



Article

Testing the Role of Ethnicity and Health Consciousness in Preventive Health Behaviors

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Abstract

As preventive health care has gained in importance, health researchers have paid increasing attention to the role of health consciousness in preventive health behaviors. However, little is known about how ethnicity comes into play in the relationship between health consciousness and preventive health behaviors. The purpose of the current study is, thus, twofold. First, we attempt to test whether health consciousness actually predicts preventive health behaviors such as healthy eating, regular exercise, doctor visits, alternative medicine use, and information seeking; second, we explore the main effect of ethnicity (African vs. Caucasian Americans) on preventive health behaviors and its moderating effect on the relationship of health consciousness and preventive health behaviors. Analyzing the Life Style survey data collected by DDB Needham Co., an international marketing communication firm, we found that health conscious individuals would be more likely to practice preventive health behaviors such as healthy eating, regular exercise, alternative medicine use, and information seeking. Some differences emerged between the two ethnic groups in healthy eating, regular exercise, and doctor visits. We also found a marginally significant interaction effect of ethnicity by health consciousness on healthy eating, such that when the level of health consciousness was low, African Americans showed healthier eating than Caucasian Americans. These differences underscore the need to develop culturally appropriate, evidence-based health promotion messages to maximize preventive health behaviors when targeting different ethnic groups.

■ **Keywords** : ethnicity, health consciousness, preventive health behavior, healthy lifestyle, health information seeking

Introduction

One of the most prominent changes in the past three decades has been a shift from cure-focused to prevention-focused health care. The preventive health care trend has continued to influence wellness life styles such as healthy eating, regular exercise, and alternative medicine use across globe. As a consequence, national health spending grew 3.9% to \$3.5 trillion in 2017, accounting for 17.9% of Gross Domestic Product (GDP) in the U.S. (U.S. Census Bureau, 2018). In the Korean market, national health expenditure has continuously increased, accounting for 7.7% of GDP in 2017 (Huh, 2017).

As preventive health care gained considerable importance, health researchers have examined what factors can promote preventive health behaviors (e.g., Moorman & Matulich, 1993; Yang, 2015). An emerging body of research has suggested that health conscious individuals tend to adopt a wellness lifestyle and are more likely to undertake preventive health behaviors (Dutta-Bergman, 2005; Insel & Roth, 2006; Kibret, 2016).

Despite a gradually growing body of research testing the relationship between health consciousness and preventive health behaviors, there remain substantial knowledge gaps regarding the interplay of ethnicity and health consciousness on preventive health behaviors. Incorporating ethnicity into the relationship is critical in that much of the health literature has suggested that ethnicity is one of the essential variables in health behavior research (Cheng, Perko, Fuller-Marashi, Gau, & Stice, 2019; Epperson et. al., 2019; Williams, Gonzalez, Fitzgerald, & Brincat, 2019; Xie, St. Clair, Goldman, & Joyce, 2019), and that health behaviors differ in each ethnic group (Dubowitz, Heron, Basurto-Davila, Bird, Lurie, & Escarce, 2011; Li, Thompson, Richards, & Steele, 2016). For instance,

more Caucasian American men were found to consuming more than 2 alcoholic drinks per day than African American men, while more African American men reported being obese than their counterparts (Li, Thompson, Richards, & Steele, 2016).

We thus sought to conduct a study examining first, whether health consciousness actually predicts preventive health behaviors such as healthy eating, regular exercise, doctor visits, alternative medicine use, and information seeking, second, the main effect of ethnicity (African vs. Caucasian Americans) on preventive health behaviors and its moderating effect on the relationship of health consciousness and preventive health behaviors. We accomplished this by analyzing the Life Style survey data collected by DDB Needham Co., an international marketing communication firm.

The findings of this study will lay the groundwork for future empirical studies exploring the impact of ethnicity in Korea on preventive health behaviors, helping to develop culturally appropriate, evidence-based health campaigns to maximize preventive health behaviors.

Literature Review

Health Consciousness and Preventive Health Behaviors

Health consciousness is an internal attitude toward one's own health, defined as the extent to which health concerns are integrated into a person's daily activities (Hoque, Alam, & Nahid, 2018). Health consciousness has been considered a critical concept in a health context because health conscious individuals tend to adopt a wellness lifestyle and are more likely to undertake preventive health behaviors (Dutta-Bergman, 2005; Espinosa & Kadiæ-Maglajliæ, 2018; Mesanovic, Kadic-Maglajlic, & Cicic, 2013). Insel and Roth (2006), for example, argued health consciousness is one of the core constructs that have a significant influence on preventive health care behaviors. Previous research showed that health consciousness triggered two sets of important

preventive health care behaviors: health maintenance, composed of lifestyle (e.g., diet, tobacco and alcohol use, and regular exercise), medical service choices (Moorman & Matulich, 1993; Sawant, 2018) and health information seeking behavior (Dutta-Bergman, 2005; Espinosa & Kadiæ-Maglajliæ, 2018; Mesanovic, Kadic-Maglajlic, & Cacic, 2013).

Previous research has shown that health consciousness is positively associated with preventive health behaviors such as physical exercise (Divine & Lepisto, 2005) and healthy eating (Michaelidou & Hassan, 2008). Health conscious individuals were also found to try to minimize stress compared to those who were not health-conscious (Hoque, Alam, & Nahid, 2018). The amount of cigarette and alcohol consumption was also found to be less among those who were highly health-conscious (Hoque, Alam, & Nahid, 2018; Michaelidou & Hassan, 2008).

Although several studies have tested whether health consciousness predicts preventive health behaviors, a long tradition of attitude research has consistently reported that there is a discrepancy between attitude (i.e., health consciousness) and observed behaviors (i.e., preventive health behaviors). For instance, general attitudes toward organ donation were found to be positive nationwide; however, only a handful number of people were registered as donors (Siegel, Navarro, Tan, & Hyde, 2014). Therefore, we attempt to replicate the previous research finding concerning health consciousness and preventive health behaviors.

Another health maintenance behavior associated with health consciousness is medical choice behavior such as visiting doctors and using alternative medicines. Previous studies found individuals' medical choice behaviors differed depending on their level of health consciousness, such that highly health-conscious individuals visited physicians more frequently than less health-conscious individuals (Thompson & Chambers, 2000). It was also found that people with less health consciousness tended to see doctors only after they get sick (Kibret, 2016). The findings suggest health consciousness might be one of the key variables in promoting preventive health behaviors. Along with using conventional medical serv-

ices, a growing body of research has reported health-conscious individuals are more likely to use alternative medicine (Arcury et al., 2006). The usage of alternative medicine has increased significantly in the United States. According to a national survey, Americans were reported to spend \$30.2 billion out-of-pocket on alternative health in 2016 (National Center for Complementary and Integrative Health, 2016).

The relationship between conventional medical services and alternative medicine is not well defined. Alternative medicine users may not consider alternative medicines for any principal medical condition. Rather, most alternative medicines are used for health maintenance and disease prevention (Falci, Shi, & Greenle, 2016). Due to the simultaneous usage of conventional medical care and alternative medicine, some researchers insisted that unconventional therapies were not alternative but complementary in their relationship to conventional medical care (e.g., Falci, Shi, & Greenle, 2016). In summary, previous studies suggested health conscious individuals are more likely to visit doctors and to use alternative medicines to maintain, improve their health and prevent diseases.

Health-conscious individuals are proactive in seeking out health information, such that health consciousness had a positive relationship with the use of health apps (Cho et al., 2014; Xiao et al., 2014) and with seeking health news from TV programs and magazines (Hong, 2011; Iversen & Kraft, 2006). A group of researchers also suggested those who are health conscious actively sought health information through active and information-oriented media (Hoque, Alam, & Nahid, 2018; Kim, Lee, & Son, 2016).

Despite a growing body of research examining the relationship between health consciousness and health behaviors, few studies have explored how ethnicity comes into play in the relationship. In health communication and health behaviors literature, ethnicity has been considered to be one of the essential variables, and a series of studies have found that health behaviors differ in different ethnic groups (Dubowitz et al., 2011; Li, Thompson, Richards, & Steele, 2016). We,

therefore, examine the interaction effects of ethnicity and health consciousness on preventive health behaviors.

Ethnicity, Health Consciousness and Preventive Health Behaviors

One of the most important social determinants of health is ethnicity. The available evidence suggests that ethnic differences in health behaviors persist even after controlling for individual and neighborhood factors (Stimpson, Ju, Raii, & Eschbach, 2007; Trim & Chassin, 2008).

Previous studies have found ethnic differences in health maintenance behavior and health information seeking behavior, such that African Americans were less likely to practice health maintenance behaviors than Caucasian Americans (Dubowitz et al., 2011; Li et al., 2016). More specifically, Caucasian Americans were found to engage in healthy life styles such as physical activities (Burgard & Hauschildt, 2018) and healthy foods and nutrients consumption more than did African Americans (Cockerham, Bauldry, Hamby, Shikany, & Bae, 2017). Studies consistently show that African American women have higher prevalence of physical inactivity and poorer diets than Caucasian American women; differences between African American and Caucasian American men are less consistent (Burke et al., 1992; DiPietro, Williamson, Caspersen, & Eaker, 1993; Duelberg, 1992; Folsom et al., 1991; Gidding et al., 1996; Kumanyika, Wilson, & Guilford-Davenport, 1993).

Ethnic differences were also found in medical service choices and information seeking behaviors possibly due to social and historical reasons (e.g., distrust of medical services among African Americans because of the infamous Tuskegee study. For details, see Meng et al., 2016; (O'Hanlon, 2013). African Americans consistently used fewer health care services (Ashton et al., 2003) and sought health information less than Caucasian Americans (Arnett, Thorpe, Gaskin, Bowie, & Laveist, 2016). Laz and Berenson (2013), for instance, found that more Caucasian and African American women used the Internet than Hispanics. More Caucasian American women were found to use it to seek health

information than African American women.

A similar pattern was also reported in non-traditional medical service use. African Americans were found to use alternative medicines less than other racial groups (Tamhane et al., 2014).

Although there have been studies examining ethnic differences in various health behaviors, there still is a need to replicate some of the research findings. In addition, few studies have explored how ethnicity may influence the relationship between health consciousness and preventive health behaviors. Would ethnicity make a difference in preventive health behaviors? Further, would there be any difference in preventive health behaviors between health conscious African Americans and Caucasian Americans? At this point, to our knowledge, there are few studies examining how ethnicity interacts with health consciousness, and further how the interactions may influence preventive health behaviors.

Based on the review above, we propose the following hypotheses and research questions.

- H1: Highly health-conscious individuals will practice healthier lifestyles measured by healthy eating and regular exercise.
- H2: Highly health-conscious individuals will visit a doctor more than will low health-conscious individuals.
- H3: Highly health-conscious individuals will use non-traditional health care services more than will low health-conscious individuals (e.g., alternative medicines).
- H4: Highly health-conscious individuals will seek health information more than will low health-conscious individuals.
- H5: There will be a difference in preventive health behaviors between African and Caucasian Americans.
- RQ1: Will there be interaction effects of ethnicity by health consciousness on preventive health behaviors?

Method

Data

To test the four hypotheses proposed in this study, we used the Life Style survey data collected by DDB Needham Co., an international marketing communication firm. The data were collected from adult male and female members of the Market Facts' Consumer Mail Panel. The members were chosen using an annual standing-panel quota sample similar to the U.S. adult population in terms of age, gender, income, geography, and other demographics. The DDB's reputation for using representative samples has been recognized (Umesh & Weeks, 2018). Of 5,000 questionnaires, usable responses were received from 1,440 males (48%) and 1,581 females (52%); a response rate of 60.4%. The DDB Needham Life Style surveys have been used in numerous studies including advertising and consumer research (e.g., Lastovicka et al., 1999) and communication and psychology (e.g., Holbert, Shah, & Kwak, 2004). The data set included a wide range of questions encompassing attitudes, interests, opinions, activities, lifestyle, and media use. The IRB at Michigan State University approved this study.

Measures

Independent variables. Independent variables included ethnicity and health consciousness. The DDB surveys asked participants to identify their ethnicity as one of the five categories, "White, Black, Asian/Pacific islander, Hispanic, or Other." Self-reported White respondents were classified as Caucasian Americans and Black respondents as African Americans. The other three racial ethnic groups (i.e., Asian/Pacific islander, Hispanic, and Other) were not included in our study. Respondents were asked to indicate the degree how the words "Health-Consciousness" describe the person they would ideally like to be. Their responses ranged from 1 (*Definitely does not describe ideal self*) to 6 (*Definitely does*

describe ideal self). This item measures the respondent's motivational level for good health. Previous studies defined health consciousness as an indicator of one's intrinsic motivation to maintain good health (Dutta-Bergman, 2005). Respondents were grouped into either a high level or a low level of health consciousness by median split.

Dependent variables. Healthy life style was measured by two constructs: healthy eating and regular exercise. Healthy eating was measured by responses to the following seven questions: I try to avoid foods that are high in cholesterol; I try to avoid foods with a high salt content; I try to avoid foods that are high in fat; I make a special effort to get enough fiber in my diet; I am concerned about how much sugar I eat; I am concerned about getting enough calcium in my diet; I use a lot of low calorie or calorie reduced products. Each response to these statements was assessed on a six-point Likert-type scale ranging from 1 (*I definitely disagree*) to 6 (*I definitely agree*). Scores from the seven questions were summed, which was operationalized as a global score of healthy eating. Reliability of the seven items was assessed, which yielded a satisfactory Cronbach Alpha score, .829.

Regular exercise was measured by two items: "Went to a health club or gym" and "Did exercises at home." The two items were anchored at seven points ranging from "*None in past year*" to "*52+ times past year*." We used a composite score of the two items to test the frequency of regular exercise.

Respondents were asked the frequency of their primary care physician or family doctor visits on the seven point scale "*None in past year*" to "*52+ times past year*," to which responses measured one of our dependent variables, doctor visits. The use of non-traditional health care services was measured by composite scores from the following three statements: "Used an alternative medical treatment (e.g., acupuncture, etc.)," "Used aromatherapy," and "Used herbal remedies." Responses to these statements were assessed on a six-point Likert-type scale ranging from 1 (*None in past year*) to 6 (*52+ times past year*). The reliability of the three items was assessed satisfactorily with Cronbach Alpha score

.6126 for exploratory studies (e.g., the use of secondary data as in this study) (Hair, Anderson, Tatham, & Black, 1998).

Health information seeking was measured by responses to the following two statements: “I rely on a number of sources for health information besides my doctor” and “Searched for health information on the Internet.” The former statement was anchored at six points from 1 (*I definitely disagree*) to 6 (*I definitely agree*). The responses to the latter statement ranged from “None in past year” to “52+ times past year” at a seven-point scale. Since responses to the two statements were measured by different scales, the responses were standardized. Sums of the standardized scores from the two statements measured health information seeking. The correlation of the two items was .207.

Data Analysis

Demographic profiles of respondents are reported in Table 1. Responses from 1,948 participants among the total sample of 3,021, including only two ethnic racial groups (i.e., Caucasian and African Americans), were used to test the hypotheses proposed. We conducted a Multivariate Analysis of Covariance (MANCOVA) to run a model of a 2×2 factorial design including two levels of health consciousness (high vs. low) and two ethnic racial groups (Caucasians vs. African Americans). 1,129 respondents were identified for the high health-conscious group and 819 were for the low group. The dataset contained unbalanced group numbers for Caucasian ($N = 1,753$) and African American respondents ($N = 195$). However, the statistical software package we used, SPSS, adjusts for unequal group sizes in analyses.

The independent variables included in the analysis were health consciousness and ethnicity. The influence of the independent variables was tested on five dependent variables: healthy eating, regular exercise, doctor visits, the use of non-traditional health care services, and health information seeking. Income, education, age, and current physical condition were employed as covariates in the analysis. It is reasonable to believe

Table 1
Demographic Profiles of Respondents

	Caucasians		African Americans		Total	
	N	Ratio (%)	N	Ratio (%)	N	Ratio (%)
Gender						
Male	1132	48.6	110	39.3	1242	47.6
Female	1199	51.4	170	60.7	1369	52.4
		100.0		100.0		100.0
Marital Status						
Married	1613	69.7	124	44.8	1737	67.1
Widowed	170	7.3	25	9.0	195	7.5
Separated	43	1.9	15	5.4	58	2.2
Divorced	196	8.5	31	11.2	227	8.8
Single (Never married)	291	12.6	82	29.6	373	14.4
		100.0		100.0		100.0
Age						
18-24	98	4.2	18	6.4	116	4.4
25-34	383	16.4	54	19.3	437	16.7
35-44	517	22.2	72	25.7	589	22.6
45-54	526	22.6	65	23.2	591	22.6
55-64	341	14.6	34	12.1	375	14.4
65 and over	466	20.0	37	13.2	503	19.3
		100.0		100.0		100.0
Education						
Attended elementary school	5	.2	6	2.4	11	.5
Grad from elementary school	11	.5	1	.4	12	.5
Attended high school	87	4.1	22	9.0	109	4.7
Graduated from high school/trade school	565	26.9	51	20.8	616	26.3
Attended college	733	35.0	97	39.6	830	35.4
Graduated from college	416	19.8	41	16.7	457	19.5
Attended 5-8 yr school /grad school	280	13.4	27	11.0	307	13.1
		100.0		100.0		100.0
Income						
Under \$20,000	321	14.4	72	26.8	393	15.7
\$20,000-\$29,999	246	11.0	37	13.8	283	11.3
\$30,000-\$39,999	284	12.7	37	13.8	321	12.8
\$40,000-\$49,999	243	10.9	30	11.2	273	10.9
\$50,000-\$59,999	240	10.7	16	5.9	256	10.2
\$60,000-\$69,999	169	7.6	25	9.3	194	7.8
\$70,000-\$99,999	373	16.7	30	11.2	403	16.1
\$100,000 or more	358	16.0	22	8.2	380	15.2
		100.0		100.0		100.0

Geographic division						
New England	139	6.0	5	1.8	144	5.5
Middle Atlantic	324	13.9	39	13.9	363	13.9
East North Central	445	19.1	34	12.1	479	18.3
West North Central	211	9.1	12	4.3	223	8.5
South Atlantic	434	18.6	93	33.2	527	20.2
East South Central	148	6.3	31	11.1	179	6.9
West South Central	199	8.5	43	15.4	242	9.3
Mountain	163	7.0	4	1.4	167	6.4
Pacific	268	11.5	19	6.8	287	11.0
		100.0		100.0		100.0

Note: The total number of respondents analyzed is different for each variable due to missing responses.

that income, education, age and physical conditions may have some correlations with the health-related behaviors, our dependent variables. The four covariates were included in the analysis to control for their potential influence on the dependent variables.

Results

The result of MANCOVA revealed significant multivariate effects for both independent variables, health consciousness ($F_{(5, 1936)} = 14.240, p < .001$) and ethnicity ($F_{(5, 1936)} = 4.462, p < .001$) (Table 2). Significant multivariate effects for all four covariates were found, $F_{(5, 1936)} = 13.747, p < .001$ for Income; $F_{(5, 1936)} = 27.306, p < .001$ for education; $F_{(5, 1936)} = 75.259, p < .001$ for age; $F_{(5, 1936)} = 30.994, p < .001$ for physical condition. A full interaction model, including a two-way interaction between health consciousness and ethnicity, was tested.

A univariate result on each dependent variable was examined to test the five hypotheses proposed. We found significant main effects of health consciousness on four dependent variables (i.e., healthy eating, regular exercise, the use of non-traditional health care services, and health information seeking) (Table 3).

In hypothesis 1, we predicted highly health-conscious individuals would practice healthier lifestyle measured by healthy eating and regular

Table 2
Multivariate tests

Effect		Value	<i>F</i>	Hypothesis <i>df</i>	Error <i>df</i>	<i>Sig.</i>
Intercept	Pillai's Trace	.283	152.480	5.000	1936.000	.000
	Wilks' Lambda	.717	152.480	5.000	1936.000	.000
	Hotelling's Trace	.394	152.480	5.000	1936.000	.000
	Roy's Largest Root	.394	152.480	5.000	1936.000	.000
Income	Pillai's Trace	.034	13.747	5.000	1936.000	.000
	Wilks' Lambda	.966	13.747	5.000	1936.000	.000
	Hotelling's Trace	.036	13.747	5.000	1936.000	.000
	Roy's Largest Root	.036	13.747	5.000	1936.000	.000
Education	Pillai's Trace	.066	27.306	5.000	1936.000	.000
	Wilks' Lambda	.934	27.306	5.000	1936.000	.000
	Hotelling's Trace	.071	27.306	5.000	1936.000	.000
	Roy's Largest Root	.071	27.306	5.000	1936.000	.000
Age	Pillai's Trace	.163	75.259	5.000	1936.000	.000
	Wilks' Lambda	.837	75.259	5.000	1936.000	.000
	Hotelling's Trace	.194	75.259	5.000	1936.000	.000
	Roy's Largest Root	.194	75.259	5.000	1936.000	.000
Physical condition	Pillai's Trace	.074	30.994	5.000	1936.000	.000
	Wilks' Lambda	.926	30.994	5.000	1936.000	.000
	Hotelling's Trace	.080	30.994	5.000	1936.000	.000
	Roy's Largest Root	.080	30.994	5.000	1936.000	.000
Race	Pillai's Trace	.011	4.462	5.000	1936.000	.000
	Wilks' Lambda	.989	4.462	5.000	1936.000	.000
	Hotelling's Trace	.012	4.462	5.000	1936.000	.000
	Roy's Largest Root	.012	4.462	5.000	1936.000	.000
Health consciousness	Pillai's Trace	.035	14.240	5.000	1936.000	.000
	Wilks' Lambda	.965	14.240	5.000	1936.000	.000
	Hotelling's Trace	.037	14.240	5.000	1936.000	.000
	Roy's Largest Root	.037	14.240	5.000	1936.000	.000
Race*Health consciousness	Pillai's Trace	.002	.930	5.000	1936.000	.460
	Wilks' Lambda	.998	.930	5.000	1936.000	.460
	Hotelling's Trace	.002	.930	5.000	1936.000	.460
	Roy's Largest Root	.002	.930	5.000	1936.000	.460

Table 3
Tests of between-subjects effects

Source	Dependent variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Healthy eating	23180.969(a)	7	3311.567	75.603	.000
	Regular exercise	3125.477(b)	7	446.497	60.910	.000
	Doctor visits	199.868(c)	7	28.553	22.311	.000
	Non-traditional health care services	175.041(d)	7	25.006	4.068	.000
	Health information seeking	557.277(e)	7	79.611	37.952	.000
Intercept	Healthy eating	8370.824	1	8370.824	191.105	.000
	Regular exercise	50.220	1	50.220	6.851	.009
	Doctor visits	474.682	1	474.682	370.919	.000
	Non-traditional health care services	735.996	1	735.996	119.735	.000
	Health information seeking	112.176	1	112.176	53.477	.000
Income	Healthy eating	498.586	1	498.586	11.383	.001
	Regular exercise	78.671	1	78.671	10.732	.001
	Doctor visits	14.385	1	14.385	11.240	.001
	Non-traditional health care services	5.088	1	5.088	.828	.363
	Health information seeking	40.474	1	40.474	19.295	.000
Education	Healthy eating	1480.555	1	1480.555	33.801	.000
	Regular exercise	501.023	1	501.023	68.349	.000
	Doctor visits	4.105	1	4.105	3.208	.073
	Non-traditional health care services	57.276	1	57.276	9.318	.002
	Health information seeking	163.614	1	163.614	77.999	.000
Age	Healthy eating	10727.394	1	10727.394	244.905	.000
	Regular exercise	133.952	1	133.952	18.274	.000
	Doctor visits	56.587	1	56.587	44.217	.000
	Non-traditional health care services	6.707	1	6.707	1.091	.296
	Health information seeking	10.930	1	10.930	5.211	.023
Physical condition	Healthy eating	870.339	1	870.339	19.870	.000
	Regular exercise	517.081	1	517.081	70.539	.000
	Doctor visits	76.801	1	76.801	60.013	.000
	Non-traditional health care services	1.441	1	1.441	.234	.628
	Health information seeking	.990	1	.990	.472	.492
Race	Healthy eating	158.296	1	158.296	3.614	.057
	Regular exercise	42.164	1	42.164	5.752	.017
	Doctor visits	12.464	1	12.464	9.739	.002
	Non-traditional health care services	5.670	1	5.670	.922	.337
	Health information seeking	.001	1	.001	.001	.981
Health conscious-ness	Healthy eating	1644.918	1	1644.918	37.553	.000
	Regular exercise	257.494	1	257.494	35.127	.000
	Doctor visits	1.173	1	1.173	.917	.338
	Non-traditional health care services	29.352	1	29.352	4.775	.029
	Health information seeking	66.773	1	66.773	31.832	.000

Ethnicity	Healthy eating	133.324	1	133.324	3.044	.081
*	Regular exercise	3.579	1	3.579	.488	.485
Health	Doctor visits	.127	1	.127	.099	.753
conscious	Non-traditional health care services	.231	1	.231	.038	.846
-ness	Health information seeking	.698	1	.698	.333	.564
Error	Healthy eating	84976.261	1940	43.802		
	Regular exercise	14221.014	1940	7.330		
	Doctor visits	2482.709	1940	1.280		
	Non-traditional health care services	11924.981	1940	6.147		
	Health information seeking	4069.450	1940	2.098		
Total	Healthy eating	1389780.000	1948			
	Regular exercise	63930.000	1948			
	Doctor visits	15925.000	1948			
	Non-traditional health care services	48928.000	1948			
	Health information seeking	4627.509	1948			
Corrected	Healthy eating	108157.230	1947			
Total	Regular exercise	17346.491	1947			
	Doctor visits	2682.576	1947			
	Non-traditional health care services	12100.023	1947			
	Health information seeking	4626.727	1947			

exercise. The result supports our prediction such that highly health-conscious individuals appeared to have healthier lifestyles measured by healthy eating ($F_{(6, 1941)} = 37.553, p < .001$) and regular exercise ($F_{(6, 1941)} = 35.127, p < .001$). Health-conscious (HC) individuals showed healthier eating patterns ($M_{HC=high} = 27.2952$ and $M_{HC=low} = 24.172$) and exercised more ($M_{HC=high} = 5.200$ and $M_{HC=low} = 3.965$) compared with the low health-conscious group.

In contrast to what we hypothesized in H2 (i.e., highly health-conscious individuals will have more doctor visits), the frequency of doctor visits was not associated with the level of health consciousness ($F_{(6, 1941)} = .917, p = n.s.$). However, we found support in testing Hypothesis 3 and 4, such that highly health-conscious individuals seemed to use more of non-traditional health care services ($F_{(6, 1941)} = 4.775, p = .029$; $M_{H=high} = 4.595$ and $M_{HC=low} = 4.177$) and to seek health information more than those who were less health-conscious ($F_{(6, 1941)} = 31.832, p < .001$; $M_{HC=high} = .288$ and $M_{HC=low} = -.342$).

Interesting results emerged in testing Hypothesis 5 (i.e., main effects

of ethnicity on preventive health behaviors). We found differences between African Americans (AA) and Caucasian Americans (CA) in healthy eating ($F_{(6, 1941)} = 3.614, p = .057$), regular exercise ($F_{(6, 1941)} = 5.752, p = .017$), and doctor visits ($F_{(6, 1941)} = 9.739, p = .002$), while no difference emerged on the use of non-traditional health care services ($F_{(6, 1941)} = .922, p = n.s.$) and health information seeking ($F_{(6, 1941)} = .001, p = n.s.$). More specifically, while Caucasian Americans were found to exercise more than their counterparts ($M_{CA} = 4.833$ and $M_{AA} = 4.332$), African Americans showed a marginally higher tendency of healthy eating ($M_{CA} = 25.248$ and $M_{AA} = 26.219$) and more doctor visits ($M_{CA} = 2.575$ and $M_{AA} = 2.848$).

We also found directional evidence for an interaction effect of ethnicity and health consciousness on healthy eating ($F_{(7, 1940)} = 3.044, p = .081$), such that when the level of health consciousness was low, African Americans showed healthier eating than Caucasian Americans ($M_{CA} = 23.245$ and $M_{AA} = 25.099$). When the level of health consciousness was high, however, there was not much difference in healthy eating between Caucasian and African Americans ($M_{CA} = 27.251$ and $M_{AA} = 27.338$). No other significant interactions were found in this study.

Discussion

As the primary attention has shifted from cure-oriented to preventive-oriented health care, health consciousness has gained considerable importance in promoting preventive health behaviors. In the current study, we attempted to test whether health consciousness would predict preventive health behaviors such as healthy eating, regular exercises, doctor visits, alternative medicine use, and health information seeking. In particular, we incorporated ethnicity (African vs. Caucasian Americans) into the relationship between health consciousness and health behaviors and tested both main and interaction effects, controlling for age, education, income, and physical health condition.

Our data suggested that highly health conscious individuals would

be more likely to eat healthy foods, exercise regularly, use non-traditional health care services (e.g., alternative medicines), and seek health information. This finding is consistent with the previous studies where health conscious individuals were found to adopt a wellness lifestyle and to be more likely to undertake preventive health behaviors (Dutta-Bergman, 2005; Mesanovic, Kadic-Maglajlic, & Cicic, 2013).

We, however, did not find a significant relationship between health consciousness and doctor visits. According to our finding, health conscious individuals did not visit doctors more often than those who are less health conscious; however, they were more likely to use non-traditional medical services such as alternative medicine compared to their counterparts. This finding might be attributed to the prevalent use of non-traditional medicines. The usage of alternative medicine has increased significantly in the United States. Total out-of-pocket expenditures for alternative health care services were estimated to be \$30.2 billion (National Center for Complementary and Integrative Health, 2016). In the United States, approximately 38% of adults used some form of complementary and alternative medicine in 2007 (Evans et al., 2018). In particular, research findings showed health-conscious individuals were more likely to use alternative medicine (Arcury et al., 2006). While some studies found people used alternative medicines as a complement to conventional medicines, others argued that those who use non-traditional medical services were less likely to use conventional medical services (Arcury et al., 2006). Our findings suggest that health consciousness increases not the use of conventional medical services (i.e., doctor visits) but the use of non-traditional health services. Future research should examine what motivates health conscious individuals to use non-traditional medicines. Such studies will help health message designers better develop health promotion messages when targeting health conscious individuals.

Another key research question we examined is whether there is any ethnic difference in health behaviors and further, any interaction effect of ethnicity by health consciousness on preventive health behaviors. Our

data suggested there were significant differences between African and Caucasian Americans in healthy eating, regular exercises, and doctor visits. While Caucasian Americans excelled African Americans in regular exercises, African Americans showed higher tendency of healthy eating and more doctor visits. We also found a marginally significant interaction effect of ethnicity by health consciousness on healthy eating, such that when the level of health consciousness was low, African Americans showed healthier eating than Caucasian Americans. When the level of health consciousness was high, however, there was not much difference in healthy eating between Caucasian and African Americans. These findings stand in contrast to previous literature where African Americans were found to be less likely to practice health maintenance behaviors (Dubowitz et al., 2011) and to consistently use fewer health care services than Caucasian Americans (Arnett et al., 2016). One approach to understanding this surprising finding comes from Moorman and Matulich (1993)'s study. In an attempt to explain their study result where they found low health status individuals were more likely to practice health behaviors than those who were in high health status, Moorman and Matulich (1993) argued healthy individuals seemed to underrate their health status because of their high awareness and knowledge of health issues and potential problems, whereas unhealthy individuals tended to overrate their health status because of their lack of knowledge and denial of health problems. Previous studies have also found that overall, African Americans had poor health knowledge compared to Caucasian Americans (Meng et al., 2016). When this logic is applied to our study context, it may be possible that African Americans overrated their medical use and healthy lifestyle from their lack of knowledge and awareness of health issues. The interaction effect we found (i.e., when the level of health consciousness is low, African Americans showed healthier eating than Caucasian Americans) might reflect this explanation. The lack of knowledge in low health conscious African Americans might lead them to self-report they are practicing a healthy lifestyle. A group of researchers (Levine et al., 2016; Simpson, 2014) found that the concept of healthy

eating might mean different things in different cultural groups. Therefore, it is probable that African Americans have different standards for high cholesterol or high fat foods than Caucasian Americans. For example, Caucasian Americans might perceive only 0% fat as low fat foods, whereas African Americans might perceive ten or 20% fat as low fat foods. It would be beneficial for future study to measure and compare knowledge and awareness in health issues between African and Caucasian Americans. This seems a promising avenue for future research.

In testing the interaction effects of ethnicity by health consciousness on preventive health behaviors, we found one marginally significant interaction effect of ethnicity by health consciousness on healthy eating. We did not find other interaction effects. Why, then, weren't there interaction effects on other preventive behaviors? Newsom and colleagues (2005) found that preventive health behaviors such as diet, exercise, and alcohol consumption were not related to one another, and that it would be a myth to believe that one or two variables are common causes of all preventive health behaviors. According to their explanation, health consciousness and ethnicity seem to be able to predict a specific preventive health behavior such as healthy eating but not all preventive health behaviors. Future studies might benefit from exploring potential variables influencing each specific preventive health behavior along with health consciousness and ethnicity.

The current study has several limitations. First, we used secondary data that were gathered for other purposes than our own research questions. Therefore, health consciousness, for example, was measured by using a single item. Second, the term "ethnicity" has a distinct connotation in each society. The role of ethnicity tested in this study contains US-specific elements and may not always be generalized. Third, the mail-back panel used in this study is not free from the problems of attribution and panel bias.

According to Statistics Korea, net international migration recorded 107 thousand persons in 2017, rising by 31 thousand persons from 2016. The entries from China, Thailand and Vietnam were reported to occupy

61% of the total non-Korean entries in 2017. The 2018 Migration Trend of Korea also reported that family level immigration to Korea has increased by 76.8% for the last 10 years. It seems to be due time for ever-diversifying Korean society to pay attention to ethnicity in designing health campaigns. We hope that the finding of this study will lay the groundwork for future empirical studies exploring the impact of ethnicity in Korea on preventive health behaviors.

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