

Predictors of Smoking and Smokeless Tobacco Use in College Students: A Preliminary Study Using Web-Based Survey Methodology

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Abstract. Cigarette smoking and smokeless tobacco (SLT) use are associated with numerous health hazards and economic costs, and rates of tobacco use have recently increased among young adults. In this study, the authors compared predictors of smoking and SLT use among college students ($N = 21,410$) from 13 Texas universities using a Web-based survey. Results revealed that sex, belonging to a fraternity or sorority, participation in intercollegiate sports, peer influences, and ethnicity predicted smoking and SLT use. Although common factors predicted both lifetime and current smoking and SLT use, patterns of prediction differed across dependent variables. The authors discuss implications for developing tobacco prevention programs targeting specific risk factors salient to the young adult population.

Key Words: college students, smokeless tobacco, smoking, tobacco

Tobacco use, including smoking and using smokeless tobacco (SLT), has devastating health and economic consequences. It accounts for approximately 440,000 deaths per year, which makes it the leading preventable cause of death in the United States.¹ This rate is staggering considering the well-known health risks associated with chronic tobacco use. Smoking is associated specifically with asthma, chronic bronchitis, lung cancer, coronary heart disease, and emphysema.² Smokeless tobacco use is associated with cardiovascular dysfunction, oral cancer, and periodontal disease.³ Studies also indicate that medical expenses caused by tobacco use range from \$53 to \$73 billion per year.⁴ It is not surprising that these facts have prompted researchers to study the factors that

predict tobacco use in an effort to prevent and treat nicotine dependence.

Nationally, 45.3% of all tobacco users are aged between 18 and 25 years.⁵ Furthermore, smoking among young adults aged 18 to 20 years increased by 16% between 1995 and 1997.⁶ These statistics suggest that the young adult population is at risk for tobacco use and that current prevention efforts have not been entirely successful. One reason for this may be that researchers and practitioners alike do not have a thorough understanding of the risk factors in this population. According to the National Center for Education Statistics (NCES), approximately 14.8 million students, a large proportion of whom are aged between 18 and 20 years, were enrolled in degree-granting institutions (ie, colleges and universities) as of 1999.⁷ The number of young adults enrolled in colleges and universities has increased more dramatically than for any other age group. Between 1990 and 1999, the number of students aged younger than 25 years increased by 12%, and the NCES projects a 21% rise in enrollment of students aged younger than 25 years from 1999 to 2010.⁷ These statistics suggest that the college population may be a useful index of tobacco use among young adults in general.

Although many studies have examined predictors of smoking and SLT use separately, few have measured them simultaneously and compared them within the same population. Therefore, we do not have a complete understanding of whether there is a general set of predictors that strongly predisposes individuals to begin using tobacco, regardless of type, or if there are product-specific risk factors. Understanding patterns of predictors within the young adult population might aid in developing more effective prevention modules that target population-specific and possibly product-specific risk factors.

Emmons and colleagues⁸ examined predictors of smoking in a sample of over 25,000 college students from 140

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four-year colleges across the United States. Results from this study revealed that the most significant predictors of smoking were precollege drinking status, lifestyle choices (eg, not participating in intercollegiate sports), high-risk behaviors (eg, smoking marijuana, binge drinking), gender (women were more likely to smoke than men), and general unhappiness. Paavola and colleagues⁹ conducted a longitudinal study of predictors of smoking in a sample of young adults from Finland. This group administered surveys to participants when they were in the seventh grade, the ninth grade, and 4 more times over the next 15 years. Results from this study indicated that, over time, having friends who smoke was 1 of the most important predictors of smoking.

Hill and colleagues³ examined predictors of SLT use among sixth and seventh graders. They found that peer use of SLT, mother's lifetime use of SLT (ie, whether the child's mother had ever used SLT), father's lifetime use of SLT, male sex, white race, and mother's education significantly predicted current SLT use. Peer use of SLT, mother's lifetime use of SLT, and father's lifetime use of SLT predicted lifetime use of SLT. Severson¹⁰ conducted a review of the literature and reported on general predictors of SLT use in young adults. Severson found that peer influence, male gender, and alcohol/drug use were strong predictors of smoking behavior. In a more recent study, Tomar and Giovino¹¹ examined predictors of experimentation with and regular use of SLT in youths aged 11 to 19 years. They found that white men were more likely to experiment with SLT, especially if their peers also used SLT. White men were also more likely to become regular SLT users if they participated in organized athletics and if their family members and peers used SLT.¹¹

DeMoor and colleagues¹² computed predictors of both weekly smoking and monthly SLT use among a group of high school students. Results indicated that white ethnicity, weekly use of marijuana and alcohol, having a friend who smokes, and living with adults who smoke significantly predicted weekly smoking. Male sex, having friends who use SLT, using alcohol on a weekly basis, intending to enroll in college, and living with an adult who used SLT predicted monthly SLT use. Although DeMoor and colleagues never made a direct comparison between predictors of smoking and SLT use, a critical examination of their findings highlights the importance of peer influences, family influences, and additional substance use. Despite such similarities, it is clear that the profiles of predictors of smoking and SLT use are not identical in this population.

Horn and colleagues¹³ compared predictors of smoking and SLT use in a rural adolescent population. Results from this study mirrored the findings of DeMoor and colleagues,¹² in that gender (ie, being male) and having close friends who used tobacco predicted both smoking and SLT use. Again, despite some similarities in risk profiles, smokers and SLT users exhibited different profiles overall. For example, having family problems predicted smoking behavior but did not predict SLT use.^{12,13}

A review of the literature indicates that several common predictors may influence both smoking and SLT use. These include gender, ethnicity, additional substance use, peer influences, and family influences. However, some factors are unique to the modality of SLT use. For example, DeMoor and colleagues¹² found that being white was associated with smoking but not SLT use, and Horn and colleagues¹³ found that having family problems predicted smoking, but SLT use did not predict smoking. Researchers have examined many of these predictors in different populations with similar findings, which is encouraging in the context of external validity. Nevertheless, to our knowledge, no study has compared predictors of smoking and SLT use in a young adult population.

METHOD

Sample of Colleges

We identified and contacted seventy-two 4-year colleges and universities in Texas for this Web-based survey. All students enrolled in these institutions who registered an e-mail address with their respective registrar or had an e-mail address assigned to them by the university were eligible to participate in this study. The colleges and universities in this study included 34 state-supported and 38 privately funded institutions. The director of the Institute for Communications Research (ICR) at Texas Tech University attempted to contact representatives of each university's research services via telephone in August and September of 2002 to solicit their participation in the Web-based survey.

ICR representatives made at least 5 attempts to contact a representative at each of the 72 prospective institutions. Representatives at 27 prospective institutions did not respond to the request for information. Three institutions did not collect e-mail addresses from their students, and representatives from 29 institutions refused to release their students' e-mail addresses or refused to participate. Most of the concerns about releasing student e-mail addresses were related to the frequency with which students would be contacted in this study, future use of the e-mail list for purposes unrelated to this study, and questionable privacy rights of students. Thirteen institutions agreed to participate in the study and obtained Institutional Review Board (IRB) approval. These 13 institutions represented 184,559 students. Four of the 13 schools were privately funded, and 9 were state-supported. The student population ranged from 1,323 (a small private liberal arts college) to 49,636 (a major state-supported institution).

Questionnaire

The 72-question survey that we used in this study queried students about their knowledge and use of tobacco products on a dedicated Web site. The survey included questions that researchers have previously used in other studies about respondents' knowledge and use of tobacco products, as well as questions that we designed specifically for the present study. The survey assessed demographic characteristics, past and present tobacco use, attitudes toward tobacco

use, response to tobacco marketing campaigns, and knowledge of the risks associated with tobacco use.

We designed the survey instrument so that respondents were required to answer each question before they could continue to the next question. If some of the questions did not apply to a particular respondent, the program automatically skipped to the next appropriate question. For example, if respondents indicated that they did not smoke tobacco, the program automatically skipped all questions related to his or her use of tobacco products. Skips were transparent to respondents.

E-mailing and Response Rate

Participating institutions provided the ICR at Texas Tech University with an electronic database containing their respective students' e-mail addresses. They provided a total of 164,433 e-mail addresses for the 184,559 students (89.1%). We invited students to participate in "a 10-minute survey" with a chance to win one of five \$500 airline gift certificates. The invitation informed participants that the purpose of the survey was to determine Texas college students' use and perception of tobacco products. It also informed the students that the ICR had permission and IRB approval from their respective institutions to conduct the survey. The invitations also included a promise of anonymity and assurances that their e-mail address would not be sold or disseminated to any company or individual. The invitation explained that the survey would run for 7 days and that participants could complete the survey any time during that period. Instructions directed students to a hyperlink contained within the e-mail invitation and provided the name of the principle investigator and her e-mail address, should they have any questions regarding the survey. We e-mailed a reminder to each nonresponding student 3 to 4 days after the study commenced.

We initiated separate Web-based surveys of the 13 institutions between October 3, 2002, and February 21, 2003. We concluded data collection from the final participating university on February 28, 2003. A total of 21,410 students (13%) completed the survey instrument successfully. The response rates per university ranged from 2.07% to 31.54%, with a mean response rate of 14.16%. These response rates are very low compared with typical response rates for telephone and mail surveys. However, this is not unusual for e-mail and Web-based surveys, which often exhibit significantly lower response rates compared with telephone and mail surveys¹⁴⁻¹⁶ and may reflect a general decline in responses to electronic surveys over the past several years.¹⁷

Data Analysis

We assessed predictors of smoking and SLT use using multiple logistic regression. We classified students who reported any smoking or SLT use as lifetime users. We classified students who reported smoking or using smokeless tobacco within the past 30 days as current users. We chose predictors in accordance with previous research and a priori hypotheses; we evaluated their influence by examining the

direction and significance of odds ratios (ORs). We conducted all statistical analyses using the Statistical Package for the Social Sciences, Version 10.0.5 (SPSS Inc, 1999) using an α level of .05.

RESULTS

Description of Survey Respondents

Of the 21,410 students who responded to the survey, 8,211 (38.4%) were men, 13,130 (61.3%) were women, and 69 (0.3%) did not report their gender (see Table 1 for additional demographic information). Approximately 20% of respondents reported having ever used SLT products, such as chewing tobacco or snuff. Of those who had tried SLT products, 17.1% reported current use. Sixty-six percent of all participants indicated that they had tried smoking cigarettes at least once, and 36.7% of these identified themselves as current smokers. Among women, 65.8% reported smoking cigarettes at least once in their life, and 35.9% reported being current smokers. In addition, 8.5% of women reported having tried an SLT product at least once, and 3.2% reported current SLT use. Among men, 68.1% reported smoking cigarettes at least once, and 38.4% reported being current smokers. In addition, 38.1% of men reported having tried a SLT product at least once, and 22.4% reported current SLT use.

Logistic Regression Analyses

We selected predictor variables (see Table 2) from the survey based on past research and theoretical relevance; we excluded those with greater than 5% of their values missing. We excluded lifetime and current smoking and SLT use from several analyses because they did not contribute significantly to the regression model or because of problems

TABLE 1. Demographic Characteristics of Survey Respondents (N = 21,410)

Characteristic	%
Ethnicity	
Caucasian	68.8
Hispanic or Mexican American	11.0
Asian American	8.0
African American	3.1
Native American	0.5
Other	4.8
Prefer not to answer	3.8
Academic classification	
Freshman	17.0
Sophomore	15.9
Junior	19.6
Senior	26.0
Graduate	21.5
Age (in years)	
18-19	27.4
20-22	37.3
> 22	34.7
Prefer not to answer	0.6

TABLE 2. Predictor Variables Used in Multiple Logistic Regression Analyses

Variable	Lifetime smoking	Current smoking	Lifetime SLT use	Current SLT use
Gender	✓	✓	✓	✓
Ethnicity	✓	✓	✓	✓
Age	✓	✓	✓	✓
Participation in intercollegiate sports	✓	✓	✓	✓
Greek membership	✓	✓	✓	✓
Peer smoking	✓	✓	✓	✓
Peer SLT use	✓	✓	✓	✓
Lifetime smoking				✓
Current smoking				✓
Lifetime SLT use	✓	✓		
Current SLT use		✓		

Note. SLT = smokeless tobacco.

with multicollinearity. Tables 3 and 4 show the results of all logistic regression analyses (ie, odds ratios).

Predictors of Smoking

Lifetime use of SLT, gender, participation in intercollegiate sports, percentage of friends who smoke, percentage of friends who use SLT, and ethnicity all predicted lifetime smoking. College students were specifically more likely to have tried smoking at least once if they were female, identified themselves as Hispanic, participated in intercollegiate sports, had ever tried SLT, and estimated that between 0% to 10% or between 21% to 30% of their friends used SLT. They were less likely to have tried smoking if they reported that less than 75% of their friends smoked and if they identified themselves as Asian American.

Current SLT use, gender, membership in a fraternity or sorority, and percentage of friends who smoke all predicted current smoking status. Specifically, college students were more likely to be current smokers if they were female. However, they were less likely to be current smokers if they were members of a fraternity or sorority, were not current SLT users, and reported that less than 75% of their friends smoked.

Predictors of Smokeless Tobacco Use

Gender, membership in a fraternity or sorority, participation in intercollegiate sports, percentage of friends who use SLT, percentage of friends who smoke, and ethnicity all predicted lifetime use of SLT. College students were specifically more likely to have tried SLT at least once if they were white or Native American. Students were less likely to have tried SLT if they were female and Asian American, did not belong to a fraternity or sorority, and did not participate in intercollegiate sports. They were also less likely to have tried SLT if they estimated that between 11% to 20% or between 31% to 50% of their friends smoked or if less than 10% of their friends used SLT.

Gender, participation in intercollegiate sports, and percentage of friends who use SLT predicted current SLT use. College students were less likely to be current users of SLT if they were female, did not participate in intercollegiate sports, and reported that less than 30% of their friends used SLT. Membership in a fraternity or sorority did not predict current SLT use.

COMMENT

We designed this study to examine and compare predictors of smoking and SLT use among college students by means of a Web-based survey. Results indicate that gender, ethnicity, peer tobacco use, participation in intercollegiate sports, and membership in a fraternity or sorority significantly predicted both smoking and SLT use. However, patterns of prediction differed between lifetime and current users of cigarettes and SLT. For example, despite the fact that gender was a significant predictor in all 4 regression equations, we found that being female was a predictor of smoking, and being male was a predictor of SLT use. Ethnicity was similarly a significant predictor of both lifetime smoking and SLT use; however, identifying oneself as Hispanic predicted lifetime smoking and identifying oneself as white or Native American predicted SLT use. These findings are consistent with previous studies, which indicate that smoking and SLT use are often associated with a set of common factors, but each possess distinct predictors as well.

Gender was a significant predictor of lifetime and current use of cigarettes and SLT. To be specific, women were more likely to be lifetime or current smokers, and men were more likely to be lifetime or current users of SLT. These results correspond with the results of most previous research, especially with regard to SLT use. The majority of studies focusing on predictors of smoking in college populations have not found gender to be a significant predictor of current smoking.^{18,19} However, there is a trend that suggests that

TABLE 3. Results of Multiple Logistic Regression Analyses Predicting Lifetime and Current Smoking

Variable	Lifetime smoking			Current smoking		
	OR	CI	<i>p</i>	OR	CI	<i>p</i>
Gender						
Male (R)	—	—	—	—	—	—
Female	1.54	1.43–1.65	< .001	1.41	1.20–1.66	< .001
Ethnicity						
White	1.05	0.89–1.24	<i>NS</i>	1.04	0.71–1.52	<i>NS</i>
Hispanic	1.44	1.19–1.73	< .001	1.03	0.67–1.59	<i>NS</i>
African American	0.85	0.68–1.06	<i>NS</i>	0.76	0.34–1.67	<i>NS</i>
Asian American	0.61	0.51–0.74	< .001	1.24	0.71–2.18	<i>NS</i>
Native American	1.13	0.68–1.88	<i>NS</i>	1.04	0.43–2.52	<i>NS</i>
Other	0.90	0.73–1.11	<i>NS</i>	0.92	0.54–1.56	<i>NS</i>
Prefer not to answer (R)	—	—	—	—	—	—
Participation in intercollegiate sports						
No	1.44	1.24–1.66	< .001	1.00	0.76–1.33	<i>NS</i>
Peer smoking (%)						
< 10	0.07	0.05–0.11	< .001	0.07	0.05–1.00	< .001
11–20	0.13	0.09–0.19	< .001	0.13	0.09–0.20	< .001
21–30	0.20	0.14–0.30	< .001	0.20	0.14–0.30	< .001
31–50	0.30	0.20–0.44	< .001	0.33	0.22–0.49	< .001
51–75	0.54	0.36–0.80	< .001	0.65	0.43–0.98	< .05
> 75 (R)	—	—	—	—	—	—
Peer SLT use (%)						
< 10	3.23	1.53–6.81	< .001	1.38	0.64–2.96	<i>NS</i>
11–20	2.10	0.98–4.45	<i>NS</i>	0.89	0.41–1.95	<i>NS</i>
21–30	2.20	1.02–4.74	< .05	1.01	0.46–2.21	<i>NS</i>
31–50	2.00	0.91–4.41	<i>NS</i>	0.53	0.24–1.18	<i>NS</i>
51–75	1.88	0.81–4.40	<i>NS</i>	1.00	0.44–2.32	<i>NS</i>
> 75 (R)	—	—	—	—	—	—
Lifetime SLT use						
No	0.11	0.09–0.12	< .001	0.36	0.08–1.65	<i>NS</i>
Current SLT use						
No	NA	NA	NA	0.38	0.31–0.47	< .001

Note. OR = odds ratio; CI = 95% confidence interval; *NS* = not significant; SLT = smokeless tobacco; NA = not applicable and is used to denote independent variables that were not included in a specific analysis. The referent variable is denoted by (R). Whenever the referent variable is not specified assume that it is the opposite of the listed variable (eg, if *No* is listed then the referent variable is *Yes*). Age did not significantly predict any of the dependent variables and was therefore excluded from the table.

women are more likely to smoke.⁸ Studies that examine predictors of SLT use in college students and adolescents have uniformly found that men are much more likely to be lifetime and current users of SLT.^{3,18} It remains unclear, however, the degree to which geographical and cultural factors might affect the present findings.

Ethnicity significantly predicted lifetime smoking and SLT use. Those individuals who identified themselves as Hispanic were more likely to have tried smoking at least once in their lifetime, whereas those who identified themselves as white and Native American were more likely to have tried SLT at least once. In general, past research sug-

gests that whites are actually more likely to smoke, although 1 study indicated that Hispanic children in elementary and middle school were more frequent smokers.¹⁹ It should be noted, however, that most of these studies focused on current smokers, and several defined their ethnic categories differently. For example, Rigotti and colleagues¹⁸ defined 4 ethnic categories—white, Hispanic, black, and Asian—and selected white as the referent category. In contrast, in the present study, we included 7 ethnic categories and selected prefer not to answer as the referent group. The present findings also correspond with past research that suggests that whites are significantly more likely to have

TABLE 4. Results of Multiple Logistic Regression Analyses Predicting Lifetime and Current Smokeless Tobacco Use

Variable	Lifetime SLT use			Current SLT use		
	OR	CI	<i>p</i>	OR	CI	<i>p</i>
Gender						
Male (R)	—	—	—	—	—	—
Female	0.12	0.10–0.14	< .001	0.13	0.08–0.21	< .001
Ethnicity						
White	1.74	1.20–2.51	< .001	1.35	0.62–2.91	<i>NS</i>
Hispanic	1.25	0.812–1.91	<i>NS</i>	1.22	0.50–3.00	<i>NS</i>
African American	0.56	0.24–1.29	<i>NS</i>	0.58	0.06–6.12	<i>NS</i>
Asian American	0.46	0.27–0.76	< .001	1.29	0.40–4.18	<i>NS</i>
Native American	2.49	1.04–5.96	< .05	1.36	0.22–8.22	<i>NS</i>
Other	0.73	0.44–1.22	<i>NS</i>	1.17	0.39–3.57	<i>NS</i>
Prefer not to answer (R)	—	—	—	—	—	—
Greek membership						
No	0.77	0.64–0.94	< .05	0.76	0.55–1.05	<i>NS</i>
Participation in intercollegiate sports						
No	0.61	0.43–0.86	< .05	0.43	0.27–0.71	< .001
Peer smoking (%)						
< 10	0.75	0.53–1.09	<i>NS</i>	1.21	0.58–2.49	<i>NS</i>
11–20	0.62	0.42–0.91	< .05	0.92	0.44–1.90	<i>NS</i>
21–30	0.76	0.54–1.08	<i>NS</i>	0.82	0.42–1.60	<i>NS</i>
31–50	0.74	0.54–1.01	< .05	0.96	0.53–1.74	<i>NS</i>
51–75	0.82	0.62–1.09	<i>NS</i>	0.97	0.56–1.68	<i>NS</i>
> 75 (R)	—	—	—	—	—	—
Peer SLT use (%)						
< 10	0.14	0.04–0.48	< .001	0.03	0.01–0.10	< .001
11–20	0.31	0.09–1.07	<i>NS</i>	0.12	0.03–0.44	< .001
21–30	0.41	0.12–1.41	<i>NS</i>	0.20	0.06–0.74	< .05
31–50	0.40	0.11–1.14	<i>NS</i>	0.32	0.08–1.19	<i>NS</i>
51–75	1.61	0.40–6.70	<i>NS</i>	0.45	0.12–1.74	<i>NS</i>
> 75 (R)	—	—	—	—	—	—
Lifetime smoking						
No	0.91	0.61–1.36	<i>NS</i>	NA	NA	NA
Current smoking						
No	NA	NA	NA	NA	NA	NA

Note. OR = odds ratio; CI = 95% confidence interval; *NS* = not significant; SLT = smokeless tobacco; NA = not applicable and is used to denote independent variables that were not included in a specific analysis. The referent variable is denoted by (R). Whenever the referent variable is not specified assume that it is the opposite of the listed variable (eg, if *No* is listed then the referent variable is *Yes*). Age did not significantly predict any of the dependent variables and was therefore excluded from the table.

experimented with or report current use of SLT.¹¹ In addition, Tomar and Giovino¹¹ reported high prevalence rates of SLT use among Native Americans.

Consistent with previous research, membership in a Greek organization and participation in intercollegiate sports predicted tobacco use. In particular, we found that students were more likely to be current smokers or lifetime SLT users if they belonged to a fraternity or a sorority. Emmons and colleagues⁸ found similarly that students who rated participation in a Greek organization as important were more like-

ly to smoke. It is conceivable that such organizations may encourage conformity among their members, and if smoking is an accepted social activity among existing members, initiates may be strongly encouraged to smoke as well.

Results from this study also indicate that students were more likely to be lifetime smokers if they did not participate in intercollegiate sports and more likely to be lifetime SLT users or current SLT users if they did participate in intercollegiate sports. Although Emmons and colleagues⁸ and Rigotti and colleagues¹⁸ only focused on current tobacco

use, they found that athletes were less likely to be current smokers and more likely to be current SLT users, respectively. It may be that athletes are aware that smoking can affect their athletic performance, given that it diminishes lung capacity and so forth. However, they may believe that SLT provides a nicotine "high" without compromising their athletic performance. This may explain, in part, the high prevalence of SLT use among certain groups of athletes, such as baseball players.

Perhaps most consistent with previous research findings is the relationship between tobacco use and peer influence. We found that peer tobacco use (ie, the percentage of friends who smoked or used SLT) was a significant predictor of lifetime smoking, current smoking, and lifetime SLT use. Students were specifically more likely to have tried smoking at least once or report being a current smoker if more than 75% of their friends smoked. In addition, students were less likely to have ever tried SLT if they estimated that 11% to 20% or 31% to 50% of their peers smoked. Other studies examining predictors of tobacco use among children and adolescents also show that peer smoking is a strong predictor of smoking behavior.^{12,13,19} Studies of SLT use in children and adolescents similarly indicate that peer SLT use is a significant predictor of both SLT use and smoking.^{3,11} Results from the current study indicate that students whose friends used SLT were more likely to use SLT themselves. When less than 10% of students' peers used SLT, they were actually less likely to be lifetime SLT users, and when less than 30% of students' peers used SLT, they were less likely to be current SLT users.

Finally, previous research suggests that individuals who use one type of tobacco are more likely to use other types of tobacco. Consistent with these findings, our results indicate that lifetime SLT users were more likely to be lifetime smokers, and current SLT users were more likely to be current smokers.

In general, the present findings suggest a dichotomy between the influences of what might be called social factors and endogenous factors. To be specific, social factors (such as peer tobacco use, membership in a Greek organization, and lack of participation in intercollegiate sports) predicted both smoking and SLT use, but endogenous factors (such as gender and ethnicity) had more differential effects on tobacco use. In particular, smokers and SLT users demonstrated different gender and ethnic profiles. These results highlight the importance of tailoring prevention efforts to the population in question.

Limitations

Although we went to great lengths to design a methodologically sound study, caution should be used in interpreting these findings. First, this was a purely cross-sectional design, which precludes any longitudinal application of the results (although it by no means restricts the development of hypotheses that would be better addressed by a longitudinal design). Second, because of the low response rates across universities, our sample may be biased in favor of a

certain type (eg, computer savvy) of respondent. Low response rates may be in part a function of students not checking their university e-mail accounts, e-mail accounts that have exceeded their quota, or the habitual deletion of any university-related e-mails. As we mentioned previously, these low response rates are neither unexpected nor do they completely negate the results of the study. A third limitation is that the sample may have been biased simply because universities were not chosen randomly; this relates to the fact that not all universities agreed to participate in the study. Fourth, because other studies suggest regional differences in tobacco use, the present results may not be generalizable to other college students or the US population at large. Despite these limitations and the use of a novel survey methodology, it should be noted that the results from this study replicated results from previous studies that used regionally specific and nationally representative samples. This suggests that the Web-based survey may be an efficient, accurate, and cost-effective method of collecting large amounts of data in this research area. Furthermore, the response rates from each college and university were comparable to response rates obtained using e-mail and Web-based surveys in other domains.^{14-16,19}

Conclusion

Our findings clearly replicate the results of previous research by identifying a set of common factors that predict lifetime and current use of cigarettes and tobacco. However, our results expand upon current knowledge of tobacco use among young adults by demonstrating that patterns of predictors across smokers and SLT users in this population show some product-specific variability. Understanding these predictors of tobacco use among young adults in the United States is likely to increase our awareness of risk factors and, consequently, to improve the effectiveness of tobacco prevention programs targeted toward this at-risk population (eg, targeting special audiences in television or billboard ad campaigns). For example, general prevention efforts might focus on social factors through campaigns against peer pressure, and product-specific prevention efforts might target certain populations (ie, SLT prevention programs might focus on young men on college campuses). Future research should focus on replicating these results in different regions of the United States or using a nationally representative sample, adding additional predictors that theory and past research have emphasized as important (eg, alcohol use) and incorporating a longitudinal design.

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NOTE

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