Understanding Nonsmoking in African American and Caucasian College Students: An Application of the Theory of Planned Behavior

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Few studies have considered whether psychological determinants of nonsmoking among college students vary by ethnicity. The authors tested the theory of planned behavior (TPB) to explain differences in nonsmoking intentions of 238 African American and 197 Caucasian college students who completed an in-class TPB questionnaire and a smoking assessment 1 week later. After removing 35 students who reported smoking at the baseline assessment, regressions were used to examine ethnic effects on TPB constructs when predicting nonsmoking intentions. Caucasians had statistically significant higher nonsmoking intentions than African Americans. Further, subjective norms for Caucasians and attitudes for African Americans had small but significant relations to intention, but perceived behavioral control (PBC) was a strongly significant predictor for both ethnic groups. However, the prediction of nonsmoking intentions was not statistically moderated by ethnicity for any of the TPB constructs. This study suggests that the TPB may aid in understanding collegiate nonsmoking intentions and help begin to explain differences in smoking on the basis of ethnicity. Last, because of strong associations shown in this study, PBC should be considered when developing ethnic-specific smoking interventions in college students.

Index Terms: college students, health education, smoking

Recent research has shown that American adults are far from meeting the Healthy People 2010 goal of a 12% prevalence of cigarette smoking.¹ Presently, approximately

22% (45 million) of adults smoke. Although this percentage is decreasing, it will not meet the 2010 goal at the current rate of decline.^{2,3} This is regrettable because of the well-known and widely established consequences of smoking. For example, tobacco use is still the leading cause of preventable death in the United States.⁴ In addition, the tremendous harmful social costs of smoking and being exposed to second-hand smoke match or exceed the negative health aspects.⁵

The use of tobacco is especially a problem among young people. Research shows that smoking initiation typically occurs in the teenage or high school years.⁶ Although the majority of smokers begin in these years, many begin their addiction in the young adult years of ages 18–24.^{7,8} The aged 18–24 years group is of added concern because since the early 1980s, smoking

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prevalence has decreased for every other group except those aged 18–24 years. At present, those aged 18–24 years have the highest prevalence of smoking (24.4%) compared with all other age groups.⁵

Government reports and researchers in the field have expressly identified colleges and universities as ideal surroundings for smoking behavior change.^{1,9,10} However, interventions focusing on delaying or stopping initiation and/or cessation in this age group have been infrequent and have exhibited mixed results.^{9,10} Research into the area shows that of the small number of cessation interventions in this age group, only a few even approach satisfactory effectiveness.¹⁰ Therefore, using existing intervention tools that have shown mixed results may not be the best strategy. More formative research into the correlates of nonsmoking intentions and initiation among young adults is warranted before effective interventions may be designed.

In addition to high rates of smoking among ages 18–24 years, another demographic trend that has been consistent in tobacco use has been ethnic smoking differences. Specifically, Caucasians of all ages, including young adults, have higher smoking rates than African Americans.^{3,5,6,8} To date, there has been a lack of consensus and little theoretical research on the reasons for this disparity. Therefore, interventions targeted at reducing this disparity may be inefficient without a proven foundation from which to work.^{8,11} Additional research is needed to explain the theoretical basis for the ethnic differences in smoking initiation and behavior among college students.

The moderate success rates of collegiate smoking interventions and those focusing on ethnic differences may be improved by using the moderating variable framework to systematically test behavioral change theory.^{12,13} Using this framework, the psychosocial, behavioral, and demographic correlates that are hypothesized to account for smoking initiation in college students could be systematically investigated to determine important variables to be targeted in interventions. Moderator variables can influence the strength or direction of the association between the predictor and dependent variable. For example, there may be an interaction by ethnicity when predicting smoking, causing an intervention to be more or less effective based upon that ethnicity.¹²

One behavioral change theory that has been successfully used to explain smoking initiation is the theory of planned behavior (TPB).^{14,15,16} The TPB was developed as an extension of the theory of reasoned action with the addition of perceived behavioral control (PBC).¹⁷ This extension recognizes that people may not have complete volitional control over all behavioral circumstances. In other words,

people may not always have the control they wish to have over performing a behavior.

The TPB states as its main tenet that the intention to perform a behavior is the most critical determinant and immediate predictor of that behavior.¹⁷ Therefore, those individuals with stronger intentions to not smoke are posited to be the least likely to do so. In the TPB, an individual's intention to not smoke has 3 determinants. The first determinant is attitude, which is reflected in one's beliefs and evaluations of the outcomes of smoking. The second determinant is the subjective norm that reflects the perceived social pressure that individuals may or may not feel to smoke. The final determinant is PBC, which is the perceived ease or difficulty of not smoking.

Studies show the utility of the TPB in predicting smoking intentions and behavior.^{14,21,22} Additionally, research has shown that intentions to not smoke are a strong positive predictor of future nonsmoking in this age group.²² However, the majority of studies investigating the TPB and tobacco have investigated smoking cessation in Caucasian samples. Therefore, there is a need for studies that expressly investigate ethnic-specific smoking correlates among nonsmokers.¹¹ The epidemiologic evidence of smoking rates and preliminary theoretical studies already suggest that ethnicity may moderate smoking cessation. For example, Hanson¹⁵ found that the TPB constructs of attitude, subjective norm, and perceived behavioral control were significantly related to African American teenage girls' intentions to quit smoking. When examining Caucasian girls, only attitude and PBC emerged as being significantly associated with their intentions to quit smoking. A later study also by Hanson¹⁶ found that African American and Caucasian teenage girls had different underlying attitudinal beliefs and subjective norms associated with quitting smoking. Statistically significant behavioral beliefs for African American girls related to quitting smoking were that smoking caused heart disease and breathing problems. On the other hand, Caucasian teenage girls simply believed that smoking was bad for their health. In terms of normative beliefs associated with African American teenage girls' smoking cessation, they believed that their mothers and best friends were key contributors to their decision. For Caucasians, only boyfriends emerged as contributing to their decision to quit smoking.

With the high levels and ethnic differences of smoking in college students, those that initiate smoking in this age group, and the mixed success rates of collegiate interventions in mind, the purpose of our present study was to determine whether the TPB predicts intentions not to smoke and smoking similarly for African American and Caucasian college

students over a 1-week period. Additionally, this may be the first study that examines all of the TPB variables and behavior phrased from a nonsmoking point of view. On the basis of the preliminary nature of this study, we tested the null hypothesis between the 2 ethnic groups concerning (1) the attitude, subjective norms, and PBC/intention associations; and (2) the association between nonsmoking intention and smoking.

METHODS

Participants

Participants consisted of 217 African American (M age = 20.04; SD = 2.97) and 183 Caucasian (M age = 19.46; SD = 2.26) undergraduate nonsmokers. The African Americans were primarily from 1 of the 2 universities (81.9%), female (66.4%), lived in campus dormitories (62.2%), were freshmen or sophomores (67.4%), and were not employed (65%). The Caucasians were completely from the second university, primarily male (64%), lived in campus dormitories (71.6%), were freshmen or sophomores (80.1%), and were not employed (77%).

A total of 35 (8%) students were classified as current smokers. Students classified as current smokers were removed from further analyses because the focus of this study was to examine TPB variable relationships to nonsmoking intentions and future behavior and not current smoking or cessation.

Procedure

We recruited students from 2 universities located less than 10 miles apart in a major city in the southern United States. One institution is a 4-year, historically black, private university and the second is a 4-year, public, state university. Ethical approval was obtained from the institutional review boards of the 2 universities. The TPB questionnaire was administered in a variety of required undergraduate health and fitness classes following a standardized procedure. The students were informed verbally and in writing that they were not required to participate. Upon completion of the questionnaire, they were given an American Cancer Society t-shirt and asked to construct and memorize a 4-digit number that they would recognize for survey matching. One week later, students were given a 1-page questionnaire on which to write their 4-digit number and measure that week's smoking. After completing the second questionnaire, they were given a \$10 grocery coupon. Given the preliminary nature of the study, a 1-week time frame was chosen to provide optimal predictive accuracy because of the dynamic nature of social cognitions and the TPB tenets of time, context,

target, and action. All data were collected in the same 3-week period at both universities.

Measures

Demographics were assessed by self-report and consisted of age, sex, ethnicity, residence (on or off campus), employment status, and year of school (freshman, sophomore, etc.).

The latent variable attitude was measured using six 7-point semantic differential adjective scales that tapped instrumental (harmful–beneficial, bad–good, useful–useless) and affective (unpleasant–pleasant, boring–fun, unenjoyable–enjoyable) aspects of attitude. The verbal descriptors were *extremely* (points 1 and 7), *quite* (points 2 and 6), and *slightly* (points 3 and 5). The statement that preceded the list of adjectives was “During the next week, for me to not smoke cigarettes will be . . .” Internal consistency for the attitude scale from this sample (Cronbach's alpha) was .82 for African Americans and .68 for Caucasians. Furthermore, a principal components analysis (PCA) with oblique rotation supported the 1 factor structure in both ethnic groups.

The latent variable subjective norm was measured by 6 items and was rated on 7-point scales that ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). The items were: “During the next week, most people who are important to me (1) think I should, (2) approve of me, and (3) support me in not smoking cigarettes.” Internal consistency for this 3-item scale (Cronbach's alpha) from this sample was .88 for African Americans and .85 for Caucasians. Results from the PCA supported the 1-factor structure.

The latent variable perceived behavioral control was measured by 6 items rated on 7-point scales that were all preceded by the statement “During the next week.” The items were (1) “how confident are you that you can not smoke cigarettes?” rated on a scale from 1 (*not at all confident*) to 7 (*extremely confident*); (2) “for me to not smoke cigarettes will be . . .” rated on a scale from 1 (*extremely difficult*) to 7 (*extremely easy*); (3) “how much control do you believe you have to not smoke cigarettes?” rated on a scale from 1 (*extreme lack of control*) to 7 (*extreme control*); (4) “if I wanted to, I could easily not smoke cigarettes” rated on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*); (5) “it is completely up to me whether or not I smoke cigarettes” rated from 1 (*strongly disagree*) to 5 (*strongly agree*), and (6) “it is beyond my control whether or not I smoke cigarettes,” also rated from 1 (*strongly disagree*) to 5 (*strongly agree*). Initial internal consistency (Cronbach's alpha) from this sample was .62 for African Americans and .48 for Caucasians. On inspection of the PCA, we deter-

mined that item 6 had a low factor loading for both ethnic groups (.16 for African American and .06 for Caucasians) and was removed. The resulting internal consistency (Cronbach's alpha) for the scales was .84 for African Americans and .63 for Caucasians.

We used 2 items to assess the latent variable intention. The items were: (1) "During the next week, I intend to not smoke cigarettes," and (2) "During the next week, I will try to not smoke cigarettes." Both items were rated on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Internal consistency from this sample (Cronbach's alpha) was .81 for African Americans and .84 for Caucasians, and the 1-factor structure was supported by the PCA.

We measured smoking behavior at baseline and follow-up by a slightly altered version of the previously validated 2004 National Health Interview Survey item of "On how many days did you smoke during the last week?"¹⁸ The change consisted of altering the phrase "do you" and "during the past 30 days" to "during the past week" for consistency with the rest of the current questionnaire. Any student that reported smoking during the last week was considered a smoker.

RESULTS

Preliminary Analyses

We performed 1-way ANOVAs and χ^2 analyses to test for demographic differences between the 2 ethnic groups. Results showed that there was a statistically significant higher proportion of females and employed students in the African American participants, compared with the Caucasians ($p < .01$). Also, we found a statistically significant higher representation of freshman and sophomores among Caucasians ($p < .01$). Finally, descriptive statistics and zero-order correlations among the TPB variables were calculated. Although we found notable ceiling effects for the scale scores, levels of these effects were consistent between the total TPB scale scores and the ethnic groups. Additionally, examination of z -scores for each construct revealed that the ceilings were not unduly affected by individual extreme scores, only generally high ratings of the TPB items. Nonetheless, scores from the 13 participants who produced z scores that were > 3.29 standard deviations from the mean were removed from further analyses. As can be seen from Table 1, Caucasians had higher attitude ($p < .05$) and PBC scores ($p < .01$) compared with African Americans. These differences were tested to be statistically significant. As can also be seen from Table 1, ratings of nonsmoking intentions were statistically higher ($p < .01$) for Caucasians than African Americans. Last, as stated earlier, 35 (8%) of the

sample were classified as smokers at baseline and removed from analyses. Removal of the baseline smokers resulted in only 3 students that reported smoking at the 1-week follow-up. Therefore, it was not possible to make meaningful comparisons between the TPB and smoking over the 1-week period.

Regression Analyses

The main hypotheses concerning the TPB were tested with regression analyses. The association of the TPB constructs with nonsmoking intention was first conducted separately by ethnicity. These analyses regressed nonsmoking intention onto attitudes, subjective norm, and PBC. As can be seen from the regression coefficients (β s) in Table 2, for African Americans PBC ($\beta = .46$) and attitudes ($\beta = .14$), and for Caucasians subjective norms ($\beta = .19$) and PBC ($\beta = .43$) all significantly predicted intention. The unstandardized regression coefficients were then compared to see if they were different using the calculation method as recommended by Baron and Kenny¹² and described in Cohen and Cohen²⁴ (this z test examines the null hypothesis that the regression coefficients are the same in both groups). We examined the potential difference between groups (ie, the interaction) for moderation, rather than whether the regression coefficients were themselves significant. Results indicated that there were no statistically significant differences between nonsmoking intention and the TPB variables of attitude ($z = 0.51$, 95% CI = $-.07$, $.11$), subjective norms ($z = 0.19$, 95% CI = $-.14$, $.17$), and PBC ($z = -.02$, 95% CI = $-.26$, $.26$), between the African American and Caucasian students.

COMMENT

Our purpose for our present study was to determine whether the TPB worked similarly for nonsmoking African American and Caucasian college students regarding their intentions not to smoke and their smoking over a 1-week period. This was accomplished by using the moderating variable framework as proposed by Baron and Kenny.¹² Our first hypothesis (ie, that there would be differences between the 2 ethnic groups concerning the attitude, subjective norms, and PBC/intention associations) was not supported. Attitudes emerged as a small, but statistically significant predictor of nonsmoking intention for African Americans. However, the size of this prediction and the differences between African Americans and Caucasians in this case were quite minimal. These results seem to indicate that attitudes may not be a strong predictor of nonsmoking intention among college students of either ethnicity. The current conceptualization of attitudes, as directed by the theory, was

TABLE 1. Descriptive Statistics and Zero-Order Correlations Among Planned Behavior Constructs, for African-American and Caucasian Students

Construct	2	3	4	<i>M</i>	<i>SD</i>
African American					
1. Attitude	.26***	.37***	.33***	5.86	1.41
2. Subjective Norm	—	.43***	.42***	6.62	0.92
3. PBC	—	—	.57***	6.76	0.62
4. Intention	—	—	—	6.64	1.06
Caucasian					
1. Attitude	.20**	.18*	.25**	6.18	0.93
2. Subjective Norm	—	.31***	.37***	6.66	0.81
3. PBC	—	—	.49***	6.91	0.30
4. Intention	—	—	—	6.88	0.42

* $p < .05$. ** $p < .01$. *** $p < .001$.

toward personal intentions not to use tobacco.¹⁷ A recent study found that college student attitudes toward tobacco issues such as tobacco marketing and smoking restrictions were significant predictors of smoking status.²³ Perhaps both conceptualizations should be included in future studies to determine their relative impacts.

Our results also show that subjective norm was weakly associated with intention and only for Caucasians. Therefore, it appears that subjective norms may not be important predictors of nonsmoking intention. This finding is consistent with a previous meta-analysis showing subjective norm to be the weakest correlate of intention.¹⁹ Our findings are somewhat consistent with other college-aged studies that found significant association between subjective norms with intention.^{21,23} However, previous studies have been limited by majority Caucasian samples. These results differ by suggesting that the subjective norms/intention relationship is somewhat important, but only for Caucasian college students. Although studies with multi-ethnic girls aged 13–19 years found subjective norm to be predictive of smoking behavior, our findings are consistent with another college-aged study that found subjective norms to have little association with intention.^{14,15,16}

The strongest predictor of nonsmoking intentions in this study for both ethnic groups was PBC. PBC may be an important and common predictor of smoking intention, given the similar effects for both ethnic groups. Such a finding about the importance of PBC is also consistent with previous research.^{14,15,16,21} Additionally, in the 2003 McMillan and Conner study, the only significant predictor of intention was PBC.¹⁴ As this was consistent over both ethnic groups,

it seems as though future research in a diverse sample could benefit by the further development of control strategies. The TPB suggests that this should be accomplished by developing resources and opportunities for control and removing barriers that may hinder control.¹⁷

With respect to the second hypothesis (ie, the association between intention and smoking would differ by ethnicity), we were not able to make meaningful comparisons on the basis of the small number of students that were not classified as smokers at the baseline measurement and then reported smoking over the 1-week period. Future studies should actively recruit students that are current smokers. This could be accomplished by advertising the study, using

TABLE 2. Results From the Regression Analyses for Nonsmoking Intention, by Ethnicity

Predictors	β	R^2
African American Intention		
Attitude	.14*	
Subjective norm	.12	
PBC	.46***	.34
Caucasian Intention		
Attitude	.12	
Subjective norm	.19**	
PBC	.43***	.32

Note. β = standardized beta.

* $p < .05$. ** $p < .01$. *** $p < .001$.

a screener sheet to determine smoking status, or including classrooms throughout additional academic departments.

Despite the promising findings, several limitations need to be addressed. First, there may be a selection bias in the sample because of the convenience-sampling methodology. Selection bias is common in postsecondary studies of smoking behavior.^{10,20} It will be important that future studies attempt to randomly select students to increase the representation of the sample. Second, self-reported smoking is inferior to an objective smoking assessment.¹⁰ Therefore, future studies should increase the validity of smoking assessment by using a method such as biochemical verification. Third, the underlying accessible beliefs were not included in the present study. Given that the TPB suggests that attitudes, subjective norms, and PBC are assumed to be on the basis of these underlying accessible beliefs, behavioral interventions must try to change the beliefs that ultimately guide the performance of the behavior.¹⁷ Identifying common and ethnic-specific beliefs in future studies that are statistically associated with the global constructs will provide invaluable information when developing a culturally appropriate smoking intervention in postsecondary students. Finally, the 1-week time frame used was appropriate given the preliminary nature of the current study. However, future studies need to extend the time frame to a longer period to examine the predictability of the theory for the 2 ethnic groups. It may be, for example, that ethnic differences are apparent over short time frames but not extended ones (eg, 6 months). Again, this is a persistent issue with smoking studies and should be addressed.¹⁴

In light of the above limitations, our present study demonstrated that the TPB may be a useful theory to shed light on nonsmoking intentions from a TPB perspective in a diverse group of college students. Although further research to confirm these results is needed, this study may also be useful in developing change in interventions, as called for by recent recommendations.¹¹ As predicted by the model, programs must be tailored to focus primarily on PBC to be successful in understanding nonsmoking intentions. Attitudes and subjective norms were weakly significant predictors of intentions, but not consistently over ethnic groups. Research focusing on these constructs may be diverting effort from other methods that may effect change. This research has reinforced the importance of focusing on perceived behavioral control in this context and shown that there were only small differences by ethnicity. Greater efforts must be targeted to encourage the sense of control that students from both ethnicities feel over not initiating smoking. Future research should focus on substantiating these findings and focusing on strategies that may produce

improvement in the measurement and implementation of these constructs. Lastly, this study examined this problem in a collegiate sample of only African Americans and Caucasians; future efforts should include a multi-ethnic sample and adults from different age groups.

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NOTE

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