (Fisher & Kalbaugh, 2011), primarily due to challenges associated with mistrust of the research process and confidentiality concerns (Hammer, 2000). Although the generalizability of results to various racial/ethnic minority groups is not possible, the robust sample of Black/AAs is a noteworthy strength of this study. Online health information seekers may be more tech-savvy (Norman & Skinner, 2006a) and have greater eHealth literacy (Strekalova, 2014). Therefore, future research should use a mixed-mode survey method that is pilot tested (Dillman, Smyth, & Christian, 2014).

Practical Implications

Findings of this study have important implications for future research and practice. First, socio-demographic differences in perceived trust in online health communication channels and information sources were detected when considering the moderating effect of eHealth literacy. This finding suggests that eHealth literacy can significantly influence diverse audiences' perceived trust in specific online health communication channels and information sources. Therefore, researchers and practitioners, who are seeking to reach an intended audience through trustworthy online health communication channels and information sources, should consider the socio-demographics as well as the eHealth literacy level of the audience.

Second, segmenting audiences according to their eHealth literacy level allowed us to obtain a refined understanding of the socio-demographic differences in the perceived trustworthiness of discrete online health communication channels and information sources. Our findings recommend that researchers and practitioners aiming to reach and recruit Black/AAs with low eHealth literacy should consider using YouTube and Twitter. To reach Black/AAs with high eHealth literacy, health information from online government and religious organizations will be perceived as most trustworthy. Additionally, we recommend

that researchers and practitioners use caution when recruiting for or designing online support groups on Facebook for older adults. Older adults generally have low eHealth literacy, a segment in this audience that reported high perceived trust in health information from Facebook but low perceived trust in online support groups.

Conclusion

eHealth literacy is positively associated with greater perceived trust in health information from online health communication channels and information sources, but the relationship significantly varies by gender and age. In segmenting audiences according to their eHealth literacy level, socio-demographic disparities in perceived trust in specific online health communication channels and information sources are apparent. By considering both the eHealth literacy level and socio-demographic factors of an intended audience, researchers and practitioners will be better able to disseminate targeted and literacy-appropriate health information through health communication channels and information sources that are perceived as most trustworthy.

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Figure 1.

Results of interaction effects between eHealth literacy*age and eHealth literacy*gender on perceived health communication channels

Figure 2.

Results of interaction effects between eHealth literacy*age and eHealth literacy*gender on perceived health information sources

Table 1

Demographic Factors by eHealth Literacy Level

Demographic Variable	Low eHealth Literacy <i>n</i>(%)	High eHealth literacy <i>n</i>(%)	<i>p</i>^a
Gender			
Male	91 (41)	131 (59)	.24
Female	268 (45.6)	320 (54.4)	
Age			
18–24	50(51.5)	47(48.5)	<.001
25–49	107(33.9)	209(66.1)	
50–64	106(44)	135(56)	
65+	94(63.9)	53(36.1)	
Race			
Black/AA	162(40.3)	240(59.7)	.02
Caucasian	197(48.3)	211(51.7)	
Annual Income			
<\$20,000	70(47)	79(53)	.004
\$20,000–\$34,999	90(54.9)	74(45.1)	
\$35,000–\$49,999	57(41.9)	79(58.1)	
\$50,000–\$74,999	74(44.6)	92(55.4)	
\$75,000 or more	66(34.6)	125(65.4)	
Education			
<HS/GED	19(67.9)	9(32.1)	.005
HS/GED	87(50.9)	84(49.1)	
Some college	122(44.2)	154(55.8)	
Bachelor's degree	71(42)	98(58)	
Master's degree	43(39.1)	67(60.9)	
Advanced degree	14(27.5)	37(72.5)	

Note. *N* = 811. *p*-value, two-tailed. Low eHealth literacy (*n* = 359; 44.3%), High eHealth Literacy (*n* = 452; 55.7%)

Table 2

Hierarchical Multiple Regression Analysis Examining eHealth Literacy and Socio-Demographic Factors on Perceived Trust in Online Health Communication Channels

Predictor	R ² Change	b	SE b	95% Confidence Interval	
				Lower Bound	Upper Bound
Step 1	.02**				
Income		− 0.89	.14	− 0.36	0.18
Education		0.52**	.15	0.22	0.82
Step 2	.27***				
Facebook Use		1.98***	.34	1.32	2.64
Twitter Use		2.63***	.45	1.76	3.50
Pinterest Use		1.90***	.37	0.96	2.83
Diary/Blog Use		2.42***	.50	1.43	3.41
Support Group Use		1.98***	.38	1.23	2.71
YouTube Use		1.30***	.37	0.58	2.03
Step 3	.33***				
eHealth Literacy		0.25***	.03	0.19	0.31
Race ^a		0.99**	.31	0.38	1.59
Gender ^b		− 0.37	.34	− 1.04	0.30
Age ^c		− 0.01	.01	− 0.04	0.01
Step 4	.35**				
eHealth Literacy × Race		− 0.07	.06	− 0.18	0.04
eHealth Literacy × Age		0.01*	.01	0.00	0.01
eHealth Literacy × Gender		− 0.35*	.34	− 0.26	− 0.01
Total R ²	.35				
Adjusted R ²	.34				

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Note.
a Race (0 = Caucasian; 1 = Black/AA).
b Gender (0 = Male; 1 = Female).
c Age (centered at mean).
* $p < .05$;
** $p < .01$;
*** $p < .001$

Hierarchical Multiple Regression Analysis Examining eHealth Literacy and Socio-Demographic Factors on Perceived Trust in Online Health Information Sources

Table 3

Predictor	R ² Change	b	SE b	95% Confidence Interval	
				Lower Bound	Upper Bound
Step 1	.01 [*]				
Income		− 0.01	.08	− 0.17	0.14
Education		0.25 ^{**}	.09	0.07	0.43
Step 2	.06 ^{***}				
Facebook Use		0.49 [*]	.22	0.05	0.93
Twitter Use		0.85 ^{**}	.30	0.27	1.43
Pinterest Use		0.09	.32	− 0.53	0.72
Diary/Blog Use		0.58	.34	− 0.07	1.24
Support Group Use		0.63 [*]	.25	0.13	1.12
YouTube Use		0.41	.25	− 0.07	0.89
Step 3	.15 ^{***}				
eHealth Literacy		0.16 ^{***}	.02	0.12	0.20
Race ^a		0.70 ^{**}	.21	0.30	1.10
Gender ^b		− 0.21	.23	− 0.65	0.24
Age ^c		− 0.01	.01	− 0.01	0.00
Step 4	.17 ^{**}				
eHealth Literacy × Race		− 0.01	.04	− 0.09	0.06
eHealth Literacy × Age		0.01 [*]	.00	0.00	0.00
eHealth Literacy × Gender		− 0.13 ^{**}	.04	− 0.21	− 0.05
Total R ²	.17				
Adjusted R ²	.15				

Note.

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^a Race (0 = Caucasian; 1 = Black/AA).
^b Gender (0 = Male; 1 = Female).
^c Age (centered at mean).
* $p < .05$;
** $p < .01$;
*** $p < .001$

Table 4
Perceived Trust in Online Health Information from Specific Channels by Low and High eHealth Literacy

Channel By Race, Age, and Gender			Low eHealth Literacy, <i>n</i> (%)		High eHealth Literacy, <i>n</i> (%)		<i>p</i> ^a
	More Trust	Less Trust	More Trust	Less Trust	More Trust	Less Trust	
Facebook							
Gender							
Male	29 (31.9)	62 (68.1)			71 (54.2)	60 (45.8)	.47
Female	67 (25)	201 (75)			161 (50.2)	160 (45.8)	
Race							
Black/AA	49(30.2)	113(69.8)			127(52.9)	113(47.1)	.44
Caucasian	47(23.9)	150(76.1)			104(49.3)	107(50.7)	
Age							
18-24	7(14)	43(86)			19(40.4)	28(59.6)	.24
25-49	40(37.4)	67(62.6)			116(55.5)	93(44.5)	
50-64	33(31.1)	73(68.9)			67(49.6)	68(50.4)	
65+	16(17)	78(83)			25(47.2)	28(52.8)	
Twitter							
Gender							
Male	18 (19.8)	73 (80.2)			57 (43.5)	74 (56.5)	.07
Female	40 (15)	227 (85)			109 (34)	212 (66)	
Race							
Black/AA	35(21.7)	126(78.3)			93(38.8)	147(61.3)	.36
Caucasian	23(11.7)	174(88.3)			73(34.6)	138(65.4)	
Age							
18-24	9(18.4)	40(81.6)			20(42.6)	27(57.4)	.03
25-49	25(23.4)	82(76.6)			89(42.6)	120(57.4)	
50-64	17(16)	89(84)			39(28.9)	96(71.1)	
65+	7(7.4)	87(92.6)			15(28.3)	38(71.7)	

Channel By Race, Age, and Gender		Low eHealth Literacy, n(%)		High eHealth Literacy, n(%)		p ^a
		More Trust	Less Trust	More Trust	Less Trust	
Male		15 (16.5)	76 (86.5)	48 (36.6)	83 (63.4)	.67
Female		37 (13.9)	229 (86.1)	126 (39.3)	195 (60.7)	
Race						
Black/AA		28(17.4)	133(82.6)	92(38.3)	148(61.7)	.91
Caucasian		24(12.2)	172(87.8)	82(38.9)	129(61.1)	
Age						
18–24		8(16.3)	41(83.7)	20(42.6)	27(57.4)	.02
25–49		21(19.8)	85(80.2)	94(45)	115(55)	
50–64		18(17)	88(83)	41(30.4)	94(69.6)	
65+		5(5.3)	89(94.7)	15(28.3)	38(71.7)	
<hr/>						
YouTube						
Gender						
Male		31 (34.1)	60 (65.9)	80 (61.1)	51 (38.9)	.12
Female		74 (27.6)	194 (72.4)	170 (53)	151 (47)	
Race						
Black/AA		64(39.5)	98(60.5)	150(62.5)	90(37.5)	.001
Caucasian		41(20.8)	156(79.2)	100(47.2)	112(52.8)	
Age						
18–24		23(48.9)	24(51.1)	30(66.7)	15(33.3)	<.001
25–49		37(34.6)	70(65.4)	138(66.3)	70(33.7)	
50–64		28(26.4)	78(73.6)	54(39.7)	82(60.3)	
65+		15(16)	79(84)	23(43.4)	30(56.6)	
<hr/>						
Diaries or blogs						
Gender						
Male		18 (19.8)	73 (80.2)	58 (44.3)	73 (55.7)	.99
Female		66 (24.7)	201 (75.3)	142 (44.2)	179 (55.8)	
Race						
Black/AA		46(28.6)	115(71.4)	114(47.5)	126(52.5)	.15
Caucasian		38(19.3)	159(80.7)	86(40.8)	125(59.2)	

Channel By Race, Age, and Gender		Low eHealth Literacy, n(%)		High eHealth Literacy, n(%)		p ^a
		More Trust	Less Trust	More Trust	Less Trust	
Age						
18–24		15(30.6)	34(69.4)	23(48.9)	24(51.1)	<.001
25–49		30(28)	77(72)	115(55)	94(45)	
50–64		24(22.6)	82(77.4)	44(32.6)	91(67.4)	
65+		14(14.9)	80(85.1)	14(26.4)	39(73.6)	
Support groups						
Gender						
Male		26 (28.6)	65 (71.4)	77 (58.8)	54 (41.2)	.83
Female		100 (37.5)	167 (62.5)	193 (60.1)	128 (39.9)	
Race						
Black/AA		63(39.1)	98(60.9)	154(64.2)	86(35.8)	.04
Caucasian		64(32.5)	133(67.5)	115(54.5)	96(45.5)	
Age						
18–24		23(46.9)	26(53.1)	28(59.6)	19(40.4)	.09
25–49		42(39.3)	65(60.7)	137(65.6)	72(34.4)	
50–64		40(37.7)	66(62.3)	75(55.6)	60(44.4)	
65+		21(22.3)	73(77.7)	26(49.1)	27(50.9)	
Newspapers						
Gender						
Male		4 (4.4)	87 (95.6)	19 (14.5)	112 (85.5)	.88
Female		17 (6.3)	251 (93.7)	44 (13.7)	277 (86.3)	
Race						
Black/AA		12(7.4)	150(92.6)	41(17.1)	199(82.9)	.04
Caucasian		9(4.6)	188(95.4)	22(10.4)	190(89.6)	
Age						
18–24		5(10.6)	26(52)	9(20)	36(80)	.13
25–49		11(10.3)	70(65.4)	34(16.3)	174(83.7)	
50–64		4(3.8)	78(73.6)	14(10.3)	122(89.7)	
65+		1(1.1)	79(84)	4(7.5)	49(92.5)	

Note. p -value, two-tailed

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Table 5
Perceived Trust in Online Health Information from Specific Sources by Low and High eHealth Literacy

Source By Race, Age, and Gender		Low eHealth Literacy, n(%)		High eHealth Literacy, n(%)		p ^a	
		More Trust	Less Trust	More Trust	Less Trust		
Healthcare Providers							
Gender							
Male		42 (46.2)	49 (53.8)	.72	84 (64.1)	47 (35.9)	.75
Female		117 (43.7)	151 (56.3)		199 (62)	122 (38)	
Race							
Black/AA		79 (48.8)	83 (51.2)	.14	156 (65)	84 (35)	.29
Caucasian		80 (40.6)	117 (59.4)		127 (59.9)	85 (40.1)	
Age							
18–24		28 (57.4)	20 (42.6)	.17	36 (80)	9 (20)	.02
25–49		48 (44.9)	59 (55.1)		133 (63.9)	75 (36.1)	
50–64		44 (41.5)	62 (58.5)		74 (54.4)	62 (45.6)	
65+		36 (38.3)	58 (61.7)		34 (64.2)	19 (35.8)	
Family and Friends							
Gender							
Male		9 (9.9)	82 (90.1)	.51	35 (26.7)	96 (73.3)	.17
Female		20 (7.5)	248 (92.5)		66 (20.6)	255 (79.4)	
Race							
Black/AA		13 (8)	149 (92)	.99	52 (21.7)	188 (78.3)	.74
Caucasian		16 (8.1)	181 (91.9)		49 (23.1)	163 (76.9)	
Age							
18–24		3 (6.4)	44 (93.6)	.13	12 (26.7)	33 (73.3)	.02
25–49		14 (13.1)	93 (86.9)		59 (28.4)	149 (71.6)	
50–64		6 (5.7)	100 (94.3)		24 (17.6)	112 (82.4)	
65+		5 (5.3)	89 (94.7)		6 (11.3)	47 (88.7)	
Government Organizations							
Gender							

Source By Race, Age, and Gender					
	Low eHealth Literacy, n(%)		High eHealth Literacy, n(%)		<i>p</i> ^a
	More Trust	Less Trust	More Trust	Less Trust	
Male	13 (14.3)	78 (85.7)	40 (30.5)	91 (69.5)	.99
Female	34 (12.7)	233 (87.3)	97 (30.2)	224 (69.8)	
Race					
Black/AA	25 (15.5)	136 (84.5)	85 (35.4)	155 (64.6)	.01
Caucasian	22 (11.2)	175 (88.8)	52 (24.5)	160 (75.5)	
Age					
18–24	6 (13)	40 (87)	19 (42.2)	26 (57.8)	.04
25–49	14 (13.1)	93 (86.9)	67 (32.2)	141 (67.8)	
50–64	17 (16)	89 (84)	38 (27.9)	98 (72.1)	
65+	9 (9.6)	85 (90.4)	9 (17)	44 (83)	
Charity Organizations					
Gender					
Male	11 (12.1)	80 (87.9)	40 (30.8)	90 (69.2)	.65
Female	31 (11.6)	236 (88.4)	92 (28.7)	229 (71.3)	
Race					
Black/AA	23 (14.3)	138 (85.7)	81 (33.8)	159 (66.3)	.03
Caucasian	19 (9.6)	178 (90.4)	51 (24.2)	160 (75.8)	
Age					
18–24	6 (13)	40 (87)	19 (42.2)	26 (57.8)	.17
25–49	14 (13.1)	93 (86.9)	62 (30)	145 (70)	
50–64	13 (12.3)	93 (87.7)	35 (25.7)	101 (74.3)	
65+	8 (8.5)	86 (91.5)	13 (24.5)	40 (75.5)	
Religious Organizations					
Gender					
Male	8 (8.8)	83 (91.2)	27 (20.6)	104 (79.4)	.03
Female	15 (5.6)	252 (94.4)	39 (12.1)	282 (87.9)	
Race					
Black/AA	14 (8.7)	147 (91.3)	47 (19.6)	193 (80.4)	< .001
Caucasian	9 (4.6)	188 (95.4)	19 (9)	193 (91)	

Source By Race, Age, and Gender	Low eHealth Literacy, n(%)		High eHealth Literacy, n(%)		p ^a
	More Trust	Less Trust	More Trust	Less Trust	
Age					
18–24	6 (13)	40 (87)	9 (20)	36 (80)	.28
25–49	9 (8.4)	98 (91.6)	35 (16.8)	173 (83.2)	
50–64	5 (4.7)	101 (95.3)	16 (11.8)	120 (88.2)	
65+	2 (2.1)	91 (97.9)	5 (9.4)	48 (90.6)	

Note. p-value, two-tailed