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Attitudes Toward Secondhand Smoke
Among College Students

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ABSTRACT

The purpose of this study was to determine the perceived importance of smoke-free environments among college students. A non-experimental, cross-sectional design was used to examine the differences in attitudes toward secondhand smoke (SHS) by smoking status, and determine the factors that predict attitudes toward smoke-free environments. The sample ($N = 897$) consisted of full-time, undergraduate students at a southeastern public university. Non-smokers, non-daily smokers, and daily smokers completed a self-report questionnaire. Smoke-free environments were either somewhat or very important to 85% of participants. Women and non-smokers were more likely to perceive the importance of smoke-free environments. Of the current smokers, 66% reported smoke-free environments were important to some degree and nearly 30% reported they were bothered by cigarette smoke to some degree. Multivariate analyses revealed the best predictors of the importance of smoke-free environments were being bothered by smoke and smoking status. Since a number of current smokers are both bothered by SHS and see the importance of smoke-free environments, SHS education that targets current smokers may be helpful.

Keywords: *tobacco smoke pollution, students, smoking*

Introduction

Smoking is the leading cause of preventable death in the U.S; every year nearly 438,000 people die as a result of cigarette use.¹ Smokers not only put themselves at risk for disease and death related to cigarette use, but they also expose others to secondhand smoke (SHS). Cigarette smoke contains over 4,000 chemicals and over 50 known or suspected carcinogens.^{2,3} Exposure to SHS causes heart disease, lung cancer, and breast cancer in adults.^{4,5} SHS exposure in children causes asthma, chronic ear infections, lower respiratory tract infections, and sudden infant death.⁵ In a recent Canadian study, youth were at greatest risk for exposure to SHS. At age 12 years, 37% of Canadian children had been exposed to SHS. The percentage exposed to SHS increased to 55% by age 20.⁶

Increasingly, local and state governments and private businesses are protecting individuals from SHS by restricting smoking in public and work places. National studies show that both smokers and nonsmokers

support restricting smoking in schools and daycare centers.^{7,8} There is less support for restricting smoking in public restaurants.⁸ Studies of public attitudes toward smoke-free laws have shown that patrons increasingly support and comply with smoke-free laws in restaurants and bars.^{9,10} Furthermore, smoke-free laws have been shown to have little impact on the dining out patterns of consumers.¹¹

A recent study of smoking policies on college campuses found that 30% of universities restricted smoking inside public buildings, outside building entrances, and in student housing.¹² In the college age group (18- to 24-years-old), Wechsler and colleagues¹³ found that smoking restrictions were associated with lower rates of smoking initiation among this population. Nearly 30% of young adults (ages 18-24) are current smokers (at least one cigarette in the past 30 days).¹⁴ This rate is well above the 22% average reported for all age groups. Among college students, the smoking rate

(18- to 24-years-old) fluctuated dramatically during the 1990s and peaked at approximately 30% at the end of the decade.¹⁵ Recent data show that smoking prevalence in the college-aged population is trending down (22.5%), and now mirrors that of the general public.¹⁵ Although the smoking rate among college students has recently returned to baseline, the concern remains that college smokers not only expose themselves, but their friends to SHS. In a study of college students' SHS avoidance behaviors, Martinelli¹⁶ reported that being female, performing health promotion behaviors, being self-efficacious and SHS-avoidance efficacy, and not living with a smoker explained 26% of the variance in SHS avoidance behaviors. However, the study excluded current smokers and did not measure attitudes toward exposure to SHS.

Little is known about attitudes toward SHS in the 18- to 24-year-old college age population. The purpose of this study was to determine the perceived importance of smoke-free environments among college students. Social Cognitive Theory (SCT) was used as a framework to

guide the study. SCT¹⁷ posits that behavior is part of a triad of reciprocal causation where environmental factors, cognitive factors, and behavioral factors interact as a determinant of one another. It is a transactional theory whereby the individual and society act and react to each other in a bi-directional fashion. The triad is not necessarily symmetrical, nor the strength of the influences equal. Therefore, changes in one domain may or may not produce a response in other domains. In this study, the environmental factor is SHS, the cognitive factor is attitudes toward SHS, and the behavioral factor is smoking group status. The specific aims of the study were to (a) examine the differences in attitudes toward SHS by smoking status; and (b) determine the factors that predict attitudes toward smoke-free environments among college students. Since smoking status is associated with binge drinking, marijuana use, and decreased academic performance in college students, those variables were included in this examination of the

importance of smoke-free environments.^{18,19}

Methods

Design and Sample. A non-experimental, cross-sectional design was used. The university registrar randomly generated a sample of 1,700 18-24-year-old students from a list of enrolled full-time, undergraduate students at a southeastern public, state-supported university ($N = 18,000$) in a tobacco-producing state. The university is located in a city that had recently passed, but not yet implemented, a smoke-free ordinance that banned smoking in all public building (including restaurants and bars). During Spring 2004, questionnaires were mailed to students. After adjusting for undeliverable questionnaires, the response rate was 57% ($n = 897$).

Measures. The College Health Survey was adapted from the *National College Health Risk Behavior Survey* (NCHRBS). The NCHRBS was developed by the Centers for Disease Control and Prevention and administered to

approximately 9,400 students aged 18 to 24 from 148 different colleges and universities.²⁰ The questionnaire measures risk behaviors that contribute to the leading causes of morbidity and mortality including binge drinking and marijuana use. The College Health Survey questionnaire was reviewed by a multidisciplinary team to establish face validity.

Current cigarette use was assessed using a nominal measure of the frequency of smoking. Students who had not smoked in the past 30 days were classified as “non-smokers.” Students who had smoked some days but not every day in the past month were classified as “non-daily smokers.” Finally, students who reported smoking all 30 days were classified as “daily smokers.” Smoking status was coded into three discrete categories: non-smoker, non-daily smoker, and daily smoker. Heavy episodic or binge drinking (five or more drinks at one sitting) was measured using a seven-item ordinal scale – none to all 30 days. Marijuana use was assessed using a seven-item ordinal scale, ranging

from none to more than 100 times during the past 30 days. Other data collected included demographic characteristics (e.g., gender, age, and ethnicity) and grade point average (GPA).

In addition to the behavioral risk and demographic data, attitudes toward secondhand smoke exposure were assessed. Students were asked, "How important is it to you to have a smoke-free environment inside all campus buildings including dormitories?" Responses to the four-item ordinal scale included: "very important," "somewhat important," "not too important," or "not important at all." Next, the students were asked, "How bothered are you by smoking at the entry ways to campus buildings?" The three-item ordinal responses ranged from: "very bothered," "somewhat bothered," or "not bothered at all."

Procedure. The research protocol was approved by the University Institutional Review Board to ensure human subjects protection. Participants received a study packet via U. S. mail. The study packet contained a questionnaire without any identifying data, a stamped

completion postcard with the participant's name, a cover letter explaining the purpose of the study, and a \$2.00 bill as an incentive to participate. The participants were encouraged to respond and return the questionnaire in the enclosed, addressed, stamped envelope. Completing and returning the questionnaire served as consent to participate. Participants were asked to mail the postcard separately to indicate completion of the questionnaire. The postcard was the only document that contained identifiable data and there was no way to match the postcard to the anonymous questionnaire. A second follow-up letter and replacement questionnaire were mailed to all who had not returned a postcard approximately three weeks after the initial mailing. An attempt was made to find correct addresses for those whose questionnaires had been returned as undeliverable. Those who did not return questionnaires after the second mailing were considered non-respondents.

A predictive model for the importance of smoke-free environments was estimated using a

linear regression model. The importance of smoke-free environments was regressed onto binge drinking, marijuana use, GPA, smoking group status, and being bothered by secondhand smoke.

Results

More females (61%) responded than males. Caucasians (91%) accounted for the majority of the participants, similar to the ethnic

make-up of the population. More participants lived in residence halls (34%) compared to the overall student body (25%). The mean age was 20.1 years (*SD* = 1.5), and 98% were single. The participants consisted of freshman (26%), sophomores (23%), juniors (23%), and seniors (28%). Corresponding data for non-participants were not available. Table 1 presents the demographic characteristics.

Table 1.
Demographic Characteristics and Alcohol/Marijuana Use by Smoking Group (*n* = 889).

| | | Smoking Group | | |
|--|------------------|--|---|--|
| | | Non-smoker <i>n</i> = 640 <i>n</i> (%) | Non-daily <i>n</i> = 192 <i>n</i> (%) | Daily <i>n</i> = 57 <i>n</i> (%) |
| Sex | Female | 408 (64) | 107 (56) | 33 (58) |
| | Male | 232 (36) | 85 (44) | 24 (42) |
| Ethnicity [†] | Caucasian | 576 (91) | 175 (92) | 53 (93) |
| | Minority | 59 (9) | 16 (8) | 4 (7) |
| Age | 18-20 | 392 (61) | 122 (64) | 23 (40) |
| | 21-24 | 248 (39) | 70 (36) | 34 (60) |
| Binge drinking (no. of days past 30 days) [†] | None | 318 (50) | 20 (11) | 9 (16) |
| | 1-19 days | 317 (49) | 166 (87) | 46 (81) |
| | 20 or more days | 4 (1) | 5 (2) | 2 (3) |
| Marijuana (no. of times past 30 days) [†] | None | 479 (90) | 100 (58) | 20 (38) |
| | 1-19 times | 42 (8) | 59 (34) | 16 (30) |
| | 20 or more times | 10 (2) | 14 (8) | 17 (32) |

[†] Note: Not all participants reporting.

The majority of students (72%) had not smoked in the past 30 days. Of the 249 who reported smoking, 67% were non-daily smokers and 33% smoked on a daily basis. There was no difference in smoking by gender or ethnicity. The participants who smoked daily were slightly older than either the non-daily or non-smoking groups (20.7 vs. 20.1 respectively). The majority of participants (61%) reported at least one episode of binge drinking in the past 30 days. Both the non-daily and daily smoking groups were more likely than the non-smokers to report episodes of binge drinking ($F_{2, 886} = 88.7, p < .001$). More than one in five (21%) reported using marijuana in the past 30 days. The non-smoking group reported fewer episodes of marijuana use than either the non-daily or daily smokers ($F_{2, 756} = 40.2, p < .001$). The overall GPA for the participants was 3.17. Non-smokers reported a higher GPA than either of the smoking groups ($F_{2, 858} = 7.9, p < .001$).

Smoke-free environments were either somewhat or very important to 85% of participants. Women were more likely than men to perceive the importance of smoke-free environments ($t_{891} = 3.6, p < .001$). Non-smokers were more likely to report the importance of smoke-free environments than either the non-daily or daily smoking group ($F_{2, 882} = 98.5, p < .001$). Of the current smokers, 66% reported that smoke-free environments were either somewhat or very important. The majority of study participants (61%) also reported being bothered by cigarette smoke. Non-smokers were more bothered than non-daily or daily smokers ($F_{2, 868} = 88.9, p < .001$). Nearly 30% of current smokers were bothered by cigarette smoke to some degree. The importance of smoke-free environments was significantly correlated with binge drinking, marijuana use, GPA, and being bothered by smoke (see Table 2). Those who perceived smoke-free

environments as important were less likely to report binge drinking and marijuana use, had a higher GPA,

and were more bothered by secondhand smoke.

Table 2.
Correlations among study variables and perceived importance of smoke-free environments.

| | Binge drinking | Marijuana use | GPA | Bothered by smoke |
|------------------------|----------------|---------------|---------|-------------------|
| Smoke-free environment | .154** | .327** | -.138** | .544** |
| Binge drinking | | .386** | -.173** | .228** |
| Marijuana use | | | -.137** | .310** |
| GPA | | | | -.127** |

** Correlation is significant at the 0.01 level (2-tailed).

The overall linear regression model was significant ($F_{5, 710} = 78.3$, $p < .001$) and accounted for 34% of the variance in the importance of smoke-free environments (see Table 3). The best predictors of the importance of smoke-free environments were being bothered by smoke and smoking status. The variable "bothered by smoke" accounted for nearly 27% of the variance. Adding the variable smoking status to the model explained an additional 7% of the

variance. Both marijuana use and GPA were significant predictors. The addition of these variables added to the R-square, but these two variables explained < 1% of the variance. Although binge drinking was related to the importance of smoke-free environments in the bivariate analyses, in the multivariate analysis the variable was not a significant predictor. The variable inflation factors for this model were at most 1.4, indicating multicollinearity did not influence the model.

Table 3.
Predictors of perceived importance of smoke-free environments.

| Source | Mean Square | df | F | Sig. |
|---------------------|-------------|----|--------|-------|
| Corrected Model | 41.39 | 5 | 75.30 | <.001 |
| Binge drinking | .29 | 1 | .52 | .472 |
| Smoking group | 30.01 | 1 | 54.58 | <.001 |
| GPA | 2.13 | 1 | 3.87 | .050 |
| Marijuana use | 4.45 | 1 | 8.09 | .005 |
| Bothered by smoking | 68.62 | 1 | 124.83 | <.001 |

Adjusted R² .344

Discussion

Students bothered by smoke thought that smoke-free environments were important. These two variables were highly correlated, but theoretically the variables are two distinct constructs. The degree to which an individual is bothered by smoking predicted the importance of smoke-free environments. Although the survey did not define the meaning of "bothered," respondents may have meant headaches, irritated eyes, and runny nose when asked this question. In addition, students suffering from asthma and other respiratory conditions may have reported being bothered by secondhand smoke. It seems reasonable that students who have these symptoms and conditions

exacerbated by exposure to secondhand smoke would view smoke-free environments as more important than those who are not bothered by secondhand smoke.

Interestingly, nearly 30% of current smokers reported being bothered by secondhand smoke to some degree, and two-thirds thought smoke-free environments were important to some degree. The fact that some college students who smoke may have a positive attitude toward smoke-free environments may indicate that campus-wide as well as community-wide, smoke-free policies may be acceptable to the college population. SHS education messages could be tailored to smokers as well as nonsmokers to elicit the greatest support for smoke-

free policies. A mass education campaign that highlights that all persons, including smokers, are “bothered” by SHS may increase awareness and influence attitudes. Another approach for media campaigns could focus on protecting your closest friends from your SHS. Since friends are extremely important in this age group, the proposed media campaign may be centered on the impact of peer influence on attitudes toward SHS.

It was not surprising, however, to find that smoking group status was a significant predictor of the importance of smoke-free environments. Nonsmokers were more likely than smokers to value smoke-free environments. Future research is needed to assess the extent to which both smoking and nonsmoking college students communicate their dislike of secondhand smoke to peers and family members. It also was not surprising that those who valued smoke-free environments (primarily nonsmokers) were less likely to engage in other risky behaviors. Similar to other studies, youth and young adults who smoke also are

more likely to engage in binge drinking and marijuana use.^{18,19}

While binge drinking was related to attitudes toward SHS, it was not predictive of attitudes toward secondhand smoke when taking other factors into account. This finding is interesting given that smoking and drinking are associated in this age group.^{18,19} It might be expected that those who engaged in binge drinking were less likely to be bothered by SHS since drinking and smoking typically occur in smoke-filled bars. The current study did not examine where the binge drinking took place (e.g., bars, restaurants, private residences). If the predominant location of binge drinking is in bars, extending smoke-free policies to include these venues may be acceptable to college students, especially those who value smoke-free environments and are bothered by SHS.

Relative to Social Cognitive Theory,¹⁷ the environment (secondhand smoke), cognitive (attitudes toward SHS), and behavior (smoking group status) constructs may interact in a manner that could predict support for smoke-free

policies among college students. As greater numbers of students are bothered by SHS and display negative attitudes toward it, more campuses may be inclined to adopt smoke-free policies.

Limitations. The greatest limitation to the current study was the cross-sectional design. A longitudinal study that examines changes in college students' attitudes and behaviors over time would add significantly to the literature. While parents and friends smoking behaviors may be important and contribute to college students' attitudes and behaviors, this information was not assessed in this study. Another limitation is that the researchers did not ask about the pending enactment of a local smoke-free law and whether the debate surrounding that enactment may have influenced the students' attitudes. Repeating the survey, after the enactment of the comprehensive smoke-free law, may reveal changes that may have occurred in attitudes or behaviors of the students. Additionally, the sample had several limitations given that the participants were mostly Caucasian,

middle class, and from a southeastern state that produces tobacco. Thus, the generalizability of the findings to other groups of college students may be limited. It would be interesting to compare the results from this study to other college campuses that have greater diversity or are located in areas that are more metropolitan in nature.

There is a need for research that measures the effects of other environmental influences (i.e., tobacco industry marketing practices) on attitudes toward smoke-free environments. A high proportion of college students viewed smoke-free environments as important. This is especially interesting given that the university is located in the heart of tobacco country. The tobacco states typically have weaker tobacco control laws than the non-tobacco-producing states.²¹ These findings show promise for adopting smoke-free laws in areas that have historically been disproportionately affected by the health and economic burdens of tobacco use. The college population may be an untapped resource that may support efforts to promote

smoke-free public policy. These changes in public policy will reduce exposure to SHS and the carcinogens and other harmful chemicals contained in the smoke. Public policy

change has the potential to reduce the incidence of heart disease and cancer thereby saving countless American lives.

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