Exposure to mass media health information, skin cancer beliefs, and sun protection behaviors in a United States probability sample

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Abstract

Background—The mass media is increasingly important in shaping a range of health beliefs and behaviors.

Objective—We examined the association between mass media health information exposure (general health, cancer, sun-protection information), skin cancer beliefs and sun protection behaviors.

Methods—We utilized a general population national probability sample comprised of 1,633 individuals with no skin cancer history (Health Information National Trends Survey, 2005, National Cancer Institute) and examined univariate and multivariate associations between family history of skin cancer, mass media exposure, skin cancer beliefs, and sun protection (use of sunscreen, shade-seeking, and use of sun-protective clothing).

Results—Mass media exposure was higher in younger individuals, and among those who were Caucasian and more highly educated. More accurate skin cancer beliefs and more adherent sun protection practices were reported by older individuals, and among those who were Caucasian and more highly educated. Recent Internet searches for health or sun-protection information was associated with sunscreen use.

Limitations—Study limitations include the self-report nature of sun protection behaviors and cross-sectional study design.

Conclusion—We identify demographic differences in mass media health exposure, skin cancer beliefs, and sun protection behaviors that will contribute to planning skin cancer awareness and prevention messaging across diverse population subgroups.

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The authors have no conflict of interest to disclose.

Introduction

The availability of cancer information in mass media outlets, which include newspapers, magazines, television, and the Internet [1] has exploded in recent years. In 2006, approximately 80% of all American Internet users, or 113 million individuals, used the Internet to access health information [2]. Currently, individuals are more likely to initiate a search for health information on the Internet rather than with their physician [3]. About half of adults in the United States have sought Internet information on cancer-related topics [4]. The availability of mass media information regarding cancer has the potential to increase general awareness among those who are passively exposed to it; such information is also an important resource for those actively seeking information concerning specific cancers [5].

Little is known about whether exposure to mass media health information influences prevention behaviors regarding skin cancer. Research on this topic is important for three reasons. First, skin cancer is one of the three most heavily-researched cancer topics on the Internet 4. Second, skin cancer is the most common cancer diagnosis in the United States, with over one million cases of basal and squamous cell skin cancer and nearly 60,000 cases of melanoma diagnosed in 2007 [6]. Third, ultraviolet radiation exposure (UVR) via sunlight and artificial tanning is an important, modifiable risk factor for all types of skin cancer[7,8,9]. The mass media, including television, magazines, newspapers and the Internet, represent promising channels for widespread dissemination of public health-oriented skin cancer risk and prevention information.

Leventhal and colleagues [10] have proposed that lay beliefs about specific cancers are reflected in individuals' mental models of that cancer, and that these beliefs have important implications for how people attempt to prevent their illness and find out about symptoms and treatment [11]. These beliefs, or mental models, have been examined in relation to skin cancer, and include beliefs about what causes skin cancer, the extent to which skin cancer is preventable, knowledge of skin cancer risk factors, the severity of skin cancer, and the timeline for skin cancer, or length of time it takes to develop [12,13]. These skin cancer beliefs have been found to be associated with higher intentions and positive attitudes toward sun protection and skin cancer screening in general population samples 12,13. However, there is a lack of research examining the extent to which exposure to information from mass media outlets is associated with skin cancer beliefs and behaviors. In particular, we focus on mass media health information presented on the Internet because of its rapidly increasing utilization over the past decade. In this study we utilize data from a large United States probability sample collected in 2005 (Health Information National Trends Survey: HINTS14) to examine: 1) levels of mass media health information exposure, skin cancer beliefs, and sun avoidance and protection behaviors, 2) demographic differences (education, age, race/ethnicity, gender and marital status) in mass media health information exposure, skin cancer beliefs, and sun protection behaviors, and 3) extent to which mass media health information exposure and skin cancer beliefs relate to sun protection behaviors after controlling for demographic factors.

Methods

Procedure

This study used data from the 2005 HINTS [14], a national probability survey of U.S. adults. The 2005 HINTS included questions about a variety of health communication and health behavior topics. Participants were recruited via random-digit dialing and completed a one-time survey over the telephone or Internet. The complex sample survey design employed by the 2005 HINTS included jackknife variance estimation, data weighting, and oversampling of Black and Hispanic populations. The response rate for the initial screener of each household was 34.01% and the response rate for the remainder of the survey was 61.25% which is

comparable to other national telephone surveys [15]. Further information regarding the study methodology is available elsewhere [16,14].

Participants and Selection of Sample for Current Study

A total of 5,586 individuals participated in the 2005 HINTS, of whom 1,736 were randomly assigned to answer a series of questions about skin cancer beliefs and knowledge. Individuals who reported a personal history of skin cancer were not asked these questions. The current study was conducted with a sample of 1,633 individuals for whom a valid response was available for one or more of the skin cancer mental model variables (see below).

Measures

Demographics and family skin cancer history—Participants indicated their gender, age, race/ethnicity, level of education and marital/partnered status. Participants were asked about their family history of cancer. We categorized individuals according to whether they reported having a family member diagnosed with melanoma, non-melanoma skin cancer, or no skin cancer. In order to create non-overlapping categories, individuals reporting a family history of both melanoma and non-melanoma skin-cancer were coded as having a history of melanoma (and thus were not included in the non-melanoma skin cancer family history category).

Mass media health communication variables—Participants answered a series of questions about their exposure to major mass media outlets for health and cancer information. Two questions asked participants to report the number of hours they use the Internet for personal reasons on a typical weekday and during a typical weekend. Based on responses to these questions, we calculated the total number of hours of weekly Internet use for each participant. Participants indicated whether in the past 12 months they had read a newspaper or magazine health section, watched health segments on the local news, or read unsolicited health information on the Internet. They also reported whether in the past 12 months they had looked for health information for themselves on the Internet, or looked for information on the Internet about protecting themselves from the sun. Finally, participants indicated whether they had ever visited a Web site to learn about cancer.

Skin cancer beliefs—Participants completed questions pertaining to five skin cancer beliefs. With regard to *perceived causes of skin cancer*, participants were asked to agree or disagree whether skin cancer is most often caused by a person's lifestyle and whether it "seems like almost everything causes skin cancer." We combined responses to these two questions to categorize participants as believing skin cancer is caused by a person's lifestyle and almost everything, lifestyle but not almost everything, or neither lifestyle nor almost everything. We created an index of *perceived preventability of skin cancer* by combining responses to five items. Four of the items asked participants to agree or disagree with whether there's not much you can do to lower your chances of getting skin cancer; there are so many different recommendations about skin cancer that it's hard to know which ones to follow; there are ways to slow down the development of skin cancer; and getting checked for skin cancer increases the chances of finding cancer when it's easy to treat. For each item, we assigned a value of 1 to the response indicative of skin cancer being preventable and a value of 0 to the other response. Participants were also asked to indicate what things people can do to reduce their chances of getting skin cancer. Individuals who were able to name at least one skin cancer preventive measure (e.g., stay out of the sun, wear protective clothing) were assigned a value of 1 and those unable to name a measure were assigned a value of 0. Responses across the five items were then summed to create a 0 to 5 perceived preventability index, with a higher score representing greater preventability. Participants reported the common *symptoms of skin cancer*. Participants' spontaneous responses were coded "correct" if they mentioned: abnormal

growth, changing mole, lesions, or abnormal pigment (correct symptom coding recommended by Allan Halpern MD and Martin Weinstock MD, personal communication 2009). We coded individuals as to whether or not they knew at least one skin cancer symptom (e.g., abnormal growths, change in a mole). With regard to the *survivability of skin cancer*, participants made their best guess of the percentage (0%–25%; about 50%; about 75%; nearly all) of people with skin cancer will survive at least 5 years. With regard to the *timeline of skin cancer*, participants were asked whether they agreed or disagreed that skin cancer develops over a period of years.

Sun protection variables—Using a 5-point Likert-type scale (from 1 = *never* to 5 = *always*), participants indicated how often they do each of the following when they go outside for more than an hour on a sunny day: wear sunscreen; stay in the shade; wear a hat that shades the face, ears, and neck; wear a long-sleeve shirt; and wear long pants. Individuals who reported that they don't go outside on a sunny day ($n = 55$) were assigned a value of 5 (the highest value) for each of the sun protection variables. We averaged responses across the three clothing variables (wearing a hat, long-sleeve shirt, and long pants) to create a sun-protection clothing use index variable (α=.61). We retained the sunscreen and shade items as separate variables. The correlations between frequency of sunscreen use, shade, and the clothing use index were low (r=0.17–0.29), justifying the retention of these variables to reflect different types of sun protection.

Statistical Analyses

To take into account the study design and data weighting, all analyses were conducted using SUDAAN (version 9.0.1; Research Triangle Institute, Research Triangle Park, NC). All sample sizes reported are unweighted and all percentages are weighted. First, we report the frequencies for each major study variable. Next we examined demographic differences (education, age, race/ethnicity, gender and marital status) for these variables using chi-square bivariate analyses. Finally, we conducted a series of linear regression analyses to examine the association between family history of skin cancer, mass media exposure, skin cancer beliefs, and sun protection variables (use of sunscreen, shade-seeking, and use of sun-protective clothing) after controlling for demographic variables. For each of the three sun protection variables, we conducted separate linear regressions to examine the association with the family history of skin cancer, the health communication variables (due to collinearity among these variables, each was entered as a single predictor in a series of regressions), and the skin cancer belief variables entered together in a single regression. Each regression controlled for the effects of education, age, race/ethnicity, gender, and marital status. Due to the large sample size, we used a cutoff value of $p < .01$ to determine statistical significance for all analyses.

Results

The background characteristics of the sample are shown in Table 1. There was an equal gender split and the group was diverse in terms of age ($M = 43.8$ years), race/ethnicity, and education, with almost two-thirds of participants being married or partnered. There was a low reported family history of skin cancer. Those excluded due to a prior skin cancer history were predominantly Non-Hispanic white (91%); the sample we retained had a lower percentage of Non-Hispanic white participants (67%). Frequencies for the mass media exposure variables, skin cancer beliefs, and sun protection variables are shown in Table 2. While more than half of the sample reported weekly Internet usage (59%) and had been exposed to print or local television news information about health in the past year (58% and 68%, respectively), fewer had read or searched for unsolicited Internet health information (38% and 34% respectively), and very few had searched for Internet information on sun protection (8%) in the past year. Nearly a third (28%) had ever visited an Internet site to learn about cancer.

In general, individuals in this sample reported that skin cancer was preventable and survivable. For example, 63% believed that lifestyle choices were a cause of skin cancer, but did not believe that everything caused it; 77% affirmed that skin cancer was very preventable (4 or 5 on a 5-point scale) and 60% knew at least one correct symptom associated with skin cancer. Most (60%) felt that about 75% or nearly all of those diagnosed with skin cancer would survive it. However, protective behavior adoption was not consistently high; for example only 26% often or always used sunscreen, 41% often or always sought shade, and 31% often or always wore a hat when outside on sunny days.

Demographic differences in Mass Media Exposure, Skin Cancer Beliefs, and Sun Protection

Below we summarize the statistically significant findings regarding demographic differences in mass media exposure, skin cancer beliefs, and sun protection. There were significant differences in the major study variables (mass media exposure, skin cancer beliefs, and sun protection) across educational attainment. Those with higher education levels endorsed higher levels of Internet use and exposure to health information on the Internet and in newspapers/magazines. However, exposure to health information on television news did not differ by educational level. Those with higher education levels also reported higher levels of exposure to information about cancer and sun protection. Those with more education also reported greater use of sunscreen and shade-seeking, and greater awareness of skin cancer causes, prevention strategies, symptom knowledge, awareness of the survivability of skin cancer, and greater endorsement of the belief that skin cancer develops over a series of years.

Age was also significantly related to study variables, with younger people endorsing more Internet use as well as increased exposure to health information via all the channels assessed (Internet, newspapers/magazines, and local television news). Internet use, including exposure to health information, dropped off sharply among those aged 60 and older. Significant age effects on skin cancer beliefs were predominantly curvilinear; awareness of skin cancer, causes, prevention strategies, and endorsement of the belief that skin cancer develops over a series of years increased by age and peaked in the 50–59 year-old cohort; while accurate skin cancer symptom knowledge and awareness of the survivability of skin cancer increased by age and peaked in the 40–49 year-old cohort. Older people reported more consistent use of sun protection – including use of sunscreen, shade-seeking, and sun-protective clothing.

Non-Hispanic white participants reported greater Internet use and exposure to health information on the Internet and in newspapers/magazines, but this effect did not extend to exposure to health information on television news, where exposure was similar across all racial/ ethnic groups. Non-Hispanic whites reported higher levels of awareness of skin cancer causes, prevention strategies, symptom knowledge, awareness of the survivability of skin cancer, and greater endorsement of the belief that skin cancer develops over a series of years, and higher utilization of sunscreen and shade-seeking. In contrast, Hispanic and African-American participants reported higher utilization of shade-seeking behavior.

Gender and marital status were not consistently related to the outcomes of interest. Women and men reported similar levels of Internet use, exposure to Internet health information, and Internet searching for cancer information. Women reported greater exposure to health information in magazines/newspapers and on local television news, and were more likely to have looked for health information and sun protection information on the Internet. Women and men reported similar skin cancer beliefs. Finally, women were more likely to use sunscreen and to seek shade, but men had higher reported levels of sun-protective clothing. Married individuals had higher levels of Internet use, sunscreen use, awareness of skin cancer causes and accurate symptoms, and awareness of the survivability of skin cancer, but otherwise did not differ on the variables of interest.

In summary, mass media exposure was higher in younger individuals, and among those who were Caucasian and more highly educated. In contrast, more accurate skin cancer beliefs and more adherent sun protection practices were reported by *older* individuals, and among those who were Caucasian and more highly educated. Women showed more active searching for health information as well as higher use of sunscreen and shade-seeking; but men were more likely to use sun-protective clothing.

Correlates of Sunscreen Use, Shade-Seeking, and Use of Sun-Protective Clothing

Table 3 presents results pertaining to Research Question 3, which addresses the extent to which mass media exposure and skin cancer beliefs relate to sun avoidance and protection behaviors controlling for demographic variables. Sunscreen use was associated with endorsement of Internet searching for health information in the past 12 months, and Internet search for sun-protection information in the past 12 months. Greater use of sun-protective clothing was associated with having looked for Internet sun-protection information in the past 12 months. None of the other media exposure or any of the skin cancer belief variables were associated with the sun protection variables after controlling for the demographic factors.

Discussion

This study examines the skin cancer-related correlates of mass media health information exposure in 1,633 individuals from the general population with no skin cancer history. The HINTS national probability sample afforded us the opportunity to examine the extent to which exposure to mass media health communication and skin cancer beliefs are related to skin cancer prevention behaviors. The study also allowed us to examine demographic differences in mass media health communication, skin cancer beliefs, and skin cancer prevention behaviors. This research represents an important step in determining the most appropriate skin cancer prevention messages, and channels for those messages, among individuals from diverse general-population subgroups.

Mass media exposure in this general population sample was characterized by frequent Internet use, and high levels of exposure to health information in print (magazine or newspaper) media and local television news. Exposure to Internet-based health, sun-protection, and cancer-related information was less common, however. Given that a large proportion of United States Internet users who access health information online[2], it is possible that individuals in our sample are accessing health information less often than average; alternatively, our divergent findings may be due to the fact that the HINTS questions ask separately about reading unsolicited Internet health information and proactive health information-seeking on the Internet, which were both endorsed by approximately a third of our participants. Indeed, both passive exposure and active information gathering processes are likely operative and contribute to exposure to available health information[5]. Our findings point to the continued importance of mainstream print media and television as critical channels for dissemination of health and cancer information in the general population. The ongoing development of high-quality public health messages for these media channels is warranted, as such messages will reach as large or potentially a larger segment of the population than the Internet.

In general, individuals in this sample reported that skin cancer was preventable and survivable. This finding is consistent with recent large United States population surveys 17, 18, as we found the sample reported inconsistent use of sunscreen, shade-seeking, and clothing during sunny activities. For example, Coups and colleagues (2008) examined data from over 28,000 individuals in the 2005 National Health Interview Survey [18] and found that about half (43%–51% across age groups) reported frequent (sometimes/most of the time/always) use of sunscreen, 65% to 80% did not usually stay in the sun when outside on a sunny day, and 15% to 51% used sun-protection clothing. Accordingly, our study is consistent with the available

literature in terms of the great variation in level of consistency with which sun protection are used as documented in large general population samples.

We found patterns of findings across demographic groups and mass media exposure, skin cancer beliefs, and sun protection behaviors that will be useful in planning skin cancer awareness and prevention messaging across diverse demographic groups. First, we found that young people are receptive to mass media health information but less knowledgable about skin cancer (causes, prevention strategies, symptoms, survivability, timeline) and less likely to be consistent users of sun protection, making them a useful target for skin cancer prevention messages using the Internet and other (newspapers, magazines, television) channels that would aim to increase their awareness of skin cancer and recommended strategies for prevention. These findings also indicate the importance of bringing Internet-based information on skin cancer prevention - especially sun avoidance and minimizing exposure through the use of clothing - to Internet-savvy audiences.

Second, those individuals with lower education levels, as well as those from non-Caucasian subgroups are more consistently receptive to health information via television news; skin cancer prevention messages using television may be an important route to increasing their awareness of skin cancer and recommended strategies for prevention. Finally, men appear to favor the use of sun-protective clothing but are less likely to use sunscreen or seek shade than do women. This dictates targeted messages for men regarding the importance of sunscreen when clothing use is less feasible; of note, given that married individuals were more likely to use sunscreen than unmarried individuals, it may be that unmarried men could be a particular focus for these messages. After controlling for age, education, racial/ethnic group, gender and marital status, those who searched for health information on the Internet in the past 12 months, and those who searched for sun-protection information on the Internet in the past 12 months were more likely to use sunscreen. Those who searched for sun-protection information on the Internet in the past 12 months reported greater use of sun-protective clothing. These findings dictate the importance of providing accurate Internet-based skin cancer information as one strategy to "get the word out" regarding skin cancer prevention.

These findings also indicate the importance of examining sunscreen use, shade-seeking, and use of sun protective clothing separately, as they were not highly correlated with each other and may respond differently to intervention. It is important to consider the need to develop separate interventions, or separate intervention components, in order to address the different barriers and facilitators of sunscreen use, shade-seeking, and use of protective clothing. It is possible some individuals may perceive that sunscreen alone will adequately protect against skin cancer. Adequate consideration of the wholistic mass media environment surrounding skin cancer and skin cancer prevention (public health messages as well as promotional or commercial messages) is important in the development of messages targeted to those with different levels of exposure to the mass media.

~~Family history of skin cancer was not related to sun protection strategies after controlling for demographics. This may be because those with a family history of skin cancer may feel that cancer is inevitable, which may lead to reduced use of sun-protective clothing. Second, it has been documented previously that first-degree family members of melanoma patients do not have adequate sun protection[19], [20]. Finally, the family skin cancer history variable used in this HINTS survey may have been too general, as it did not limit endorsement to those with only first-degree relatives with skin cancer.~~

There are implications of this current work for physicians as well as those who develop public health messages regarding skin cancer prevention. First, younger mass media-savvy individuals don't necessarily practice adequate sun protection. Therefore, clinicians need to

educate patients and inform them of the importance of multiple protective behaviors, including sunscreen use, shade-seeking, as well as use of sun-protective clothing. Secondly, those who may be informed about sunscreen may not be the same people who appreciate the importance of other forms of sun avoidance and protection, dictating the need to be explicit in counseling on the use of hats, clothing, and shade – as well as sunscreen - during high risk time periods.

Additionally, very few people are seeking information about sun protection on the Internet, so clinicians have an obligation to educate patients at routine visits, and those devising new public health messages may want to consider presenting sun protection messages on health, well-being, or vacation/recreation websites and in other mass media in order to capture the attention of those who may remain uninformed. Studies have documented inaccuracies and incomplete Internet information regarding the risk factors, diagnosis, treatment, prevention, and prognosis for skin cancer [21–23] which should be remedied.

There are limitations of the work described here. First, this study is cross-sectional so we cannot distinguish causal relationships between health communication and skin cancer beliefs and behaviors. Second, sun protection behaviors were collected via self-report, which may not accurately reflect actual behavior. Third, the HINTS sunscreen question did not ask participants to report sunscreen SPF, or reapplication of sunscreen, so our knowledge of the actual protection conveyed by this behavior is limited. Additionally, we did not have assessments regarding month of the year or region of the country which may have influenced reported sun protection behaviors. Finally, the question about family history of skin cancer did not ask specifically about skin cancer in first-degree relatives, and even when this is assessed skin cancer family history reports can be unreliable [24].

In conclusion, given the frequency with which individuals in the United States may seek information about skin cancer via the Internet [4], there are useful opportunities for targeted messaging dictated by our study findings. In particular, messages targeting younger people who are heavily-exposed to the Internet but less adherent to sun-protection practices, those from lower educational groups with diverse ethnicity, as well as men would usefully address preferred sources of health information exposure to increase awareness and behavior change in skin cancer prevention. Future transdisciplinary research should include dermatologists in collaboration with behavioral and communication scientists could document trends in mass media content regarding skin cancer, general population awareness of available mass media information about skin cancer, and examination of perceived informational needs and preferences of those individuals seeking skin cancer information. Skin cancer prevention intervention studies would ideally measure baseline frequency of use of mass media channels, and preferences for, diverse mass media channels where individuals may encounter health information about skin cancer as these factors may moderate intervention effects. The findings reported here will be relevant to those devising mass media messages regarding skin cancer, and will also be useful to clinicians addressing the content and deficits of mass media messages regarding skin cancer with their patients.

Acknowledgments

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Table 1

Characteristics of Study Sample Drawn from Health Information National Trends Survey 2005

	Sample %
Gender	
Male	49.7
Female	50.3
Missing (*n*)	0
Age (years)	
18–29	24.5
30–39	20.1
40–49	20.8
50–59	15.0
60–69	10.5
≥ 70	9.1
Missing (*n*)	0
Race/ethnicity	
Non-Hispanic white	66.9
Non-Hispanic black	11.2
Non-Hispanic other	7.1
Hispanic	14.7
Missing (*n*)	56
Education	
< High school graduate	15.6
High school graduate	31.8
Some college	30.9
College graduate	21.7
Missing (*n*)	49
Married/partnered	
No	37.0
Yes	63.0
Missing (*n*)	46
Family history of skin cancer	
Family member with melanoma	5.1
Family member with non-melanoma skin cancer	4.8
No family history of skin cancer	90.1
Missing (*n*)	76

Note. N = 1633. All percentage are weighted.

Table 2

Descriptive Statistics for Health Communication, Skin Cancer Mental Model, and Sun Protection Variables

	Sample %
Health Communication Variables	
Hours of weekly Internet use	
0	41.3
1–7	32.8
≥ 8	25.9
Missing (*n*)	7
Read newspaper or magazine health sections in the past 12 months	
No	42.4
Yes	57.6
Missing (*n*)	1
Watched health segments on the local news in the past 12 months	
No	31.7
Yes	68.3
Missing (*n*)	3
Read unsolicited health information on the Internet in the past 12 months	
Never use Internet	40.0
No	21.9
Yes	38.1
Missing (*n*)	1
Looked for health information for self on the Internet in the past 12 months	
Never use Internet	40.0
No	26.3
Yes	33.7
Missing (*n*)	1
Looked for information about protecting self from the sun on the Internet in the past 12 months	
Never use Internet	40.0
No	52.3
Yes	7.8
Missing (*n*)	1
Ever visited a Web site to learn about cancer	
Never use Internet	40.1
No	32.4
Yes	27.5
Missing (*n*)	3
Skin Cancer Mental Model Variables	
Perceived causes of skin cancer	
Lifestyle and everything	9.7
Lifestyle but not everything	62.7
Neither lifestyle nor everything	27.5

	Sample %
Missing (*n*)	145
Perceived preventability of skin cancer (higher score = more preventable)	
0–2	6.7
3	16.6
4	36.5
5	40.2
Missing (*n*)	252
Know a symptom of skin cancer	
No	39.8
Yes	60.2
Missing (*n*)	13
Number of people who develop skin cancer who survive at least 5 years	
≤ 25%	12.3
About 50%	22.3
About 75%	32.6
Nearly all	27.8
Don't know	5.1
Missing (*n*)	8
Believe that skin cancer develops over a period of several years	
No	77.6
Yes	22.4
Missing (*n*)	161
Sun Protection Variables	
Frequency of using sunscreen when outside on a sunny day	
Never	33.6
Rarely	17.1
Sometimes	21.3
Often	14.1
Always	11.4
Don't go out on a sunny day	2.5
Missing (*n*)	3
Frequency of staying in the shade when outside on a sunny day	
Never	6.7
Rarely	13.7
Sometimes	36.2
Often	27.2
Always	13.6
Don't go out on a sunny day	2.5
Missing (*n*)	13
Frequency of wearing a hat when outside on a sunny day	
Never	33.8
Rarely	14.3

	Sample %
Sometimes	18.7
Often	12.2
Always	18.5
Don't go out on a sunny day	2.5
Missing (n)	0
Frequency of wearing a long-sleeved shirt when outside on a sunny day	
Never	40.7
Rarely	21.7
Sometimes	22.0
Often	7.6
Always	5.5
Don't go out on a sunny day	2.5
Missing (n)	1
Frequency of wearing long pants when outside on a sunny day	
Never	15.0
Rarely	12.8
Sometimes	23.3
Often	18.5
Always	27.9
Don't go out on a sunny day	2.5
Missing (n)	2

Note. N = 1633. All percentage are weighted.

Table 3

Results of Linear Regression Analyses Examining Correlates of Sun Protection Variables

	Sunscreen Use		Staying in the Shade		Use of Sun-Protective Clothing	
	Wald's F	b	Wald's F	b	Wald's F	b
Family history of skin cancer	0.21		0.39		1.34	
Family member with melanoma		0.03		0.00		−0.24
Family member with non-melanoma skin cancer		−0.13		−0.13		0.12
No family history of skin cancer		Ref		Ref		Ref
Health Communication Variables						
Hours of weekly Internet use	1.79		0.58		1.72	
0		Ref		Ref		Ref
1–7		0.27		−0.12		−0.15
≥ 8		0.20		0.01		−0.18
Read newspaper or magazine health sections in the past 12 months	3.18		0.34		0.08	
No		Ref		Ref		Ref
Yes		0.17		0.05		0.02
Watched health segments on the local news in the past 12 months	3.15		0.26		0.28	
No		Ref		Ref		Ref
Yes		0.17		0.05		0.04
Read unsolicited health information on the Internet in the past 12 months	4.03		0.18		0.99	
Never use Internet		Ref		Ref		Ref
No		0.12		−0.04		−0.12
Yes		−0.35		−0.07		−0.13
Looked for health information for self on the Internet in the past 12 months	5.40[*]		0.60		1.18	
Never use Internet		Ref		Ref		Ref
No		0.12		−0.12		−0.15
Yes		0.39[*]		−0.01		−0.11
Looked for information about protecting self from the sun on the Internet in the past 12 months	7.07[*]		0.30		4.69[†]	
Never use Internet		Ref		Ref		Ref
No		0.18		−0.07		−0.17
Yes		0.66[**]		−0.01		0.10

	Sunscreen Use		Staying in the Shade		Use of Sun-Protective Clothing	
	Wald's *F*	*b*	Wald's *F*	*b*	Wald's *F*	*b*
Ever visited a Web site to learn about cancer	2.09		1.14		2.73	
Never use Internet		Ref		Ref		Ref
No		0.23		−0.13		−0.19
Yes		0.31		0.04		−0.02
Skin Cancer Mental Model Variables						
Perceived causes of skin cancer	0.46		1.72		0.72	
Lifestyle and everything		Ref		Ref		Ref
Lifestyle but not everything		−0.02		−0.25		−0.14
Neither lifestyle nor everything		−0.15		−0.28		−0.12
Perceived preventability of skin cancer (higher score = more preventable)	2.32		1.20		0.45	
0–2		Ref		Ref		Ref
3		0.37		0.60		0.15
4		0.34		0.57		0.06
5		0.56		0.54		0.09
Know a symptom of skin cancer	3.82		0.85		0.15	
No		Ref		Ref		Ref
Yes		0.27		−0.15		−0.04
Number of people who develop skin cancer who survive at least 5 years	1.81		0.59		1.35	
≤ 25%		Ref		Ref		Ref
About 50%		−0.04		0.04		0.03
About 75%		0.02		0.20		0.16
Nearly all		−0.09		0.19		0.19
Don't know		0.72		0.29		−0.04
Believe that skin cancer develops over a period of several years	0.25		0.95		0.02	
No		Ref		Ref		Ref
Yes		−0.05		−0.12		−0.01

Note. b = unstandardized regression coefficient; Ref = reference group.

[†] *p* = .01.

[*] *p* < .01,

**
p < .001. All regressions controlled for gender, age, race/ethnicity, education, and marital status.