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Social Media Use and Health Information Seeking and Sharing among Young Chinese Adults

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This study sets out to determine who trusts health- and fitness-related information available in traditional and social media and what influences online engagement with health and fitness in China. The focus is on differences in media use across four specific traditional media and eight social media outlets. Using the survey method, we classify the eight social media platforms into two types, on the basis of their characteristics; and the main criterion in our classification is whether these platforms are able to offer social support to users easily or not. Ordinary least squares (OLS) regression is applied to predict perceived media credibility and online engagement with health and fitness. The results show that young adults who are less well educated, watch television and use the social support-oriented platforms WeChat and Qzone very frequently, and read newspapers and use Baidu Tieba sometimes are more likely to consider online information to be credible. Also, being male, being better educated, and regarding health information supplied by media as credible, as well as using certain media platforms frequently are features associated with frequent engagement with health and fitness. The media outlets in question include magazines and three social support-oriented websites: Sina Weibo, WeChat, and Qzone.

Keywords: health communication, media use, media credibility, social media, social support, health and fitness, China

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In 2016 Wei Zexi, a 21-year-old Chinese college student, died after receiving unsuccessful experimental treatment for a rare form of cancer at a state military-run hospital. He had learned of this treatment from a promoted result publicized on the Chinese search engine Baidu. Wei's death drew widespread attention from Chinese Internet users and raised questions about the credibility of health-related information delivered online (M. Liu & Hu, 2016). Nowadays it is increasingly common for people to seek health-related information on the Internet (Bundorf, Wagner, Singer, & Baker, 2006; Sundar, 2008). Millions of people turn to the Internet as their first source of information (Hesse et al., 2005; Rutsaert et al., 2013); young people in particular have developed this habit (McKinley & Wright, 2014). However, one of the biggest limitations of

the Internet, and more specifically of social media platforms for health communication, is the sometimes inaccurate character of the information they release on health (Pant et al., 2012; Rutsaert et al., 2013; X. Zhang, Wen, Liang, & Lei, 2017). In China, despite the fact that the Internet is an increasingly important source of information on matters of health (Cao, Zhang, Xu, & Wang, 2016), there has been, for a long time, a lack of valid health information obtainable online (Tang et al., 2008; X. Zhang et al., 2017). Thus on the one hand seeking health- and fitness-related information online has become widespread, while on the other hand the quality and credibility of this information often seems questionable. This dilemma raises questions concerning awareness of the quality of health-related information among various demographic groups, as well as more general questions about the link between media usage and media credibility when it comes to informing oneself on health matters.

Of course, besides the Internet, traditional media such as television and newspapers also play key roles in disseminating health-related information (Peng & Tang, 2010; M. Wang, Viswanath, Lam, Wang, & Chan, 2013; Z. Wang & Gantz, 2007). Yet little is known about differences in the credibility and trustworthiness of health-related information between various media outlets. This study attempts to explore how different media platforms affect or influence the perceived credibility of health-related information acquired from the media – traditional and social alike. Also, by comparison to traditional media, new media, particularly social media, have great potential to support health-related information searching (Miller & Bell, 2012). This research seeks to understand what stimulates online engagement with health, conceptualized as active behavior that takes the form of searching, comparing, and sharing health-related information online. Previous studies have examined various factors that influence online engagement with health, such as socio-demographic factors (Bundorf et al., 2006), source characteristics (Cao et al., 2016), and social media usage (Mano, 2014). But, to the best of our knowledge, no study has compared the different effects of media use and media credibility on the question of online engagement with health. The present study attempts to fill in this gap: through data analysis of young Chinese adults, it aims to build a general image of those who tend to trust health-related information online and of what influences online engagement with health.

China represents a theoretically important case for an examination of the relationship between media factors and online engagement with health. First, although it has been suggested that there are cross-cultural differences when it comes to seeking and sharing online health information (Y. Li, Wang, Lin, & Hajli, 2018; Morahan-Martin, 2004; Song et al., 2016), most of the current studies on credibility in this area concern Western users and are carried out in an Anglo-Saxon context (AlMansour, Brankovic, & Iliopoulos, 2014; Jiang, 2019). A study of this problem from the Chinese perspective would expand general knowledge of health information online beyond Western cultures. Second, the media environment has its own circumstances; and this is particularly true of the online environment in China, given the strict censorship exerted by the Chinese government. Notions of media credibility might work differently in such a system. Also, in China, social media users are slightly younger than in the Western world (China Internet Network Information Center [CNNIC], 2019): nearly 76 percent of them are under 40 years of age. This research focuses on young adults in the broadly defined age group of 18 to 40, because these are, Internet-wise, the most highly connected population segment (Fox, 2004) and their media preferences are hugely different from those of the older generation (Edgerly, 2017). People in this age group also pay more attention than the older generation to the quality of the information they receive from new sources (Edgerly, 2017).

This study tries to answer three questions. (1) What is the effect of media usage on young adults' perceptions about the credibility of health- and fitness-related information they get from traditional and social media? (2) How much do differences in the use of media affect the users' perceptions about the credibility of online-derived health- and fitness-related information? (3) To what extent can we explain the phenomenon of online engagement with health and fitness through the notions of media usage and media credibility? To address these questions, we use survey data collected in 2016 in China to first compare the differences between young adults' perceptions about the credibility of health and fitness information across media platforms; then we predict online engagement with health and fitness with the help of media variables and demographics. We conclude with a discussion and suggestions for future research.

THEORETICAL FRAMEWORK

Explaining Media Credibility of Health and Fitness-Related Information in China

Over the past two decades, the environment in China has experienced huge changes associated with unprecedented economic development. Most notably, air pollution has become a major public health issue, given the rapid urbanization and industrialization. The problem of air pollution caused an explosion in the numbers of those seeking health information online, and recent years saw a proliferation of discussions on air pollution-related issues conducted nationwide on Chinese social media (S. Wang, Paul, & Dredze, 2015). In the meantime, the general improvement in the quality of people's lives, driven as it was by income growth, has created an increasing need for more mundane types of health information (e.g. how to work out properly and effectively). This is not surprising, considering that the consumption of sports and fitness activities per capita in the Chinese population increased by 39.3 percent in the first half of 2018 (NBS, 2018).

Although the Internet is one of the major media outlets for people to gather information on health (Peng & Tang, 2010; Redmond, Baer, Clark, Lipsitz, & Hicks, 2010), most health information found on Chinese websites is unreliable and very complicated to understand (Cao et al., 2016; Jiang & Street, 2017). One survey shows that more than 60 percent of users were concerned about the quality of the health information on WeChat (X. Zhang et al., 2017), one of the largest Chinese social media platforms in the world. Apart from the Internet, mass media also play important roles in disseminating health-related information (Cline & Haynes, 2001; Peng & Tang, 2010; Redmond et al., 2010). An empirical study with 1,000 sampled Beijing residents shows that around 65 percent of these participants selected TV programs, 63 percent identified print media outlets (newspapers and magazines), and 44 percent chose radio programs to receive health information (S. Liu, Yao, Lin, Jia, & Zhang, 2003). Health-related reports can differ across media types. For instance, health-related news tends to be short, fleeting, and normally without follow-up information on television (Gantz & Wang, 2009). More in-depth and diverse information is provided on social media, for example professional advice and networking with peers (Van de Belt et al., 2013). Thus there are considerable differences among media outlets for people with health-related interests, questions, and concerns. Unlike traditional media, social media offer health-related information that

comes not only from health professionals, but also from peers who experience similar health concerns (Song et al., 2016; L. Zhang & Jung, 2018).

It has been widely accepted that people tend not to use a source that they do not trust (Tsfati, 2010). Kiousis (2001) found a positive correlation between media use and media credibility. Also, some scholars suggest that traditional media are judged to be more credible than their online counterparts (Kiousis, 2001; H. Zhang, Zhou, & Shen, 2014), although social media have become a key source of health information (Rutsaert et al., 2013). Given the differences that exist between traditional and social media, individuals evaluate the credibility of traditional media and that of Internet-based information (both with their respective sources) differently (Kiousis, 2001; H. Zhang et al., 2014). We expect that the credibility of health- and fitness-related information from media sources will be evaluated differently in the case of traditional media and in that of social media; and we also believe that this is likely to be shaped by individuals' media usage. In consequence, we propose the following hypothesis, which is informed by the findings mentioned above and adapted to the unique media environment in China:

H1 Young adults will perceive and rate the health- and fitness-related information they get from traditional media as more credible than the corresponding information they get from social media.

Even among social media outlets, varying functions and characteristics of social media platforms result in differences in users' preferences for health-related information (L. Zhang & Jung, 2018). Some social media platforms offer easy ways for users to gain social support; one of these is Baidu Tieba, the largest online community in China. Previous studies indicate that the Quitting Smoking subgroup on Baidu Tieba provides Chinese smokers with emotional and information support, which contributes to the success of quitting smoking (C. Li, 2018); and WeChat seems to be a desirable platform for users to gain informational support (Oh, Lauckner, Boehmer, Fewins-Bliss, & Li, 2013). Social support has been shown to play a key role in maintaining individuals' mental and physical health (C.-Y. Liu & Yu, 2013). Albrecht and Adelman (1987, p. 19) define social support as "verbal and nonverbal communication between providers and recipients that helps manage uncertainty about the situation, the self, the other or the relationship and

functions to enhance a perception of personal control in one's life experience." Zhao and Zhang (2017) found that social support is emphasized as one of the critical benefits to users of health-related social media settings. In this study, we argue that distinguishing between social media with and social media without social support orientation can help us understand the differences between young adults' perceptions about the credibility of the health- and fitness-related information available in traditional and social media – or, put otherwise, the different degrees of credibility that young adults bestow on this kind of information. The social support-oriented social media offer platforms on which users can interact with friends and family in order to gain emotional support, for example WeChat and Q zone, or platforms on which they can find acquaintances or even strangers with similar health concerns and receive informational support from them, for example WeChat (L. Zhang & Jung, 2018) and Baidu Tieba (C. Li, 2018); and some of these platforms also offer expert knowledge and official accounts coming from health professionals. We expect that these media exert a stronger influence on the item of perceived credibility than do social media without an orientation to social support, since such platforms engage the role of others, who have the relevant experience (and these can be both peers and experts). On the basis of this argument, we formulate the following hypothesis:

H2 The use of social support-oriented media is associated with a stronger influence on the perceived credibility of health- and fitness-related information available on social media than the use of social media without a focus on social support.

Explaining online engagement with health and fitness

We discussed the impact of media use by focusing on two elements: the nature of this use in the specific process of seeking health information; and the role of social support. In this section we intend to focus on the interactions that occur on the Internet, particularly on social media sites, around health- and fitness-related needs – in other words we will look at online engagement with health and fitness. Online engagement generally refers to behavior that indicates a certain amount of commitment to a topic or brand. Often behavior of this kind comprises frequently and proactively searching for information, comparing information, and sharing information with others. Online engagement involves liking, commenting, and sharing health-related information (L.

Zhang & Jung, 2018). Given that information seeking is one of the strongest predictors of social media use (Guo, Shim, & Otondo, 2010) and that sharing information was the second most common activity performed by users on WeChat (CNNIC, 2017), the present study focuses on the online seeking and sharing of health- and fitness-related information.

How is the credibility of various media outlets connected to online engagement? Answering this question is critical not only because of growing concerns about the accuracy and credibility of online information on health, but also in view of the popularity of online engagement with health and fitness. According to a national survey, 72 percent of American adults have searched for health information online (Fox, 2014). Around 33 percent of Chinese adults in Hong Kong have used the Internet monthly, for searches on health-related topics (M. Wang et al., 2013). In China, one of the great benefits to users who go online prompted by health concerns is that they need not worry about their privacy (Cao et al., 2016). This may be true especially for people with sensitive health-related problems, such as issues regarding sex and mental health. Compared to users in the United States and South Korea, Chinese youths in Hong Kong are significantly more likely to participate in computer-mediated communication for personal health issues (Lin, Zhang, Song, & Omori, 2016). Previous studies found that trust in and credibility of online health information is a major determinant of further online engagement in the form of seeking more health-related information and showing willingness to share it after one successful search (Hou & Shim, 2010; Lin et al., 2016; Ye, 2010; Yun & Park, 2010). Trust in social media-based information (e.g. in the information provided on social media by peers) can direct users to further health-related engagement, such as searches for different options for treatment, alternative treatment, or medicinal information (Lin et al., 2016). Hence we expect that the credibility of the media as perceived by young adults is associated with the latter's online engagement with health and fitness.

While social media usage is strongly linked to online engagement, it is likely that not all types of social media will have similar influence: again, platforms that are stronger in offering social support will probably lead to more online engagement (C. Li, 2018; McKinley & Wright, 2014). Mano (2014) shows that individuals seeking online health information are prompted by their social media usage: the more they use social media, the more likely they are to search for health information online. He also provides evidence

that different forms of social media influence online health behavior in different ways and that not all social media outlets are of equal quality in terms of users' engagement with health. More specifically, users who visit online consulting groups frequently are, according to Mano, more likely to use online health services for getting updates, but this behavior is not affected by the frequency of social network sites and chats usage. The results presented above indicate that not only differences in using traditional and social media impact the level of online health engagement; distinctions as to which social media platforms are used are also likely to generate differences in engagement. We expect that media usage across platforms is associated with these online behaviors to various degrees. Guided by the arguments presented here and by previous research, we formulate the following hypotheses:

H3a Young Chinese adults' online engagement with health and fitness is positively affected by their perceptions about the credibility of the health- and fitness-related information they get from social media.

H3b Young Chinese adults' online engagement with health and fitness is positively affected by their perceptions about the credibility of the health- and fitness-related information they get from traditional media.

H4 The use of social support-oriented social media is associated with more online engagement with health and fitness than the use of social media without a focus on social support.

METHODS

The Data

The data collection process consisted of two stages. First, a pilot survey was conducted on May 21, 2016 among 120 selected respondents who are familiar with the Chinese media system, applying snowball sampling. The questionnaire was translated from English to Mandarin Chinese by using a standard 'forward-backward' translation procedure. Accordingly, the questionnaire is adjusted based on their feedback. Next, the revised questionnaire was distributed by research agency wjx.cn which has a database that covers all Chinese provinces. Given our focus on young Chinese adults, only panel members in the age 18 to 40 were approached. Participants received compensation from

the survey company. In total 1,033 valid responses (age: Median = 30.0) were collected on July 7, 2016. This sample concerned respondents who completed the entire survey, with the final minimum response rate of 12.9%. Admittedly, this response rate is relatively low but it is common for web surveys (Shih & Fan, 2008; Yamamoto, Kushin, & Dalisay, 2015). There were slightly more female respondents (51.5%) participating in the survey. The sample contained a relatively large share of higher educated (50.1% college graduates). Up to December 2018, people with high school/vocational school educational level and junior college or above educational level constituted 25.4% and 20.4% of the Chinese Internet users, respectively (CNNIC, 2019).

Measurements

Credibility of health- and fitness-related information in the media. To compare the levels of the perceived media credibility, the respondents were asked to rate the believability, accuracy, fairness, depth, and trustworthiness of the health- and fitness-related information they found in traditional and social media on a 7-point scale (1 = not at all, 7 = very much). This credibility measurement followed the measurements of previous studies (Johnson & Kaye, 2009). Scores for the five measures of credibility were combined into two scales, for traditional and for social media respectively.

Media use. Four types of traditional media use and eight Chinese social media platforms were measured by asking participants to specify, on a 5-point scale (0 = never, 5 = almost daily), how often they used each social platform. We classified the eight social media outlets into two types, according to whether they are (easily) able to offer their users any social support. Social support-oriented platforms tend to provide emotional support, instrumental support, and informational support (Trepte, Dienlin, & Reinecke, 2015). The group of social support-oriented social media consists of Weibo, WeChat, Qzone, and Baidu Tieba. The other group consists of Zhihu.com, Tianya Club, Douban.com, and Guokr.com.

Online engagement with health and fitness. We measured young adults' online engagement with health and fitness by averaging five items measured on a 5-point scale (1 = not at all, 5 = very frequently) and then creating an index out of them (CNNIC, 2017). Respondents were asked how often they had "read blogs or microblogging of health and fitness-related information," "shared with others of health and fitness-related

information," "posted comments of health and fitness-related information online," "followed social media accounts related to health and fitness," or "participated in health and fitness-related activities." Again, these items form a reliable scale (Median = 3.40, Cronbach's alpha = 0.86).

Control variables. We take into account socio-demographic characteristics, since these have been found to influence individuals' perceptions of credibility (Kim, 2016; Ye, 2010) and online engagement (Manierre, 2015; Mesch, Mano, & Tsamir, 2012; M. Wang et al., 2013). The following demographic factors – age, gender, education, parents' education, and income — are examined. Participants' educational level and the highest educational level of their parents were measured on a scale ranging from 1 (less than primary school) to 6 (beyond master's degree). The average educational level amounted to 4.82, corresponding approximately to a four-year college graduate. Parents' educational level averaged 3.16, corresponding to high school. Respondent's income level, measured on a scale ranging from 1(no income) to 12 (over 50,000 CNY ¥), averaged 7.31, corresponding to the range from 3001 to 5000 CNY ¥, which was the biggest income group among national netizens (CNNIC, 2019).

Trust in the healthcare system. We also expect that the trust people put into the healthcare system will have an effect on the likelihood of their engaging in health-related activities (see also Tokuda, Fujii, Jimba, & Inoguchi, 2009 on this). So we include a measure of trust in the analysis. The questionnaire asked respondents to answer the question "How much do you trust the healthcare system?" on a 7-point scale (1 = not at all, 7 = very much). Trust in the healthcare system (Median = 5.00) is a single-item measure.

Analytical Design

First, this study examines the differences in media usage across the twelve outlets and their impacts on the perceived credibility of health and fitness-related information derived from traditional and social media. OLS regression is applied to predict the perceived credibility of health-related information on traditional and social media among young adults from their media usage, from demographic factors, and from trust in the healthcare system. Then, by applying the least squares method again, we go on to predict young adults' online engagement with health and fitness from their perceptions about

media credibility, from their media usage, from demographic factors, and from trust in the healthcare system.

RESULTS

Descriptive Results

Out of the four traditional media outlets, television has the highest frequency of usage (Median = 4.00). The respondents are less likely to use radio (Median = 3.00), magazines (Median = 3.00), and newspapers (Median = 3.00). For the social media platforms, the frequency of WeChat usage (Median = 5.00) is the highest and Guokr.com (Median = 2.00) scores the lowest. The rate of use for all the social support-oriented social media – WeChat, Qzone (Median = 4.00), Sina Weibo (Median = 4.00), and Baidu Tieba (Median = 3.00) – is significantly higher than the rate of use for most traditional media (except television). Regarding the credibility assessment of health- and fitness-related information in the media, descriptive results show that young adults' ratings are higher for traditional media (Median = 5.60, Cronbach's alpha = .94) than for social media (Median = 5.20, Cronbach's alpha = .94). This implies that Hypothesis 1 is supported.

Who Tends to Trust Health and Fitness-related Information?

Table 1 compares young adults' assessment of the credibility of information provided by traditional versus social media in matters of health. We estimate three models for both dependent variables: one contains only the demographic variables, another contains the media variables, and yet another contains everything. When comparing the explained variances in the models for the credibility of social media and the credibility of traditional media, we find that the former are better explained by the predictors than the latter (Model 1: Adj. R^2 = 25.2 percent vs. 4: 25.6 percent; Model 2: 18.6 percent vs. Model 5: 22.1 percent; Model 3: 31.2 percent vs. Model 6: 34.5 percent). Regarding the first research question, the results show that media usage is significantly related to how young adults perceive the credibility of health- and fitness-related information in both traditional and social media. Controlling for the socio-demographic variables does not really alter the effects of media variables. The socio-demographic variables have limited impact. It seems that it is not so much the personal background that makes respondents give higher credibility to health information on media, as it is their media usage.

Table 1
OLS Regression Models Predicting Credibility of Health- and Fitness-Related Information from Traditional and Social Media

	Traditional media credibility			Social media credibility		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Demographics						
Gender (1 = female, 2 = male)	.006	-----	.023	-.025	-----	-.001
Age	.044	-----	.021	.037	-----	.024
Education	-.001	-----	-.022	-.054~	-----	-.066*
Parents' education	.039	-----	.001	.063*	-----	.031
Income	.082*	-----	.015	.084*	-----	.002
Trust in the healthcare system	.474***	-----	.389***	.482***	-----	.383***
Traditional media usage						
TV	-----	.145***	.127***	-----	.128***	.107***
Newspaper	-----	.078~	.045	-----	.112**	.086*
Magazine	-----	.149**	.109**	-----	.088*	.046
Radio	-----	-.001	-.027	-----	-.009	-.031
Social support-oriented Social media usage						
Sina Weibo	-----	.048	.019	-----	.069*	.039
WeChat	-----	.055~	.053*	-----	.087**	.089**
Qzone	-----	.075*	.042	-----	.144***	.103**
Baidu Tieba	-----	.071*	.058~	-----	.076*	.064*
Non-social support-oriented Social media usage						
Tianya Club	-----	.021	.033	-----	.039	.055
Zhihu.com	-----	.057	.027	-----	-.001	-.019
Douban.com	-----	.015	-.004	-----	-.039	-.028
Guokr.com	-----	.006	-.022	-----	.091*	.062
Adjusted R^2	25.2%	18.6%	31.2%	25.6%	22.1%	34.5%
F value	58.800	20.638	26.977	60.037	25.355	31.146

Notes. Reported effects are standardized (beta) coefficients. Standardized effects. Significance levels: ~ p <.10 *p < 0.05; **p < 0.01; ***p < 0.001

The second research question examines whether certain media outlets are given more weight by influencing the media credibility of health and fitness. The results indicate that the effects of the twelve media platforms on the credibility of health and fitness-related information are different, as predicted. Specifically, regarding the perceived credibility of health information on traditional media, television (Model 2: β = .145, p < .001; Model 3: β = .127, p < .001) and magazine usage (Model 2: β =.149, p < .01; Model 3: β = .109, p < .01) are positively related to it. In Model 3, the social support-oriented platforms WeChat (β = .053, p < .05) and Baidu Tieba (β = .058, p < .10) are the only two social media outlets that reach the significance level needed to predict traditional media credibility when controlling for demographics. With regard to the credibility of social media, traditional media outlets still retain their influence: television (β = .107, p < .001) and newspapers (β = .086, p < .05) are all significantly related to social media credibility in Model 6. Almost all the social support- oriented platforms are associated with social media credibility: WeChat (β = .087, p < .01), Qzone (β = .144, p < .001), and Baidu Tieba (β = .076, p < .05); the only exception is Sina Weibo (in Model 5 without control variables, β = .069, p < .05). All the social media without a focus on social support fail to reach the significance level, which implies that H2 is supported. The results also show that the effect of the social support-oriented platforms is clearly larger for social media credibility in Model 6 than for traditional media credibility in Model 3. And certain traditional platforms (television and magazine) exert a stronger influence on predicting the perceived credibility of traditional media than that of social media.

So then, who tends to trust health information found online? Given the results we've looked at, young adults who are less educated, watch television and use WeChat and Qzone very frequently, and read newspapers and use Baidu Tieba sometimes are more likely to rate online health and fitness information as credible.

Online Engagement with Health and Fitness

The third research question asked how media variables linked to young adults' online activities relate to health and fitness. Table 2 shows the results of an OLS regression analysis of the factors that influence online engagement with health and fitness. It was found that both traditional and social media outlets affect the likelihood that young people participate in online engagement with matters of health.

Table 2

OLS Regression Models Predicting Online Engagement with Health and Fitness

	Model 1	Model 2	Model 3	Model 4
Demographics				
Gender (1 = female, 2 = male)	.120***	-----	.153***	.151***
Age	.031	-----	.044	.040
Education	.208***	-----	.128***	.136***
Parents' education	.082**	-----	.009	.005
income	.187***	-----	.047	.045
Trust in the healthcare system	.246***	-----	.093***	.024
Media usage				
TV	-----	-.004	.030	.010
Newspaper	-----	.101**	.065~	.052
Magazine	-----	.134***	.145***	.132***
Radio	-----	.103***	.065*	.070*
Social support-oriented social media usage				
Sina Weibo	-----	.119***	.137***	.132***
WeChat	-----	.111***	.110***	.097***
Q zone	-----	.039	.108***	.094***
Baidu Tieba	-----	.007	.001	-.010
Non-social support-oriented social media usage				
Tianya Club	-----	.098**	.083*	.075*
Zhihu.com	-----	.113**	.054	.054
Douban.com	-----	.006	.016	.019
Guokr.com	-----	.048	.061~	.056~
Media credibility				
Social media credibility	-----	.089*	-----	.103**
Traditional media credibility	-----	.102**	-----	.075*
Adjusted R^2	25.2%	42.1%	44.8%	46.5%
F value	59.070	54.446	47.349	45.632

Notes. Reported effects are standardized (beta) coefficients. Standardized effects. Significance levels: ~ p <.10 *p < 0.05; **p < 0.01; ***p < 0.001

In Model 2 almost all the traditional outlets are significantly related to online engagement; this applies to reading magazines (ß = .134, p < .001), listening to the radio (ß = .103, p < .001), and reading newspapers (ß = .101, p < .01). But the effect of radio and newspapers becomes smaller or disappears when controlling for media credibility and

demographics in Models 3 and 4, and the newspaper influence even disappears when controlling for credibility in Model 4. Similarly, the effect of some social media platforms is lowered to predict health engagement online when taking demographics and media credibility into account in Model 3 and 4 by comparison to Model 2, including Tinaya Club and Zhihu.com. On the contrary, Sina Weibo (β = .132, p < .001), WeChat (β = .097, p < .001), and Qzone (β = .094, p < .001) still demonstrate strong influence on online engagement when we control for media credibility in Model 4, which implies that H4 is supported. Also, the results indicate that the perceived credibility of both traditional and social media is significantly associated with online engagement in Models 2 and 4. Hence one can accept H3a and H3b.

Aside from media variables, some socio-demographic factors are also significantly linked to the online engagement. Gender and education are the only two demographics to influence the engagement in all models. The influences of income and parents' education disappear when controlling for demographics and media credibility in Models 3 and 4. As in the case of predicting media credibility in Table 1, trust in the healthcare system in Table 2 appears to be an essential predictor of online engagement with health in Models 1 and 3. However, the effect of trust in the healthcare system disappears in Model 4. Thus, when we take media credibility into account, trust in the healthcare system no longer affects participation in online health-related activities.

Given these results, we can conclude that there are large differences between those who engage in online health and fitness activities and those who do not. The main differences between these two groups are linked to media use, perceived media credibility, and characteristics. Male young adults who are more educated and evaluate health information from the media (and especially from social media) as credible are more likely to participate frequently in online activities related to health and fitness. Most importantly, young adults who often use certain media platforms – magazines, radio, three of the social support-oriented platforms (Sina Weibo, WeChat, and Qzone), and Tianya Club – do tend to belong in this group.

DISCUSSION

When individuals are increasingly turning to the Internet for health- and fitness-related information, the relatively low credibility of what one finds online – pointed out in various studies – is becoming a global problem. Despite many studies focusing on specific health cases or media platforms (or both), there is not enough knowledge and understanding of the overall patterns according to which young adults – who grew up with the Internet and social media – use and trust media outlets as part of their everyday information retrieval. This study is an attempt to discover those overall patterns. It sets out to show how people in this group assess the credibility of health information coming to them from all sorts of media types and outlets, and how this process is in turn related to their regular media consumption and its wider patterns in the Chinese environment. Besides comparing traditional media with social media, we distinguish between two broad types of social platforms: platforms that offer social support options and platforms that don't. We also investigate how online engagement with health and fitness – in which a more active and critical disposition is displayed – is affected by media usage and credibility.

Our major findings and contributions in the area delimited here are twofold. First, we find that the credibility of health information can be explained through very similar sets of factors, regardless of whether that information derives from traditional media or from social media. Both television watching and print media usage affect credibility in a positive way. The importance of television's impact on media credibility fits in with the results of an earlier study on the topic: out of six media types, television was rated as the most credible – the other five being newspapers, the radio, magazines, the Internet, and the mobile phone (Wu, 2016). The results for print media do raise questions: reading magazines is associated with the higher credibility of traditional media, while reading newspapers is associated with social media credibility. Perhaps this points to specific media usages: magazine reading could still primarily involve health magazines in print, whereas newspapers, may become increasingly associated with their online versions. The impact of social media usage on credibility follows rather the media classification: it is weak and very limited in the case of traditional media credibility, but stronger in the case of social media credibility. Particularly for social media credibility, two social media

platforms stand out – WeChat and Qzone – probably thanks to their distinctive characteristics: on the one hand, their users are often connected to real-life friends; on the other hand, their structures are privacy enhancing by comparison to those of other outlets (e.g. access to profiles and posts requires the personal approval of existing users) (L. Zhang & Jung, 2018). Media users tend to trust recommendations from people they are familiar with, and East Asians seem to show more trust than Americans in experience-based health information sources – that is, in information that reflects someone else's experience of dealing with a medical problem (Song et al., 2016). Finally, it should be noted that socio-demographic characteristics have little impact. We only find evidence that higher-educated youngsters consider health-related information coming from social media not to be too trustworthy.

Second, this study also investigated how media variables (use and credibility) are linked to young adults' online engagement with health and fitness. We find evidence that social media usage prompts online engagement with health, which is in line with previous research (Mano, 2014; Miller & Bell, 2012). The effect is stronger for social media outlets with social support affordances, for example Sina Weibo, WeChat, and Qzone. There is also an effect of traditional media, but not as one expects it. Reading magazines and, to a lesser degree, listening to the radio increase one's online engagement with health, while watching television and reading newspapers do not. Again, we may observe the impact of health magazines here. Readers of such magazines perhaps go online in order to combine the printed information with newer, more up-to-date information or to share what they learned. The same may apply to radio listeners. Thus the positive effect of the forms of media usage suggests that young adults "mix and match" their information diets. We also find evidence that both traditional media credibility and social media credibility predict young adults' online engagement (Lemire, Paré, Sicotte, & Harvey, 2008; Lin et al., 2016).

Finally, we find effects from demographic variables. Higher-educated people show greater online engagement with health and fitness, which is consistent with the results of prior studies (Bundorf et al., 2006; Cotten & Gupta, 2004; Manierre, 2015; Mesch et al., 2012). Yet interestingly, the effect of gender contradicts previous findings: the results from the sample indicate that young Chinese men are more likely than young Chinese women to search and share health-related information online. The traditional role of housewives

in dealing with matters of health has been emphasized in many cultures; women are supposed to spend more time than men on family issues, for instance caring for the sick, the children, and the elderly (e.g. Manierre, 2015). However, China has the highest proportion (over 90 percent) of dual-earner couples in the world (Lu, Lu, Du, & Brough, 2016). Disparities in findings related to the sex gap may be partly explained by the fact that the division of labor in the Chinese household is vastly changing. Yet we would recommend further investigation into the discrepancy between men and women in the matter of chasing information about health.

Although this study offers several significant contributions, some of its limitations should be borne in mind when interpreting these findings. First, as noted on earlier occasions, the higher-educated and metropolitan populations tend to be overrepresented in Chinese survey samples (Skoric, Zhu, & Pang, 2016). The results, too, relate predominantly to young adults with the same characteristics of highly educated and living in the city. Future studies should focus on more diverse and representative samples. Second, the research we carried out for this study did not ask about specific websites or types of sources. Also, more variables could be included in the analysis, for instance health literacy and stages of health conditions. Third, we did not measure young adults' motives for media use and online engagement. Motivation is relatively difficult to measure in a survey, since it can differ over time and across situations whenever individuals go online. Future studies could nevertheless focus on specific goals of online engagements. Also, as new generations of Chinese patients are increasingly gathering information on health with the help of the Internet and social media, it would be interesting to know the role of e-patients in distinguishing between expertise-based (e.g. professional/authoritative sources) and experience-based information sources in China. Finally, given that the most traditional media have online editions that offer similar content, the credibility of the health information that flows from traditional mass media can be transferred to the Internet (Ye, 2010). Further studies should consider distinguishing between online editions of traditional media and Internet-based media, although this is a challenging task in the increasingly larger and more complex media environment.

Nonetheless, our study provides a general framework for comparing the credibility of the health information available in the two major types of media, traditional and social,

by focusing on differences in media use; and it deepens our understanding of how online engagement with health and fitness is affected by differential media usage and media credibility, particularly in the Chinese context. Our study shows that the assessment of media credibility works increasingly in the same way for traditional media and social media. This makes it challenging to counter the rise of low-quality information on the Internet. Nevertheless, there are substantial differences between social media platforms, and these differences offer starting points for shaping a new policy, designed to achieve better health communication. Policymakers and authorities should be aware of the differential use of media outlets and of the targeting of young adults according to their socio-economic backgrounds.

NOTES

1. Qzone is a Chinese MSN Space-like media platform and its most active users are teenagers; Sina Weibo is a hybrid of Twitter and Facebook and it is the most popular Chinese microblogging website; Zhihu.com is the most popular question-and-answer website in China; Tianya Club is one of the oldest Chinese internet forums; Douban.com is a popular platform that allows users to create content related to movies, books, music, and off-line events; Guokr.com is an online community for science and technology. The fact that this study focuses on the eight social media does not mean that they all are necessarily China's most important and popular social media outlets. Some are among the mostly widely used platforms (Weibo, WeChat), while others are selected because they are representative for specific domains, such as Guokr.com in science. Also, this selection is based on the data of the research report on the social network usage in China, see the latest report (CNNIC, 2017).

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Ethical approval

The study complies with the professional and ethical standards of Dutch academia. Ethical Review Board approval is not required for this kind of study.