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Health Locus of Control, Acculturation, and Health-Related Internet Use Among Latinas

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Abstract

Among individuals residing in the United States, the Internet is the third most used source for obtaining health information. Little is known, however, about its use by Latinas. To understand health-related Internet use among Latinas, the authors examined it within the theoretical frameworks of health locus of control and acculturation. The authors predicted that acculturation would serve as a mediator between health locus of control and health-related Internet use, age and health-related Internet use, income and health-related Internet use, and education and health-related Internet use. Data were collected via a 25-minute self-report questionnaire. The sample consisted of 932 young (M age = 21.27 years), low-income Latinas. Using structural equation modeling, the authors observed that acculturation partially mediated the relation between health locus of control and health-related Internet use and fully mediated the relations among age, income, and Internet use. An internal health locus of control ($p < .001$), younger age ($p < .001$), and higher income ($p < .001$) were associated with higher levels of acculturation. Higher levels of acculturation ($p < .001$) and an internal health locus of control ($p < .004$) predicted health-related Internet use. The Internet is a powerful tool that can be used to effectively disseminate information to Latinas with limited access to health care professionals. These findings can inform the design of Internet-based health information dissemination studies targeting Latinas.

Researchers examining specific types of Internet use among individuals residing in the United States have found that it is the third most consulted health information source after health care providers and friends or family members (Fox & Jones, 2009; Talosig-Garcia & Davis, 2005). However, few researchers have examined health-related Internet use among Latinos. This is a significant gap in literature given that Latinos currently account for approximately 15% of the population in the United States and are expected to make up 29% of the population by 2050 (Passel & Cohn, 2008). Understanding their patterns of obtaining health information via media sources, such as the Internet, can aid health information dissemination efforts to a population where approximately 27% of the members do not have a regular health care provider from who they can obtain information (Livingston, Minushkin, & Cohn, 2008).

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According to one recent study, 83% of Latinos obtain health information from media sources including television, radio, newspapers, magazines, and the Internet. Further, this information was found to influence their health behavior. In fact, 64% reported that the information they obtained resulted in a change in their weight-related behaviors, 54% reported that it led to a visit with a health care professional, and 41% reported that it influenced their decisions regarding the treatment of illnesses and medical conditions (Livingston et al., 2008). Existing research specifically examining health-related Internet use among Latinos suggests that factors associated with use include: younger age (29 years and younger), being a second-generation immigrant, and speaking English (Cheong, 2007; Fox & Livingston, 2007). While demographic factors that predict health-related Internet use among Latinos have been identified, little is known about the psychosocial factors that predict its use.

One theory that may be useful in understanding health-related Internet use is the theory of health locus of control (HLC; Wallston & Wallston, 1981). HLC was adapted from Rotter's (1966) more general locus of control theory. The HLC theory describes the extent to which individuals feel they are in control of their health. Individuals with a high internal HLC believe that positive and negative health outcomes are within their power while individuals with a low internal HLC believe that they have little control over their health (Wallston & Wallston, 1981). This theory has been found to be useful in predicting participation in different positive health behaviors. For example, among Latinas, a high internal HLC has been found to predict engaging in health-promoting prenatal behavior (Esperat, Feng, & Zhang, 2007) and HIV preventive behavior (Loue, Cooper, Traore, & Fiedler, 2004). In a similar manner, HLC may be useful in predicting health-related Internet use among Latinas. In particular, those Latinas who feel they have more control over their health may be more likely to actively search the Internet for health information.

Wallston and Wallston (2005) suggested the importance of examining the influence of contextual variables and how they operate in conjunction with HLC, as mediators or moderators, to predict health behavior outcomes. They explain that this is necessary given the relatively small amount of variance in health behaviors explained by the direct effect of HLC (Wallston, 2001). One such factor that may help illustrate more clearly the relation between HLC and health-related Internet use among Latinas is acculturation.

Acculturation is defined as the process of adapting to another culture and adopting its values, attitudes, traditions, and behaviors (Berry, 1997; Cuellar, Arnold, & Maldonado, 1995). Acculturation functions differentially among Latinas depending on the behavior in question. For behaviors such as alcohol consumption, a low level of acculturation functions as a protective factor (Chambers et al., 2005). However, for other behaviors such as breast and cervical cancer screening, a low level of acculturation is a risk factor (Ramirez, Suarez, Laufman, Barroso, & Chalela, 2000). To our knowledge, researchers have not specifically examined the relation between acculturation and health-related Internet use among Latinas. However, some of the correlates of acculturation have been examined in relation to health-related Internet use among Latinos. Researchers have found that 52% of Latinos born in the United States report obtaining health information from the Internet compared with 25% of Latinos born outside of the United States. This same study also found that 53% of Latinos who were English-dominant obtained health information from the Internet compared with 17% of Spanish-dominant Latinos (Livingston et al., 2008). Given that nativity and language dominance predict health-related Internet use among Latinos, it seems likely that higher levels of acculturation will also predict use. Further, given that acculturation has been found to play a mediating role in other behaviors among Latinas such as the use of mental health services (Ho, Yeh, McCabe, & Hough, 2007), we believe that it might also mediate the relation between HLC and health-related Internet use among Latinas.

Researchers have not yet examined the utility of HLC and acculturation in predicting health-related Internet use among Latinas. Therefore, the purpose of the present study was to examine the relation between health locus of control, demographic factors (age, education, and income), acculturation and ever having used the Internet to obtain health information. We predicted that acculturation would mediate the relation between HLC, age, income, education and Latinas' use of the Internet as a source of health information. In particular, we hypothesized that acculturation would be positively associated with ever having used the Internet to obtain health information.

Method

Participants

Participants were Latinas ($n = 932$) between the ages of 16 and 24 years ($M_{age} = 21.27$ years, $SD = 2.47$ years). They were recruited, as part of a larger study, at one of five publicly funded, reproductive health clinics in southeast Texas. Approximately 45.6% of the sample was born in the United States and 54.1% were born in Latin American countries. In particular, 47.1% participants were born in Mexico; 2.8% in El Salvador; 2.4% in Honduras; and the rest in Guatemala, Nicaragua, Puerto Rico, Uruguay, or the Dominican Republic (2.1%). In terms of level of education completed, 16.2% of the participants were currently attending high school, 31.2% had not completed high school, 31.7% had graduated or obtained their GED, 18.4% had completed some college courses, and 2.5% had a college degree. Approximately 58.3% reported household incomes of less than \$15,000 per year; 28.3% reported household incomes of \$15,000–\$29,999; 10.2% reported household incomes of \$30,000–\$49,999; 2.1% reported household incomes of \$50,000–\$69,999; and 1.1% reported household incomes of \$70,000 or more.

Data Collection Procedures

Participants were approached at each of the clinic sites by trained female study recruiters and asked whether they were interested in completing a self-administered questionnaire. Those who expressed interest and met the age requirement (between 16 and 24 years) were given a brief verbal description of the study and its goals, and then asked whether they wanted to complete the 25-min self-administered questionnaire. We obtained oral informed consent from participants, and the questionnaire, available in Spanish and English, was completed on-site. Approximately 38% of the sample responded to the Spanish version of the questionnaire. Participants were compensated \$5 upon completion. We collected data used in the present study between August 8, 2008, and June 23, 2009. The response rate was approximately 80%. The University of Texas Medical Branch Institutional Review Board approved all procedures and measures.

Measures

Demographic Measures—Participants provided their date of birth (day, month, and year), highest level of education completed, and household income.

Internet Use—Use of the Internet as a source of health information was assessed by one item “Have you ever used the Internet to find health information about yourself?” (i.e., health-related Internet ever use) with response options of 0 (*no*) or 1 (*yes*).

Acculturation—Four items from the language portion of the widely used Short Acculturation Scale for Hispanics (Marin, Sabogal, Marin, Otero-Sabogal, & Perez-Stable, 1987) measured acculturation. The items assessed the following: language spoken as a child (ACC1), language spoken at home (ACC2), language thought in (ACC3), and language spoken with friends (ACC4). The reliability of the acculturation scale in our sample was

0.96. The response scale ranged from 1 (*only Spanish*) to 5 (*only English*). Higher scores indicated higher levels of acculturation.

Health Locus of Control—We measured health locus of control by the internal health locus of control subscale in the Multidimensional Health Locus of Control measure (Wallston & Wallston, 1981). The internal health locus of control scale consisted of six items and its reliability for our sample was 0.68. High scores indicated high levels of perceived internal HLC. The response scale ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). We conducted a factor analysis using Mplus version 5.1 (Muthén & Muthén, 1998–2008) and robust maximum likelihood estimation in order to retain only the highest loading items (higher than 0.52). This resulted in the retention of four items for internal HLC: “I am in control of my health” (HLC1); “The main thing that affects my health is what I myself do” (HLC2); “If I take care of myself, I can avoid illness” (HLC3); and “If I take the right actions, I can stay healthy” (HLC4).

Statistical Analyses

We conducted preliminary data analyses using SAS version 9.2. We examined means, standard deviations, skew, and kurtosis indices for the variables in the model. In addition, we conducted correlations and reliability tests. We conducted all subsequent analyses using structural equation modeling and the software program Mplus version 5.1 (Muthén & Muthén, 1998–2008). Also, we assessed the fit of the structural equation modeling models, as suggested by experts in structural equation modeling (Hu & Bentler, 1999; Kline, 2005), through the examination of four fit indices: chi-square (low value and nonsignificant p is desired), the comparative fit index (values greater than .90 indicate good fit), the root mean square residual (values .05 indicate good fit), and either the standardized root mean square residual (values of .10 or less are considered to be favorable) or the weighted root mean square residual (values <.90 indicate good fit).

Results

Descriptive Statistics

We calculated and examined descriptive statistics, including means and standard deviations, for the variables in the model. On the basis of the skew and kurtosis indices, we determined that the data were distributed normally. Once this was established, we tested the structural equation modeling models.

Structural Equation Modeling Analyses

First, we tested a measurement model using robust maximum likelihood estimation in Mplus. The model consisted of (a) one latent variable for internal health locus of control and (b) one latent variable for acculturation. The fit of this model was good: $\chi^2(19) = 154.45$, $p = .000$; comparative fit index = .961; root mean square error of approximation = .087; standard root mean square residual = .037. All of the indicators of the latent variables loaded significantly onto their respective latent variables (see Figure 1, HLC1–HLC4 for HLC factor loadings and ACC1–ACC4 for acculturation factor loadings). Also, internal HLC was significantly correlated with acculturation.

Next, a direct effects model including internal HLC, age, income, and education was examined. The variance-adjusted least squares estimator was employed due to the binary nature of the outcome variable. The fit of the model was evaluated through the examination of the same fit indices examined for the measurement model with the exception of the weighted root mean square residual (values <.90 indicate good fit), which was substituted for the standard root mean residual. The model fit statistics indicated good model fit and all

of the path coefficients were significant except for the path from education to health-related Internet ever use ($p = .493$). Given the nonsignificance of this path, we removed education from the model. The fit statistics of the model without education were as follows: $\chi^2 (14) = 16.29$, $p = .296$; comparative fit index = .996; root mean square error of approximation = .013; weighted root mean square residual = .463. These statistics indicated good model fit and all of the path coefficients were significant.

Last, we introduced acculturation into the model as a mediator. We used bootstrap estimation analysis with the variance-adjusted least squares estimator. We used this analysis because it does not assume multivariate normality and it has been found to be superior to other approaches to testing mediation models (Bollen & Stine, 1992; MacKinnon, Lockwood, & Williams, 2004). The number of bootstrap samples was set to 10,000 to ensure the precision of bias-corrected confidence intervals (MacKinnon et al., 2004). We examined the model fit indices and Sobel tests results to determine the statistical significance of the mediation paths (Baron & Kenny, 1986). The first model estimated included internal HLC, age, and income as direct and indirect predictors. Table 1 presents the correlations among the latent and indicator (measured) variables. The model fit statistics indicated good model fit. However, the path from age to health-related Internet ever use was nonsignificant ($p = .384$), indicating full mediation, so this path was eliminated from the model and a new model was estimated. Results from this model, which excluded the direct effect of age, also indicated good fit and all of the paths coefficients were significant with the exception of the path from income to health-related Internet ever use ($p = .058$). So, the direct path from income to health-related ever Internet use was removed from the model. The model fit statistics of the model without the direct effects of age and income were as follows: $\chi^2 (39) = 122.88$, $p = .000$; comparative fit index = .951; root mean square error of approximation = .000; weighted root mean square residual = .792 and all of the path coefficients were significant (Figure 1). The proportion of variance (R^2) in health-related Internet ever use accounted for by the variables in the model was .235. Further, the Sobel test results confirmed that acculturation partially mediated the relation between internal HLC and health-related Internet ever use and fully mediated the relation between age, income, and health-related Internet ever use (Table 2). The results suggest that, as predicted, acculturation at least partially mediates almost all of the demographic and psycho-social variables hypothesized to be related to health-related Internet ever use.

Discussion

Few studies have attempted to understand Latinas' use of the Internet to obtain health information. This study illustrates the utility of the theory of health locus of control in predicting health-related Internet use among Latinas. Further, the results highlight the fact that examining health locus of control in conjunction with acculturation further enhances our understanding of differences in health-related Internet use among Latinas.

Highly acculturated Latinas were more likely to have ever conducted a health-related Internet search as compared with less acculturated Latinas. This finding supports previous research that has found that Latinas who speak English are more likely to use the Internet than are those who do not (Fox & Livingston, 2007). The fact that the majority of online health information is only available in English may make it more difficult for non-English fluent Latinas to search the Internet for health information. This may explain the difference in Internet use by level of acculturation.

Latinas with higher levels of internal HLC were more acculturated than were Latinas with low levels of internal HLC and were more likely to have ever searched for health information online. Previous research among Latinas has found that a high internal HLC

predicts engaging in health promoting behavior (Esperat et al., 2007; Loue et al., 2004). Using the Internet as a tool to locate health information can be viewed as a health promoting behavior; therefore, it is not surprising that Latinas with higher levels of acculturation and internal HLC are more likely to take the initiative and search for answers to questions about their health.

Younger Latinas and Latinas with higher incomes reported higher levels of acculturation and, in turn, were more likely to search for health information online. This finding is consistent with previous research examining age, income, and Internet use (Fox & Jones, 2009; Livingston et al., 2008; Talosig-Garcia & Davis, 2005). Accessibility of the Internet may explain the differences found in health-related Internet use. More acculturated Latinas with higher incomes, resulting from the possession of more financial resources, may have increased access to computers and the Internet at home.

One limitation of the present study was that we measured only language acculturation. However, given that previous research has found that measures of language acculturation distinguish very well among Latinos with bicultural, American, and Latino identities (Felix-Ortiz, Newcomb, & Myers, 1994), we felt that the measure we used was adequate. Also, the sample consisted of young Latinas between the ages of 16 and 24 years, thus the generalizability of the findings is limited to this age group. Another limitation is the cross-sectional and correlational nature of the study, which makes it impossible to draw causal conclusions regarding the predictors in the model and health-related Internet use among Latinas. Further, the 80% response rate is a potential limitation if the individuals who chose not to participate had lower literacy levels compared with participants given that literacy may be correlated with health-related Internet use. In addition, we only measured having ever searched the Internet for health information. Given that we did not obtain information regarding the frequency or number of health-related Internet searches, our conclusions are limited to comparing those who have ever used the Internet to locate health information to those who have not. However, this study provides a preliminary look into the characteristics of young Latinas who use the Internet to search for health information and sets the stage for future research.

Future studies should examine acculturation as a mediator in searching for specific types of health information in addition to other psychosocial variables such as social support and active versus passive health orientation. Also, longitudinal studies that examine the frequency of health-related Internet searches are necessary to better understand its use. Last, researchers should design studies that discover ways to effectively disseminate health information to Latinas via the Internet.

In conclusion, the Internet can be a powerful tool for information dissemination to populations with limited access to health care providers. For example, researchers have found that Latinos who reported that they had obtained “a lot” of diabetes information from the Internet were more knowledgeable about diabetes compared with those who did not (Livingston et al., 2008). However, for health professionals to effectively use the Internet as a resource and tool in interventions for Latinas, it is important to identify the factors that motivate these women to use the Internet as a health information source. This includes the identification of psychosocial factors that influence health-related Internet use and an understanding of how those factors work together. Our findings indicate that acculturation is a mechanism through which income, age, and health locus of control operate to influence health-related Internet use. This information is important because it provides prevention researchers with a more detailed picture of how acculturation is associated with health-related Internet use. It also illustrates the importance of targeting acculturation in the design

of Internet-based interventions developed for Latinas since doing so may improve the effectiveness of these interventions in this population.

Further, our findings provide evidence that the health information resources of less acculturated Latinas are limited. Not only do these women encounter barriers to accessing medical care (DuBard & Gizlice, 2008), which limits their ability to gain health information from health care providers, but they are also less likely to seek health information on the Internet. This leaves less acculturated Latinas with fewer avenues for obtaining the health information they need, compared with more acculturated Latinas. This knowledge can inform the design of Internet-based interventions developed for Latinas with high and low levels of acculturation. These interventions will be more successful if they assess the acculturation level of their participants in order to provide them with the appropriate amount of guidance needed to access health information online. Given the Internet's cost-effectiveness and relative ease of access, it is an extremely promising medium for health education and information dissemination to Latinas.

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Figure 1.

Structural model of the mediational role of acculturation in health-related Internet ever use among Latinas. Model fit indices: $\chi^2 (39) = 122.88$, $p = .000$; comparative fit index = .951; root mean square error of approximation = .000; weighted root mean square residual = .792. All p s $\leq .005$. HLC = Health Locus of Control; the number after indicates the scale item number. ACC = Acculturation; the number after indicates the scale item number.

Table 1

Correlations among latent and indicator variables

	1	2	3	4	5
1. Health locus of control	—				
2. Acculturation	.170**	—			
3. Age	.124*	-.766**	—		
4. Income	.054*	.168**	.061	—	
5. Education	-.022	.009	-.010	.005	—

* $p < .05$.

** $p < .01$.

Table 2
Indirect effects of health locus of control, age, and income on health-related Internet ever use among Latinas

Indirect effect	Standard path coefficient	SE	Z
Health Locus of Control → Acculturation → Internet	.092	.020	4.59
Age → Acculturation → Internet	-.111	.018	-6.30
Income → Acculturation → Internet	.061	.017	3.66

Note. For each indirect effect, $p = .000$.