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Tobacco Use by College Students: A Comparison of Daily and Nondaily Smokers

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Abstract

Objectives—To explore demographics, contextual factors, and health risk behaviors associated with nondaily smoking by college students.

Methods—In fall 2005, a random sample of 4,100 students completed an online survey.

Results—29% reported current smoking, of which 70% were nondaily smokers. Compared to daily smokers, nondaily smokers were younger, African American (compared to White), had mothers with higher education, belonged to Greek organizations, and attended private (vs. public) schools. Nondaily smokers were less likely to have used illicit drugs.

Conclusions—Nondaily and daily smokers differed on several demographic and contextual factors, but reported mostly similar health risk behaviors.

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Keywords

cigarette smoking; college students; patterns of smoking; nondaily smoking

Most college students who smoke cigarettes do not do so on a daily basis. Infrequent or intermittent smoking (smoking on some, but not all days) is very common among college students, accounting for more than two thirds of college smokers.[1–3] Despite this pattern of smoking being very common, there is no consistent definition or terminology in the literature for smoking less than daily.[2] The broad category is often referred to as *light and intermittent smoking (LITS),*[2] with several subcategories. Examples include *occasional smoking* which typically refers to smoking on some, but not all days[4–6] or smoking every few days, every few weeks, or every few months.[4] *Social smoking* is thought to be a subset of occasional smoking that describes smoking in social situations.[7–10] *Nondaily smokers* refer to those who have smoked in the past month, but less than every day[1,3,11–13] We have chosen to focus on nondaily smoking, defined as smoking on fewer than every day in the previous month, because this definition has been shown to be valid and stable over time.[2]

Nondaily smokers are intermittent tobacco users who most often do not consider themselves to be smokers,[10, 14] creating a challenge for interventions. Nondaily smokers often minimize the health effects of their tobacco use.[13] Because they do not typically self-identify, nondaily smokers and are less likely than daily smokers to be identified by clinicians.[15,16] Once identified, nondaily smokers are still less likely than daily smokers to receive advise to quit from health care providers.[16] Understanding the ways in which nondaily smokers are similar to and different from daily and non-smokers is important for the development of targeted interventions.

Although several studies have documented the large proportion of college student who are nondaily smokers, relatively few studies have compared nondaily smoking to daily and non-smoking by college students. Halerpin and colleagues assessed health and behavioral risks associated with different levels of smoking among a sample of college students accessing health education or medical care at five public universities.[3] Results revealed that any level of smoking (compared to no smoking) was associated with high-risk drinking, risky driving, relational abuse, depression, less exercise, and utilization of emergency and mental health services. Daily smokers (compared to nondaily) were more likely to report not wearing seatbelts and exercising less frequently. Although this study highlights several health behaviors associated with daily and nondaily smoking, it did not report on demographic or other contextual differences between the smoking groups.

Ames and colleagues assessed sociodemographic, tobacco use, psychological and alcohol-related factors between daily and nondaily college students from 2 large public universities.[13] Nondaily smokers reported lower nicotine dependence scores on the Fagertsrom Test for Nicotine Dependence than daily smokers.[17] Nondaily smokers were also more likely to minimize or deny the health effects associated with smoking than were daily smokers. Daily and nondaily smokers did not differ on age, year in college, use of multiple tobacco products, readiness to quit, prior quit attempts, psychological factors, and high-risk drinking behaviors.

Ridner[11] studied association between smoking group status (non, former, nondaily, and daily) and environmental factors (peer and family smoking), personal factors (depression, ethnicity), and behavioral factors (risk behaviors) among a random sample of students from a single institution. Results showed that membership in either smoking group (daily or nondaily) was associated with increased familial and peer smoking, increased level of

depressive symptoms (compared with nonsmokers) and increased risk behaviors, including high-risk drinking, marijuana and other drug use. Problem Behavior Theory suggests that problem behaviors co-occur within individuals and that engagement in one risk behavior will increase the probability of experimentation with others.[18] Although smoking is related to some health risk behaviors, questions still exist about how different patterns of tobacco use (daily and nondaily smoking) are related to other risk behaviors. Kandel and colleagues have suggested that substance use develops in a hierarchy where more socially acceptable substance use (eg, tobacco, alcohol) precedes less acceptable substance use (eg, marijuana, other illicit drugs).[19] Taken together, these theories suggest that smoking behavior among college students will likely lead to other problem behaviors in a predictable way. Whether nondaily and daily smokers have begun an ascent of the hierarchy of risk behaviors and begun experimenting with less acceptable substances, such as marijuana and illicit drugs, is not entirely clear. Additional, the similarities or differences between daily and nondaily smokers in their engagement in other risky behaviors is unknown. This study aims to address that question by exploring associations with other health risk behaviors between daily and nondaily smokers and non-smokers.

Although several previous studies have investigated prevalence and correlates associated with nondaily smoking by college students, most involved samples limited to one or 2 institutions only[11, 13] or convenience samples,[3] limiting generalizability. Additionally, several relevant demographics, contextual, and health-risk behaviors have yet to be studied. The focus of this study is to explore the demographic factors, contextual factors, including residence location (on- or off-campus), membership in Greek organizations, and type of institution (either public or private), and health-risk behaviors that are associated with daily and nondaily smoking.

METHOD

Participants

In fall 2005 a random sample of undergraduate college students attending ten universities (8 public and 2 private) in North Carolina were invited to complete a web-based survey as part of a randomized group trial of an intervention to prevent high-risk drinking behaviors and their consequences on college campuses and surrounding communities, the Study to Prevent Alcohol Related Consequences (“SPARC”). Students from each campus were stratified by class year and then randomly selected to participate in the survey from complete undergraduate enrollment lists provided to the study team from each participating school. The goal was to have 416 students (104 each: freshman, sophomore, juniors, and seniors) from each university complete the survey (N=4,160). The number of students selected to participate was based on the expectation from previous studies and previous waves of the survey that approximately 30–35% of the students would complete the survey within the time period allotted for the survey.[20] Every student selected for the survey received one invitation e-mail; non-responders received up to 4 reminder e-mails. The Web site was shut down shortly after the target numbers from the ten schools were achieved. The response rate across all 10 schools was 25.6% and varied quite a bit across campuses (11.4% to 32.7%). The response rate was impacted by the survey link being de-activated after the quota (4,160 students) was reached (ie, a higher response rate would have been achieved if a quota system had not been used). Variation in the response rates across schools also reflects the varying levels of technological capabilities at each school.[21]

Given that the response rate for the Web-survey was relatively low, we conducted additional analyses to assess bias in our sample using the “continuum of resistance” approach to compare early vs. later respondents. The assumption is that later respondents behave similarly to non-respondents, with the argument being that participants who require

additional email reminders before they respond or responded near but before a pre-specified cutoff (due to quota) would have been classified as non-respondents if no such additional efforts had been expended. Specifically, we compared time to response as a continuous variable (# days to response) by smoking status.[22,23] The total response period was 36 days. The average number of days to response by the entire sample was 4.0 days (SD=3.7, Median=3.0). The average number of days to response by smoking category was: Non Smokers=3.9 days (sd=3.6; Median=3.0), Nondaily smokers=4.1 days (sd=3.5; Median=3.1) Daily smokers =4.8 days (sd=4.5; Median=3.2). Using ANOVA on the ranks of the number days, these 3 groups are statistically significantly different ($P<.05$). While there is not surprising given the large sample size ($N>4,000$) we do not believe the differences constitute a clinically important difference (less than 0.2 days) in the median time to response (preference of median over mean due to presence of outliers). While this may mean that the prevalence estimates for the different categories of smokers may be underestimated or overestimated slightly, the analytic results that examined correlates of nondaily and daily smoking are unlikely to have been affected.

Measures

The web-based College Drinking Survey (CDS) was adapted from items previously used in the Harvard College Alcohol,[24] the Core Institute Drug and Alcohol Survey,[25] and the Youth Survey used in the National Evaluation of the Enforcing Underage Drinking Laws Program.[26,27] The survey took about 25 minutes to complete, depending on the skip patterns of each student.[21] The survey measured demographic variables, alcohol consumption behaviors, perceptions about other students' drinking, and consequences experienced from their own drinking as well as consequences from other students' drinking. The survey also assessed other health risk behaviors, including tobacco use, marijuana and other drug use, and sexual behaviors.

Demographic factors—Demographic variables included age, gender, race, and parents' educational level (some college education or less vs. 4 year college degree).

Contextual factors—Contextual factors included residence (on- or off-campus), Greek membership, and type of institution (either public or private).

Tobacco use—Tobacco use was measured by one item assessing past 30 day use of cigarettes. Responses options included: 0 days, 1–2 days, 3–5 days, 6–9 days, 10–19 days, 20–29 days, or all 30 days. Categories were collapsed to form 3 mutually exclusive categories: non-smokers (who smoked on zero of the past 30 days); nondaily smokers (who smoked on at least one but less than 30 days); and daily smokers (who reported smoking on all of the past 30 days).

Health risk behaviors—Alcohol use was assessed with 3 items: past 30 day use (coded as yes/no); past 30 day binge drinking (4 or more drinks in a row for females and 5 or more drinks in a row for males) (coded as yes/no); and number of days in a typical week students get drunk, where drunk is defined as unsteady, dizzy or sick to your stomach (coded as 0 days versus 1 or more days). A high-risk drinking composite was created from past 30 day binge drinking and number of days getting drunk in a typical week. Other health risk behaviors included past 30 day marijuana use (coded as yes/no), lifetime illegal drug use (cocaine, amphetamines, hallucinogens, Rohypnol, ecstasy, or prescription drugs without a prescription) (coded as yes/no), and having multiple sexual partners in the past 30 days (coded as yes/no).

Procedure

The protocol was approved by the Wake Forest University School of Medicine (WFUSM) Institutional Review Board (IRB). Several of the schools participating in the study also required IRB review and approval or set up oversight agreements with the WFUSM IRB. All of the students selected to participate were sent a postcard asking them to check their student email account for an invitation to participate in a web-based survey. The emails sent to participants informed them of the study and provided a link to a secured web site where the survey could be completed. An average of 429 students per school completed the survey, with a range of 227–537. All students who completed the survey were sent emails awarding them $10.00 in PayPal dollars with instructions on how to deposit them into their checking or savings account. From the list of completions, one student from each school was randomly selected to receive $100.

Statistical Analysis

The objectives of the statistical analyses were: 1) to estimate the proportion of past 30 day smokers (any smoking in past 30 days), nondaily smokers (1–29 days), and daily smokers (all past 30 days) in this population and 2) to examine associations of smoking status and demographic factors, contextual factors, and health risk behaviors, including binge drinking, drug use, and sexual behaviors.

Bivariate and multivariable analyses were performed to determine which variables were associated with smoking status. Analyses were performed with clustered polytomous logistic regression using generalized linear mixed modeling (GLMM) with maximum likelihood estimation. Although the smoking status categories were ordinal in nature, a multinomial (unordered, nominal) model was used with non-smokers as the reference category, since: 1) rather than estimate the probability of being in a higher smoking category, it was of direct interest to compare the daily to non-smokers, and 2) we did not want to constrain the effects of the covariates to be the same across smoking categories (ie, assume proportional odds). To directly compare nondaily to daily smokers, we also analyzed these groups using a clustered (dichotomous) logistic regression model with daily smokers as the reference group.

For these analyses, campus was treated as a random effect, with students nested within campus to adjust for the within college correlation of risk behaviors. Adaptive quadrature was used in estimation, where the number of integration points was increased until model stability was achieved (all models used a minimum of 20 quadrature points on first iteration). Study variables were initially identified based on conceptual considerations. Variables found to be significantly associated in bivariate analyses were considered in the multivariable models. P-values less than 0.05 were considered to be statistically significant. Odds ratios and their confidence intervals were calculated for significant covariates. All analyses were performed using Stata v9.2 (StataCorp, College Station, TX, USA) and using the Stata GLLAMM package.[28]

RESULTS

A total of 4297 students completed the survey; however, data for the items assessed in this paper were available from 4100 students (95.4%). The sample was 62.4% female, 78.8% Non-Hispanic White, 8.4% African-American, 3.5% Hispanic, 4.6% Asian/Pacific-Islander, and 4.7% who responded “Other.” Almost 28% of the sample were freshman; 25.4% were sophomores; 24.7% were juniors, and 22% were seniors. The average age of the students was 20.5 years (SD = 2.9). There were 2911 non-smokers, 832 nondaily smokers and for

357 daily smokers. See Table 1 for descriptive statistics on sample demographics, contextual factors, and health risk behaviors.

Twenty-nine percent of the sample reported past 30 day cigarette smoking. In an effort to adjust for possible differences between the sample and the sampling frame, we constructed post-stratification weights by school and class year, using the sample estimates and the known population numbers from registrar lists, the estimated weighted prevalence was 29.16%. Nondaily smokers represented the largest portion of past 30 day cigarette smokers, 70% reported nondaily smoking. Of the nondaily smokers, 37% reported smoking 1–2 days, 20% reported smoking 3–5 days, 13% reported smoking 6–9 days, 13% reported smoking 10–19 days, and 17% reported smoking 20–29 days. Bivariate analyses revealed significant differences based on smoking status among most demographic and contextual factors, and health risk. Results can be seen in Table 1.

Multivariable Analyses

Demographic factors—Daily smokers (DS) were older than both non-smokers (NS) (DS vs. NS: *AOR* = 1.15, P < .001) and nondaily smokers (NDS) (NDS vs. DS: *AOR* = 0.89, P < .001). Compared to non-Hispanic White students, African American students were less likely to be daily smokers than non-smokers (DS vs. NS: *AOR* = .33, P = .008) and they were also more likely to be nondaily smokers than daily smokers (NDS vs. DS: *AOR* = 2.52, P = .041). Nondaily smokers were more likely to have mothers with at least a 4-year college degree than were non-smokers (NDS vs. NS: *AOR* = 1.26, P = .038) and daily smokers (NDS vs. DS: *AOR* = 1.41, P = .035).

Contextual Factors—These included residence location (on- or off-campus), membership in Greek organizations and type of institution (public vs. private). No differences were found for residence location. Nondaily smokers were more likely to be members of Greek organizations than were daily smokers (NDS vs. DS: *AOR* = 1.79, P = .043). In terms of type of institution, there was a marginally significant difference between nondaily smokers and non-smokers (NDS vs. NS: *AOR* = .67, P = .055). Additionally, the odds of being a daily-smoker verses being a non-smoker were 79% lower at private schools (DS vs. NS: *AOR* = .21, P < .001). Futhermore, the odds of being a nondaily smoker rather than a daily smoker were 229% higher at private rather than public schools (NDS vs. DS: *AOR* = 3.29, P = .001). Thus, students attending the 2 private schools in this study were more likely to be non-smokers and nondaily smokers than daily smokers. Although daily smoking was more common at public schools (1.9% vs. 10.1%; P < .001), rates of nondaily smoking did not differ by school type (18.9% at private schools vs. 20.7% at public schools; P > .10).

Health risk behaviors—There were several health risk behaviors which clearly differentiated smokers (daily and nondaily) from non-smokers, including high-risk drinking, past 30 day marijuana use, illegal drug use (ever), and having multiple sex partners in the past 30 days. Students who engaged in each risk behavior had significantly higher odds of being a nondaily or daily smoker compared to being a non-smoker, than did students who did not engage in these behaviors (see Table 2 for adjusted odds ratios). Additionally, only one of these risky behaviors differentiated between the categories of smokers: nondaily smokers were less likely than daily smokers to have ever used illicit drugs (NDS vs. DS: *AOR* = .54, P < .001).

Discussion

The majority of college student smokers in our sample reported smoking on some, but not all days of the month. Moreover, more than half of the nondaily smokers reported smoking on fewer than 6 days out of the past 30 days. This suggests that most college nondaily smokers smoke only occasionally. Although both daily and nondaily smokers engage in roughly equal alcohol use, nondaily smokers in this sample were at less risk for using illicit drugs than daily smokers. However, they engaged in more health risk behaviors than non-smokers across several domains (ie, alcohol use, illicit drug use, sexual risk-taking).

The data revealed that college students in North Carolina smoke at a higher rate than do college students in other parts of the country. The past 30 day smoking rate among NC college students was 29%, a rate that is 19.3% higher than the national average of 24.3%.[29] Given that North Carolina is a leading tobacco producing state, has consistently ranked in the bottom 5 or 6 states in state excise taxes on cigarettes, and that in 2005, NC spent only 35.2% of the CDC recommended minimum for tobacco prevention, it is not surprising that rates of smoking among college students in North Carolina are higher than national averages.[30]

A number of demographic and contextual factors differentiated between types of college student smokers. College students who were daily smokers were older than nondaily smokers and non-smokers. This is consistent with the idea of progression through a series of several stages of smoking, beginning with initial trying and leading to daily, dependent smoking.[31, 32] This finding highlights the need to target young, nondaily smokers before the progression to daily smoking occurs.

African American college students were more likely to be nondaily smokers than daily smokers compared to non-Hispanic Whites which is consistent with the literature on the adult population.[33] African American college students were also more likely to be non-smokers than daily smokers. Therefore, if they were to smoke at all, African American students engaged in nondaily smoking. This is consistent with the notion that although African American adolescents smoke at lower rates than White teens, this disparity disappears by adulthood.[34] Young adulthood appears to be a time when African Americans catch up to Whites in their smoking behaviors. In fact, between 1993–1997, African American college students had the greatest increase in smoking prevalence compared to White, Hispanic, and Asian-Pacific Islander students.[35] While this study did not differentiate between nondaily and daily smoking, it does suggest an increase in smoking by African American students during the college years. As with age, the finding that African American students are more likely to be nondaily rather than daily smokers is consistent with the idea of progression through a series of several stages of smoking, beginning with initial trying and leading to daily, dependent smoking.[31,32] Future research should examine patterns of smoking by African American during the critical developmental period of young adulthood.

Nondaily smokers reported that their mothers were more highly educated (college graduate or higher degree) than did smokers and non-smokers. This finding suggests that nondaily smoking is associated with higher socioeconomic status than either non-smoking or daily smoking. Hassmiller and colleagues found nondaily smoking among the adult population to be associated with higher income levels than daily smoking.[36] They hypothesized that those with higher-incomes (and higher education) may have a better understanding of the dangers of smoking than daily smokers and may therefore chose to smoke only on some days, potentially lowering their health risks. An alternative explanation posed by Clarkin and colleagues[37], who found similar results in terms of family income levels and nondaily smoking status, is that college students are more susceptible to the pricing of tobacco than

older adults and thus only the more affluent students will purchase cigarettes. However, daily smokers are not as sensitive to the pricing since they are more likely to be dependent or addicted to nicotine in comparison to their nondaily counterparts.[37]

The finding that nondaily smokers reported that their mothers were more highly educated than non-smokers was surprising and is unclear. In related research, Staten and colleges[38] found that college students who initiated smoking after the age of 18 were more likely to have at least 1 parent with a college education, compared to never smokers. The authors speculated that their finding may be the result of students from more affluent families engaging in more drinking and social smoking situations than those from less affluent families. Thus, for those from less affluent families, the opportunities for social smoking may be more limited. Future research is needed to better understand this relationship.

Characteristics about the college environment were also important. Although daily smoking is more common on public campuses, nondaily smoking is equally likely at public and private schools. In addition, members of Greek organizations who smoke were more likely to be nondaily smokers than daily smokers. This may reflect a stigma against regular, daily smoking among this group of students, but an acceptance of more casual smoking, which co-occurs with alcohol use. There is considerable evidence that members of Greek letter organizations are the heaviest and most frequent drinkers on campus[39] and the relationship between alcohol use and smoking is well established.[40–42] Therefore, a possible explanation for this finding may be that the contexts around drinking promote more social smoking (ie, nondaily smoking) but do not support daily smoking. In previous research, we found that social smokers were more likely to be members of Greek organizations compared to heavy, daily smokers.[43] These findings suggest that environmental factors need to be taken into account when developing targeted interventions for college students.

As suggested by Problem Behavior Theory, smoking among college students in this sample was associated with other risky behaviors.[18] As in other studies, our results revealed that both daily and nondaily smokers were much more likely than non-smokers to engage in health risk behaviors including binge drinking, getting drunk, marijuana use, illicit drug use, and having multiple sex partners.[44–46] In this study, only one health risk behavior differentiated nondaily smokers from daily smokers, a finding which is similar to previous research.[4, 11] Nondaily smokers were less likely to have ever used illicit drugs than were daily smokers. However, patterns of alcohol use were similar across the 2 types of smoking groups. Nondaily smokers and daily smokers were equally likely to get drunk in a typical week and to binge drink. As suggested by Problem Behavior Theory, nondaily smokers may be starting to engage in somewhat more serious behaviors, such as alcohol and marijuana use, but have yet to engage in illicit drugs, which pose extremely serious health risks.[18, 19] Future research needs to investigate the longitudinal impact of nondaily smoking on other health risk behaviors.

The current findings have important implications for research and practice. Tobacco prevention and cessation programs targeting college students have largely focused either on prevention of initiation or on cessation for daily, heavy smokers.[47] Nondaily smokers, like social smokers, do not self-identify as smokers and are not likely to perceive a need to quit.[48] As suggested by Wortley and colleagues, behavior modification techniques which focus on situational cues, such as alcohol use, may be useful with nondaily smokers.[12] Additionally, social marketing campaigns focusing on the health risks of any smoking and the situational triggers (eg, alcohol) may be beneficial. Finally, health care providers, including student health center physicians need to screen for nondaily smoking and assist nondaily smokers in quitting.[16] Over the course of their 4 years in college, the majority of

students will visit their student health center.[49] This represents an ideal opportunity to reach nondaily smokers that should be maximized.

Limitations

This study was limited to college students from a particular state, which limits generalizability.[35] However, the schools selected to be part of the larger study are representative of schools in North Carolina and the demographic profile of this sample reflects that of undergraduate students in the U.S.[50] In addition, the response rate for the Web-survey is a concern; however, it is similar to rates found by others using this approach with college students.[20,51] Furthermore, prior research has demonstrated that, despite lower response rates, internet surveys yield similar statistics regarding health behaviors compared to mail and phone surveys.[52] An additional limitation is the cross-sectional design of the study, preventing the ability to assess the directionality of the relationship between smoking and other health risk behaviors. Finally, this study is limited by the fact that it was a secondary data analysis, with only one item assessing smoking. Future research should consider how age of initiation, quantity of cigarettes smoked, and when and where smoking occurs (eg, while drinking alcohol) are related to patterns of daily and nondaily smoking.

Conclusions

Despite these limitations, nondaily smokers are an important group to study given what is known about the dose-response relationship that exists between nicotine consumption and disease.[53] Nondaily smokers may have a lower risk of tobacco-related disease as compared to daily smokers, but they still remain at a much higher risk than non-smokers.[36] Additionally, they are engaging in other health risk behaviors, including getting drunk, binge drinking, marijuana use, and having multiple sex partners, that may place them at risk for other health consequences. As recommended by Halperin and colleagues,[3] health care providers need to identify smokers at any frequency level (ie, nondaily and daily) and provide cessation services as well as highlight the adverse health effects of other associated risky behaviors.

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Table 1

Student Demographics Factors, Contextual Factors, and Health Risk Behaviors by Smoking Status (N=4100)

Characteristic/Behavior	All Students	Non-Smokers [0 days past 30] (N=2,911; 71%)	Nondaily Smokers [1–29 days past 30] (N=832; 20%)	Daily Smokers [all past 30 days] (N=357; 9%)
	N (%)	N (%)	N (%)	N (%)
Demographic Factors				
Gender**				
Male	1505 (37)	1,001 (34)	350 (42)	154 (43)
Female	2559 (62)	1,886 (65)	471 (57)	202 (57)
No response	36 (1)	24 (<1)	11 (1)	1 (<1)
Age1**	20.5 ± 2.9	20.4 ± 2.9	20.4 ± 2.6	21.7 ± 3.7
Race**				
Non-Hispanic White	3229 (79)	2,208 (76)	708 (85)	313 (88)
African-American	343 (8)	294 (10)	38 (5)	11 (3)
Hispanic	144 (4)	106 (4)	29 (3)	9 (3)
Asian/Pacific-Islander	187 (5)	150 (5)	28 (3)	9 (3)
Other	189 (5)	147 (5)	28 (3)	14 (4)
No response	8 (<1)	6 (<1)	1 (<1)	1 (<1)
Mother's education level**				
4 yr. College degree or	2054 (50)	1,412 (49)	479 (58)	163 (46)
higher	2022 (49)	1,466 (50)	347 (42)	189 (53)
Some college or less	44 (1)	33 (1)	6 (<1)	5 (1)
Father's education level**				
4 yr. College degree or	2139 (52)	1,475 (51)	481 (58)	183 (51)
higher	1845 (45)	1,357 (47)	330 (40)	158 (44)
Some college or less	116 (3)	79 (3)	21 (3)	16 (4)
Contextual Factors				
Residence location**				
On campus	2156 (53)	1,633 (56)	400 (48)	123 (34)
Off campus	1939 (47)	1,274 (44)	431 (52)	234 (66)
No response	5 (<1)	4 (<1)	1 (<1)	0
Fraternity/Sorority member**				
Yes	259 (9)	226 (8)	112 (13)	21 (6)
No	3741 (91)	2,685 (92)	720 (87)	336 (94)
College Campus**				

Characteristic/Behavior	All Students	Non-Smokers [0 days past 30] (N=2,911; 71%)	Nondaily Smokers [1–29 days past 30] (N=832; 20%)	Daily Smokers [all past 30 days] (N=357; 9%)
	N (%)	N (%)	N (%)	N (%)
Private	700 (17)	557 (19)	130 (16)	13 (4)
Public	3400 (83)	2,354 (81)	702 (84)	344 (96)
Health Risk Behaviors				
Drank alcohol in past 30 days **				
Yes	2821 (69)	1,719 (59)	783 (94)	319 (89)
No	1278 (31)	1,192 (41)	48 (6)	38 (11)
No response	1 (<1)	0	1 (<1)	0
High-Risk Drinking **				
Binge drank in past 30 days ¥	563 (13)	330 (11)	145 (17)	61 (17)
Gets drunk in a typical week	82 (2)	61 (2)	16 (2)	5 (1)
Both binge drank & gets drunk	1344 (33)	640 (22)	507 (61)	197 (55)
Neither	2029 (49)	1807 (62)	136 (16)	86 (24)
No response	109 (3)	73 (3)	28 (3)	8 (2)
Marijuana use in past 30 days **				
Yes	892 (22)	326 (11)	379 (46)	187 (52)
No	3194 (78)	2573 (88)	451 (54)	170 (48)
No response	14 (<1)	12 (<1)	2 (<1)	0
Illegal drug use, ever **				
Yes	914 (22)	393 (14)	313 (38)	208 (58)
No	3184 (78)	2517 (86)	518 (62)	149 (42)
No response	2 (<1)	1 (<1)	1 (<1)	0
Had multiple sexual partners in past 30 days **				
Yes	330 (8)	139 (5)	130 (16)	61 (17)
No	3734 (91)	2740 (94)	698 (84)	296 (83)
No response	36 (<1)	32 (1)	4 (<1)	0

1 Mean ± sd;

* P-value < 0.05 in clustered polytomous logistic regression model unadjusted for other covariates;

** P-value < 0.01;

¥ Binge drinking was defined as 5 or more drinks in a row for males and 4 or more drinks in a row for females in past 30 days;

† Cocaine, amphetamines, rophypnol, GHB, Liquid X, ecstasy, heroin, LSD, PCP, ludes, prescription drugs without a prescription (pain killers, oxycodone, oxycotin).

Table 2

Multivariable Logistic Regression for Smoking Status

Characteristic/Behavior	Nondaily Smokers vs. Non-smokers ¥			Daily Smokers vs. Non-smokers ¥			Nondaily Smokers vs. Daily Smokers ¥¥		
	AOR*	95% CI*	p-value	AOR*	95% CI*	p-value	AOR*	95% CI*	p-value
Demographic Factors									
Gender									
Females vs. Males	0.95	0.79–1.16	0.636	0.99	0.76–1.29	0.944	0.96	0.72–1.28	0.797
Age	1.03	0.99–1.07	0.203	1.15	1.10–1.21	<0.001	0.89	0.84–0.94	<0.001
Race: Non-Hispanic White (referent)									
African-American	0.82	0.54–1.26	0.374	0.33	0.15–0.75	0.008	2.52	1.04–6.14	0.041
Hispanic	1.00	0.61–1.65	0.999	0.83	0.37–1.85	0.642	1.24	0.52–2.93	0.628
Asian/Pacific-Islander	1.40	0.86–2.30	0.177	1.42	0.66–3.04	0.373	0.76	0.33–1.73	0.511
Other	0.81	0.49–1.34	0.411	0.53	0.25–1.12	0.097	1.34	0.58–3.11	0.495
Mother's education level									
4 yr. College degree or higher vs. Some college or less (referent)	1.26	1.01–1.56	0.038	0.91	0.68–1.22	0.533	1.41	1.02–1.93	0.035
Father's education level									
4 yr. College degree or higher vs. Some college or less (referent)	1.02	0.82–1.27	0.876	1.05	0.78–1.41	0.754	1.02	0.74–1.40	0.912
Contextual Factors									
Residence location:									
On vs. Off campus (referent)	1.03	0.82–1.29	0.827	0.96	0.70–1.31	0.778	1.09	0.77–1.54	0.622
Fraternity/Sorority member	1.16	0.86–1.56	0.328	0.62	0.36–1.07	0.088	1.79	1.02–3.14	0.043
College Campus									
Private vs. Public (referent)	0.67	0.44–1.01	0.055	0.21	0.10–0.43	<0.001	3.29	1.61–6.72	0.001
Health Risk Behaviors									

Characteristic/Behavior	Nondaily Smokers vs. Non-smokers Ψ			Daily Smokers vs. Non-smokers Ψ			Nondaily Smokers vs. Daily Smokers ΨΨ		
	AOR*	95% CI*	p-value	AOR*	95% CI*	p-value	AOR*	95% CI*	p-value
Drank alcohol in past 30 days	2.59	1.78–3.79	<0.001	1.52	0.94–2.45	0.084	1.53	0.83–2.82	0.178
High-Risk Drinking									
Binge drank in past 30 days	2.57	1.87–3.53	<0.001	1.71	1.08–2.69	0.021	1.37	0.82–2.30	0.230
Gets drunk in a typical week	1.73	0.93–3.22	0.084	0.90	0.29–2.73	0.847	1.98	0.60–6.58	0.264
Both binge drank & gets drunk Neither (referent)	4.26	3.22–5.63	<0.001	3.45	2.33–5.13	<0.001	1.18	0.75–1.84	0.481
Marijuana use in past 30 days	2.93	2.36–3.63	<0.001	3.62	2.68–4.88	<0.001	0.78	0.58–1.07	0.124
Illegal drug use, ever	1.59	1.27–1.99	<0.001	2.94	2.20–3.92	<0.001	0.54	0.39–0.73	<0.001
Had multiple sexual partners in past 30 days	1.92	1.42–2.62	<0.001	2.63	1.77–3.91	<0.001	0.72	0.49–1.06	0.093

Note.

*AOR = Adjusted Odds Ratio; 95% CI = 95% Confidence Interval for AOR;

ΨPolytomous clustered logistic regression with Non-smokers as referent group;

ΨΨDichotomous clustered logistic regression with Daily smokers as referent group