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Understanding Cervical Cancer Screening Intentions Among Latinas Using An Expanded Theory of Planned Behavior Model

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Abstract

We examined the utility of an expanded Theory of Planned Behavior (TPB) model in predicting cervical cancer screening intentions among Latinas. The model included acculturation and past cervical cancer screening behavior along with attitude, subjective norms, and perceived behavioral control. This cross-sectional study included a sample of 206 Latinas who responded to a self-administered survey. Structural equation modeling was employed to test the expanded TPB model. Acculturation ($p = .025$) and past screening behavior ($p = .001$) along with attitude ($p = .019$), subjective norms ($p = .028$), and perceived behavioral control ($p = .014$) predicted the intention to be screened for cervical cancer. Our findings suggest that the TPB is a useful model for understanding cervical cancer screening intentions among Latinas when both past behavior and culture are included. This highlights the importance of culture on behavior and indicates a need to develop culturally sensitive, theory-based interventions to encourage screening and reduce cervical cancer-related health disparities in Latinas.

Keywords

Latinas; cervical cancer screening; acculturation; theory of planned behavior

Over the last three decades, the incidence of cervical cancer in the United States has decreased,^{1,2} making it the thirteenth most frequently occurring cancer in women.³ Several studies have linked this decrease to a decline in the incidence of invasive squamous cell carcinoma^{4,6} which appears to be due to the implementation of population based screening programs in the United States.

Despite the decline in the overall incidence of cervical cancer, Latinas still carry a disparate portion of the cervical cancer burden. While the overall incidence of cervical cancer in the United States is 8.4 per 100,000 women, racial and ethnic minority women are disproportionately affected. Among Latinas, the incidence of cervical cancer is 11.1/100,000

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women⁷ and this group is significantly less likely to be screened for cervical cancer than White or Black women in this country.^{8,9} In order to decrease the incidence of cervical cancer in Latinas, it is important to understand factors that influence their screening behavior.

Meta-analyses of motivational models including the TPB, the Health Belief Model, Social Cognitive Theory, and Protection Motivation Theory, have found the TPB to be the most parsimonious and superior model that predicts intentions and various behavioral outcomes.¹⁰ The theory of planned behavior¹¹ (TPB), an extension of the theory of reasoned action,¹² is a cognitive-motivational theory of behavior with five major components: attitude toward the behavior, subjective norms (what we believe important others want us to do), perceived behavioral control, intention to perform the behavior, and actually performing the behavior. According to the theory, attitude toward the behavior, subjective norms, and perceived behavioral control predict an individual's intention to engage in or perform a behavior. Intention, in turn, directly predicts whether or not the behavior is actually performed.

The TPB has been found to successfully predict health behaviors such as having a general health check-up, obtaining a mammography, and being screened for colorectal cancer.^{10,13,16} Further, studies that have employed components of either the Theory of Reasoned Action or the TPB to examine cervical cancer screening have found that it is useful in predicting cervical cancer screening among Latinas.^{17,18} Given the utility of the full TPB model in predicting other health behaviors and studies that have shown that several TPB constructs are associated with Pap test screening, it seems plausible that it can also explain cervical cancer screening among Latinas. However studies have not yet examined cervical cancer screening among Latinas using the full TPB model.

The TPB it is often criticized for not acknowledging the influence of other non-cognitive psychosocial and demographic variables on an individual's intentions and behavior.¹⁹ Many barriers to receiving healthcare faced by Latinas can be linked to their level of acculturation. Acculturation is defined as the process of adapting to another culture and adopting the values, attitudes, traditions, and behaviors of the new culture.^{20,21} Available research indicates that acculturation is an important predictor of cervical cancer screening among Latinas. In general, researchers have found a positive association between acculturation with higher levels of acculturation predicting a greater likelihood of being screened for cervical cancer.^{22,26} Given existing evidence indicating the importance of acculturation in predicting cervical cancer screening behavior among Latinas, it is important to examine whether its inclusion improves the predictive validity of the TPB.

Researchers have found that an individual who has engaged in a health behavior in the past, is more likely to engage in that behavior in the future.^{27,29} Further, there is evidence that past behavior increases the predictive validity of the TPB.^{30,32} It is possible that Latinas who have been screened for cervical cancer in the past are more likely to express the intention to be screened and actually engage in future screening behavior yet this hypothesis has not yet been examined.

The purpose of the current study is twofold: 1. to examine whether the TPB as originally proposed by Ajzen¹¹ predicts cervical cancer screening intentions; and 2. to examine the predictive validity of the TPB model including acculturation and past cervical cancer screening behavior on cervical cancer screening intentions. We hypothesize that acculturation, past cervical cancer screening behavior, attitude, subjective norms and perceived behavioral control will predict cervical cancer screening intentions among the Latinas in our sample.

Methods

Participants and Procedure

The participants in this study consisted of 210 females recruited at one of two study sites: 1. an annual health fair sponsored by the American Diabetes Association in Houston, Texas and 2. a Catholic church in Los Angeles, California. The majority of the participants (N= 199) were recruited at the California study site. Verbal consent to participate in the study was obtained from interested individuals. The questionnaire was anonymous and was completed on-site. Upon completion of the questionnaire, participants were debriefed and given a numbered ticket that entered them in a gift card drawing. All procedures were approved by the University of Houston's Committee for the Protection of Human Subjects (CPHS). Women who indicated that they had previously been diagnosed with cervical cancer (N = 4) were excluded from the current analyses. Therefore, the final sample retained for analyses in the current study consisted of 206 women (mean age = 36.12, SD = 5.98). The response rate of women who were approached and agreed to complete the survey was approximately 98% with 97% of the women completing the Spanish version of the questionnaire

Measures

The measures employed in this study were part of a larger questionnaire titled the *Health Behavior Survey*. The self-report questionnaire measured various demographic, psychosocial, and behavioral variables thought to be related to cervical cancer screening, diabetes and HIV/AIDS. A Spanish version of the questionnaire was created using a combination of back translation³³ and the committee method of translation.³⁴

Modified Version of the Acculturation Scale for Mexican Americans II—This is a multidimensional measure of acculturation developed by Cuellar, Arnold and Maldonado,²¹ It has been validated and found to have good reliability (Cronbach's alpha = .88) and is intended to assess the extent to which Mexican Americans identify with both the Mexican and Anglo cultures. It is composed of two subscales, which are the Mexican Oriented Scale (in this case the Latino Oriented Scale) and the Anglo Oriented Scale. A modified version substituting Latino” for “Mexican American” was employed in this study to make it possible to administer the measure to other Latinos subgroups in addition to Mexican Americans. The Latino Oriented Scale (LOS) and the Anglo Oriented Scale (AOS) employed in this study each consisted of 9 items with a response scale that ranged from 1 (*Not at all*) to 5 (*Almost always*). In our sample, the reliability of this modified version of the acculturation measure with both subscales combined was Cronbach's $\alpha = .79$. The reliability of each

subscale separately was Cronbach's $\alpha = .81$ for the LOS and Cronbach's $\alpha = .90$ for the AOS. We conducted an exploratory factor analysis on each subscale using structural equation modeling. The factors identified were then included in the full structural model as indicators of acculturation. Only the items that clearly loaded onto a single factor ($> .63$) were retained. This resulted in three different factors with two to three items in each. The first factor was labeled General Spanish Language Acculturation (GSLA) and consisted of two general items about speaking Spanish (e.g., "I like speaking Spanish."). The second factor also consisted of two items and was labeled General English Language Acculturation (GELA). "I enjoy speaking English." is a sample item from this factor. The third factor was labeled Participation in Spanish Language Activities (PSLA) and consisted of three items (e.g., I like to watch movies in Spanish.).

Short Ethnic Identity Scale—This scale was included in the questionnaire because it measures another dimension of acculturation; that is, the extent to which an individual identifies with his or her ethnic group. The Short Ethnic Identity Scale is a unidimensional measure that consists of seven items intended to assess the extent to which an individual feels like a member of their ethnic group. It was found to have good reliability (Cronbach's $\alpha = 0.85$) in the current sample. A sample item is "I am more comfortable around people from my ethnic group than outside my ethnic group." The response scale ranges from one (*Does not describe me*) to five (*Describes me very well*). Given that this ethnic identity can be thought of as a component of acculturation³⁵ this measure was also included in the factor analysis conducted with the acculturation measure discussed previously.

Theory of Planned Behavior—These items were constructed using instructions and suggestions provided by Ajzen.³⁶ Intention to be screened for cervical cancer was assessed using two items. The response scale provided ranged from 1 (*Strongly disagree*) to 5 (*Strongly agree*). "I intend to have a Pap exam in the next year" and "I plan to have a Pap exam in the next year" are the items that measured intention. The reliability for these items was Cronbach's $\alpha = 0.85$. Past cervical cancer screening behavior was assessed by one item, "How many Pap tests have you had in the past three years?" with 0 to 3 as response options. Subjective norms toward cervical cancer screening were assessed through one item. The response scale ranged from 1 (*Strongly disagree*) to 5 (*Strongly agree*). "Most people who are important to me think that I should not have a Pap exam in the next year." This item was reverse coded during data analysis so that higher scores on this item reflected more positive perceived group norms. Attitude toward cervical cancer screening is another component of the TPB that was measured. It was assessed through the item, "For me to have a Pap exam in the next year would be ____." with response anchors 1 (*Harmful*) to 5 (*Beneficial*). Perceived behavioral control over cervical cancer screening was measured by two items. The items were, "I have complete control over having a Pap in the next year?" (*perceived control*) and "If I wanted I could have a Pap exam in the next year." (*perceived difficulty*). A 5-point Likert type response scale was employed for the items. The anchors for the response scale were *Strongly disagree* to *Strongly agree*. The reliability for these items is Cronbach's $\alpha = 0.51$.

Data Analysis

All preliminary data analyses were conducted using SPSS version 15.0 (Chicago, IL). Means, standard deviations, skewness, and kurtosis indices were examined for each variable. In addition, correlation coefficients and indices of reliability were computed. All subsequent analyses were conducted using structural equation modeling (SEM) and the software program Mplus version 5.1 (Los Angeles, CA).

Structural Equation Modeling (SEM) is a group of statistical techniques that allows for the investigation of complex, multivariate theoretical models. The strength of SEM, as compared to other data analytic techniques employed in behavioral research, lies in the fact that it allows researchers to specify and test complex relationships between variables.³⁷ As such, it has the ability to test interrelations between constructs or variables much like other techniques (e.g., multiple regression and ANOVA) often employed in research. However, it does have some advantages over these more traditional data analytic methods. For example, the common practice—in SEM—of employing multiple scales or subscales to measure a construct and including measurement error in the model/analyses makes it possible to establish construct validity while at the same time examining the interrelations between constructs.³⁸ Hankins, French, and Horne³⁹ compared the use of multiple linear regression and SEM to examine the TPB and found that SEM is the better analytic tool to use to evaluate the model.

Maximum likelihood estimation was employed to test the full structural models. The model fit indices were examined to determine the statistical significance of the paths. The fit of the model was evaluated through the examination of several fit indices: 1. Chi-Square (low value and non-significant p-value is desired), 2. the comparative fit index (CFI; values greater than .90 indicate good fit), 3. the standardized root mean square residual (SRMR; values < .90 indicate good fit), and 4. the root-mean-square residual (RMSEA; values .05 indicate good fit).

Results

Descriptive statistics

The mean age of the participants was 36.12 (SD= 5.98). Approximately 73.3% of women were born in Mexico, 25% were U.S.-born, 8.9% were born in other Central American countries (El Salvador, Guatemala, Nicaragua, and Honduras), and 1.5% were born in South America. Other demographic variables are presented in Table 1.

TPB structural model

The first full structural model tested included the variables from the original version of the TPB (attitude, subjective norms, perceived behavioral control, and intention) along with acculturation, past cervical cancer screening behavior, and study site. Study site was included in the initial model in order to examine whether there were any differences in intention to be screened for cervical cancer by site. Subjective norms, attitudes, perceived behavioral control, acculturation, past cervical cancer screening behavior, and study site were tested as exogenous variables (i.e., predictor variables) and intention to be screened for

cervical cancer, on the other hand, was tested as an endogenous variable (i.e., criterion variable).

The fit statistics of the model indicated good model fit. The model fit statistics were: χ^2 (37) = 40.45, p-value= .320; CFI= .987; RMSEA=.021 (.0, .055); SRMR= .046. Results indicated that all of the paths were statistically significant with the exception of study site (p = .329). Therefore, study site was dropped from the model and a new full structural model was estimated.

The new model included attitude, subjective norms, perceived behavioral control, intention, acculturation, and past cervical cancer screening behavior. PBC1 and PBC2 are indicators of the latent variable Perceived Behavioral Control and INT1 and INT2 are indicators of the latent variable Intention. In addition, the latent variable Acculturation has four indicators: General Spanish Language Acculturation (GSLA); General English Language Acculturation (GELA); Participation in Spanish Language Activities (PSLA) and Ethnic Identity (Eth Id). Model fit statistics for this new model indicated good model fit (χ^2 (32) = 28.86, p-value= .626; CFI= 1.00; RMSEA=.000 (.000, .045); SRMR= .044, R^2 = .65. All p-values are < .05) and all of the path coefficients were statistically significant (Figure 1). In SEM, path coefficients are in the same manner as regression coefficients in multiple regression³⁷. For example, each 1 point increase in perceived behavioral control is associated with a .54 increase in the intention to be screened for cervical cancer. The path coefficients indicate that perceived behavioral control (.54) was strongest predictor of intentions followed by attitude (.29), past cervical cancer screening behavior (.27), acculturation (.23) and subjective norms (.13). The proportion of variance (R^2) in intention to be screened for cervical cancer accounted for by the variables in the model was .65.

In sum, as predicted, all of the exogenous variables were found to be positively associated with intention. Specifically, a more positive attitude (p=.036), more positive perceived subjective norms (p= .005), greater perceived behavioral control over cervical cancer screening (p= .016), higher levels of acculturation (p= .025), and past cervical cancer screening behavior (p= .046) were related to higher intentions to be screened.

Comments

This is the first study to evaluate cervical cancer screening among Latinas within a theoretical framework such as the TPB. Consistent with studies that have employed full TPB model to explain cervical cancer screening behavior among women^{18,40} we found that the TPB is useful in predicting cervical cancer screening intentions among Latinas. All of the original components of the TPB significantly predicted cervical cancer screening intentions in our study. We found perceived behavioral control to be the strongest predictor of intentions followed by attitudes and then subjective norms. This indicates the importance of developing interventions with messages that increase perceived behavioral control among this population. Our findings offer initial support for the potential to develop cervical cancer intervention programs based on the TPB. However, future research studies should confirm this through the use of a longitudinal design which allows researchers to measure both screening intentions and screening behavior among Latinas.

The results show that the addition of acculturation and past cervical cancer screening improved the predictive validity of the TPB as it relates to the cervical cancer screening intentions of Latinas. Consistent with existing research^{22,26}, we found that the more highly acculturated Latinas expressed greater intentions to be screened for cervical cancer. This provides initial support for including cultural variables such as acculturation in the TPB model when examining cervical cancer screening among Latinas. Future research should further explore the role of acculturation in the model. For example, does acculturation influence intentions and behavior directly or intentions directly and behavior indirectly?

It is widely accepted that past behavior predicts future behaviors^{27,29}. Consistent with previous studies that incorporated past behavior in the TPB^{30,32} we found that Latinas who reported having previously been screened for cervical cancer expressed greater intentions to be screened than those who had not previously been screened. This finding provides intervention developers with some guidance regarding how to identify Latinas who are most at risk for not being screened for cervical cancer. If interventions successfully convince previously unscreened Latinas to be screened, those women are more likely to be screened again in the future, thus reducing their risk of developing cervical cancer. Future research should investigate whether previous screening experience (i.e., whether the experience was positive or negative) moderates the effect of previous screening behavior on intentions to be screened.

In addition to the variables we examined, future research should examine the role of other cultural variables in the TPB. For example, cancer fatalism is a variable that could affect the intention to be screened for cervical. The future goal is to develop a comprehensive model that includes all of the variables or predictors that play an important role in the intentions and decisions to be screened for cervical cancer among this population. Once an appropriate model has been developed, researchers can then examine whether the model can be applied to other cancer-screening behaviors such as breast cancer screening.

We found that our expanded TPB model was useful in predicting the cervical cancer screening intentions. This new model included: attitude toward cervical cancer screening, perceived behavioral control, subjective norms, past cervical cancer screening, and acculturation. This is the first study to evaluate cervical cancer screening intentions using this expanded TPB model in Latinas. Given the high incidence of cervical cancer in this population, understanding theory-based models is vital to developing successful screening interventions among Latinas.

Although this study yielded informative findings, some limitations must be acknowledged. First, this study is exploratory in nature, so the conclusions should be viewed as initial conclusions that require verification with further investigation and model testing. Additionally, this is a correlational study and therefore the relations found between the variables in the expanded TPB model should not be interpreted as causal. Also, Mexican-born women were overrepresented in the sample (73.3%), therefore, conclusions are limited to this Latino sub-group. Future studies should focus on replicating these results among other Latino ethnic groups. This will increase confidence that this model is useful in predicting cervical cancer screening intentions among Latinas regardless of nationality.

Finally, the TPB assumes that individuals use existing information to make systematic rational decisions about how to behave. Thus the model does not reflect the extent to which the decision to be screened for cervical cancer is influenced by non-rational factors such as values, moral and other reasons unrelated to self-interest. Future research should include these variables and examine whether they increase the predictive validity of the model.

The current findings are an important addition to the existing research in this area. As mentioned above, theoretically based models of intentions and behavior are necessary for the development of effective interventions. Accordingly, this study has proposed a theoretical framework based on a widely used theory which can be employed to examine and understand cervical cancer screening intentions among Latinas. This is a significant addition to the literature given that few researchers in this area have attempted to understand this behavior within a theoretical framework. It is not only necessary to identify which variables influence cervical cancer screening behavior among Latinas but also to understand how the variables work together. The current study has provided an important first step in this direction. The theoretical framework employed in this study can form the basis of cervical cancer prevention programs with each component being included in order to increase both intentions to be screened for cervical cancer and also screening behavior.

This study has provided encouraging initial support for the applicability and utility of an expanded version of the Theory of Planned Behavior in predicting the intentions of Latinas to be screened for cervical cancer. It represents a first step toward developing an effective, TPB-based cervical cancer intervention for Latinas that takes into account the role of culture and past behaviors. A theory-based prevention program is essential in order to increase the rates at which Latinas are screened for cervical cancer. Given that cervical cancer is a completely preventable disease, we must develop accessible and effective programs that encourage this population to be screened for cervical cancer, thereby reducing cervical cancer-related health disparities.

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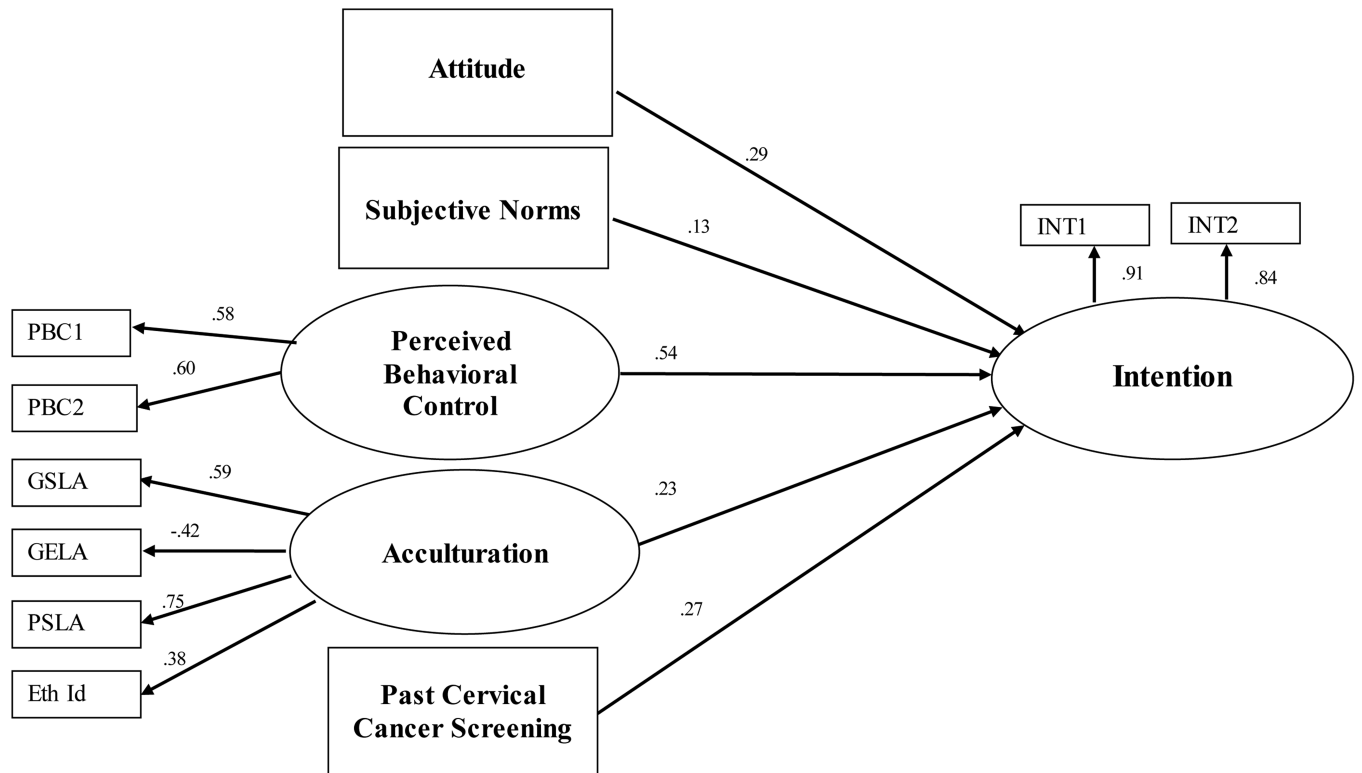


Figure 1. Structural model of the expanded TPB model predicting cervical cancer screening intention among Latinas. Model fit indices: $\chi^2(32) = 28.86$, $p\text{-value} = .626$; CFI = 1.00; RMSEA = .000 (.000, .045); SRMR = .044, $R^2 = .65$. All $p\text{-values}$ are $< .05$. PBC1 and PBC2 are indicators of Perceived Behavioral Control; INT1 and INT2 are indicators of Intention; and Acculturation has four indicators: General Spanish Language Acculturation (GSLA); General English Language Acculturation (GELA); Participation in Spanish Language Activities (PSLA) and Ethnic Identity (Eth Id). The negative factor loading GELA is expected given that it denotes English language acculturation while the other three factors denote the use of the Spanish language and/or participation in traditionally Latino activities.

Table 1

Demographic characteristics of study participants (N= 206).

Variable	Frequency	%	M	SD
Age in years			36.12	5.98
35	99	51.3		
> 36	94	48.7		
Education				
Less than High School Diploma	102	53.1		
High School Diploma	90	46.9		
Income				
\$19,999 or less	65	36.3		
\$20,000-\$39,999	69	38.5		
\$40,000 or more	45	25.1		
Marital Status				
Not Married	48	25.3		
Married or Living Together	142	74.7		
Health Insurance				
No	94	47.7		
Yes	103	52.3		
Country of Birth				
Foreign Born	181	87.9		
U.S. Born	25	12.1		
Citizenship Status				
Undocumented	62	33.0		
Documented	60	31.9		
U.S. Citizens	65	34.6		
Pap Tests in Past Three Years				
0	19	9.7		
1	24	12.3		
2	31	15.9		
3	121	62.1		

Frequencies that do not sum to total N represent missing data.