Published in final edited form as:

J Am Coll Health. 2012 ; 60(3): 194–202. doi:10.1080/07448481.2011.586388.

Use of and Interest in Smoking Cessation Strategies Among Daily and Nondaily College Student Smokers

Dr. Carla J. Berg, PhD,

Department of Behavioral Sciences and Health Education at Emory University in Atlanta, Georgia

Dr. Erin L. Sutfin, PhD,

Department of Social Sciences and Health Policy at the Wake Forest University School of Medicine in Winston-Salem, North Carolina

Ms. Jennifer Mendel, MPH, and

Department of Behavioral Sciences and Health Education at Emory University in Atlanta, Georgia

Dr Jasjit S. Ahluwalia, MD, MPH, MS

Department of Medicine and the Center for Health Equity at the University of Minnesota Medical School in Minneapolis, Minnesota

Abstract

Objective—To examine use of and interest in cessation strategies among nondaily and daily college student smokers.

Participants—800 undergraduate student smokers aged 18 to 25.

Methods—The authors examined nondaily versus daily smoking in relation to use of and interest in cessation strategies using an online survey.

Results—Nondaily (65.8%) versus daily smokers (34.3%) were more likely to have made a quit attempt ($p = .01$) but less likely to have used any assistance ($p < .001$). Nondaily smokers were less interested in pharmacotherapy and traditional behavioral interventions; however, there was no difference in interest in technology-based interventions among nondaily versus daily smokers. Controlling for covariates, there were no significant differences in interest in traditional or technology-based behavioral interventions. Higher motivation, lower confidence, and depressive symptomatology were related to interest in each intervention. Smoking for social reasons was related to interest in technology-based interventions.

Conclusions—Different intervention strategies may be appropriate for nondaily and daily smokers.

Keywords

attitude; education; smoking; young adult

Cigarette smoking remains the leading causes of preventable disease in the United States.¹ Despite efforts to decrease its prevalence, 18.1% of Americans continue to smoke.² Although daily tobacco consumption in the United States is declining,³ nondaily smoking (smoking some days but not every day) is increasing.^{4,5} Young adults have been particularly affected. One marker of this trend is that rates of smoking fewer than 5 cigarettes per day among young adult smokers increased from 4.7% in 1992 to 6.0% in 2002.³ This increase may have occurred as a result of a rise in tobacco control policies coupled with society's progressive denormalization of smoking.^{3,6}

Unfortunately, nondaily smokers can suffer from significant smoking-related morbidity and mortality compared with never smokers.⁷⁻¹⁰ The 2004 US Surgeon General's report on the health consequences of smoking indicates that even low levels of exposure carry substantial risks, particularly for cardiovascular disease, lung and gastrointestinal cancers, lower respiratory tract infections, cataracts, compromised reproductive health, and osteoporosis.¹¹ Moreover, nondaily smoking on as few as 5 days per month has been associated with cough, sore throat, shortness of breath, and fatigue among the college student population.¹² Additionally, although most nondaily smokers report motivation to quit, they still have difficulty quitting,^{13,14} and importantly, these smokers are less likely to receive or seek treatment compared with the heavier smoker.¹⁵⁻¹⁷ This may be in part due to the fact that nondaily smokers are less likely to consider themselves to be smokers, which is related to lower readiness to quit smoking.¹⁸ Thus, promoting smoking cessation among nondaily smokers is critical.

Although nondaily smoking may be a transitory condition between daily smoking and quitting¹⁹⁻²¹ or a transitional phase to heavier or regular cigarette use,²² some research shows that this pattern of smoking may represent chronic low-level (< 10 cigarettes per day) consumption.^{6,23,24} Although nondaily smokers can abstain from tobacco for days without exhibiting signs of withdrawal,²⁵ other findings indicate that nondaily smokers may experience urges to smoke and difficulty achieving cessation as a result of physiological addiction.^{25,26}

Nondaily smoking has not been a focus of cessation efforts, nor has it been incorporated into national clinical guidelines for treating tobacco dependence.²³ Current cessation strategies were developed for established smokers who consume 1 or more packs of cigarettes per day, meet clinical criteria for nicotine addiction, and experience clear physical and psychological effects of tobacco. Available treatment options (eg, nicotine replacement, bupropion hydrochloride, varenicline) focus on daily smokers who consume more than 10 cigarettes per day and suffer from nicotine addiction.²⁷ Because nondaily smokers smoke less than daily smokers and some light or intermittent users, they may not show signs of nicotine dependence and have not been extensively studied as recipients of pharmacotherapy.

However, several cessation strategies have been identified for the college student population. Motivational interventions,²⁸ group-based interventions,²⁹ and peer counselors^{29,30} have been found to be appropriate and effective for college students. Technology-based interventions are cost effective, accessible, and potentially more appealing to a young adults.³¹ Research has examined technology-based interventions for

college students who smoked regularly and has shown a promise in terms of acceptability and cessation.^{31–34} It should be noted that these studies are limited in that they generally involved small samples and focused on regular smokers; thus, they did not include nondaily smokers. Only 1 Web-based cessation study³⁵ included daily and nondaily college student smokers and found that quit rates (intervention: 41% vs control: 23%; $p < .001$) were not significantly different among daily and nondaily smokers. This demonstrates promise for behavioral interventions among college students, including those who are nondaily smokers.

Given the aforementioned literature, we examined daily versus nondaily smoking status, as well as sociodemographics, smoking-related characteristics (confidence and motivation to quit, readiness to quit, perceived harm of smoking, motives for smoking), and depressive symptoms, in relation to use of and interest in cessation strategies, specifically traditional behavioral interventions, technology-based behavioral interventions, and pharmacotherapy. We hypothesize that nondaily smokers will be less likely to have used cessation interventions or to be interested in utilizing behavioral interventions or pharmacotherapy in comparison with daily smokers.

METHODS

Procedure

The University of Minnesota Institutional Review Board approved this study (IRB 0712S22941). In October 2008, a random sample of 5,500 students at a 4-year university and all young adults enrolled at least part time at a 2-year college ($N = 3,334$) in the Midwest were invited to complete an online survey (total invited $N = 8,834$). Students received up to 3 e-mails containing a link to the consent form with the alternative of opting out. Students who consented were directed to the online survey. As an incentive for participation, students completing the survey received entry into a drawing for cash prizes of \$2,500, \$250, and \$100.

Of those invited to participate, 2,700 (30.6%) completed the survey (2-year college: 30.1%, $n = 1,004$; 4-year college: 30.8%, $n = 1,696$). The present study focused on students aged 18 to 25 years (ie, the young adult population). Of the 2,265 students (750 2-year and 1,515 4-year college students) in that age range who submitted the survey, 820 correctly followed the skip pattern, thus providing complete data, and are included in the analyses.

Measures

The survey contained 108 questions assessing health topics. For the current investigation, only questions related to demographics, smoking behavior, attitudes, and motives were included.

Demographic Characteristics—Demographic characteristics assessed included age, gender, ethnicity, and parental educational attainment. Ethnicity was dichotomized as non-Hispanic white versus other due to the homogeneity of the sample. Highest parental educational attainment was dichotomized as bachelor's degree versus bachelor's degree based on the distribution of parental educational attainment. Other categorizations and cutoff

points were examined, but yielded similar results. Thus, for ease of interpretation, this dichotomization was chosen.

Smoking Behaviors—Participants were asked, “In the past 30 days, on how many days did you smoke a cigarette (even a puff)?” and “On the days that you smoke, how many cigarettes do you smoke on average?” These questions have been used previously and shown to be reliable and valid.^{36,37} Students reporting smoking 1 day in the past 30 were considered current smokers. Daily smoking was defined as smoking every day in the past 30 days; nondaily smoking was defined as smoking less than 30 days in the past 30. This is in line with how American College Health Association and Substance Abuse and Mental Health Association have defined “daily smokers.”^{38,39}

Confidence and Motivation to Quit Smoking—Participants were asked, “On a scale of 0 to 10 with 0 being ‘not at all confident’ and 10 being ‘extremely confident,’ assuming you want to, how confident are you that you could quit smoking cigarettes starting this week and continuing for at least one month?” and “On a scale of 0 to 10 with 0 being ‘I don’t want to at all’ and 10 being ‘I really want to,’ how much do you want to quit smoking cigarettes?”^{40,41}

Readiness to Quit—Participants were asked, “What best describes your intentions regarding quitting smoking: never expect to quit; may quit in the future, but not in the next 6 months; will quit in the next 6 months; and will quit in the next month.”⁴² This variable was dichotomized as intending to quit in the next 30 days versus other responses.

Perceived Harm—Participants were also asked, “Do you believe there is any harm in having an occasional cigarette?” with options of yes or no.

Depression—Participants were asked to complete the Patient Health Questionnaire (PHQ-2), which is a 2-item depression screening tool, based on *Diagnostic and Statistical Manual of Mental Disorders Fourth Edition* diagnostic criteria, assessing frequency of depressed mood “feeling down, depressed or hopeless” and anhedonia “little interest or pleasure in doing things” over the past 2 weeks. Responses were rated on a 4-point Likert scale and range from *not at all* (0) to *nearly every day* (3). A total score 3 has been used to reflect clinical depression.⁴³ Per prior research using a mental health professional reinterview as the criterion standard, a PHQ-2 score 3 has demonstrated a sensitivity of 83% and a specificity of 92% for major depression, indicating that a 3 is the optimal cutpoint for screening purposes. Its diagnostic performance was comparable with that of longer depression scales.⁴⁴

Smoking Motives—The Motives for Smoking Scale^{45,46} assesses the extent to which each of 15 smoking-related motives is true (1 = *not at all true*, 5 = *very true*). The measure contains questions about 4 common motives: social (4 items), self-confidence (4 items), boredom relief (2 items), and affect regulation (5 items). Higher scores indicate that the motive is more relevant. It has demonstrated internal consistency (alphas from .88 to .93) and strong validity.^{45,46}

Use of Cessation Strategies—Participants were asked, “Have you ever used any of the following methods to help you quit smoking? (Check all that apply): I have never tried to quit smoking; I quit on my own, did not use anything; Nicotine patch; Nicotine gum; Nicotine lozenge; Zyban, Wellbutrin, or Bupropion; Chantix or Varenicline; Talk to a doctor or nurse for help with quitting; Talk to a counselor; Attended a class or group program; Telephone counseling; or An Internet or online program.”

Interest in Cessation Strategies—Participants were asked, “If you were going to try to quit smoking, how interested would you be in the following ways of getting help in quitting? Attending a group meeting or class; Having a face-to-face meeting with a stop smoking counselor; Using a telephone program; Visiting a stop smoking website; E-mail; Instant messaging; Online social network with others who are quitting; Cell phone text messaging; Nicotine patch; Nicotine gum; Nicotine lozenges; Zyban or Wellbutrin; or Chantix or Varenacline.” Response options included the following: *not at all interested*, *not very interested*, *somewhat interested*, *interested*, or *very interested*. Responses were dichotomized as not interested (ie, not at all or not very interested) versus interested (somewhat interested, interested, very interested).

Statistical Analyses

Data analysis was conducted in summer 2010. Use of and interest in cessation strategies among nondaily and daily smokers were compared and contrasted using chi-square tests. Bivariate analyses were also run comparing those interested in traditional behavioral, technology-based behavioral, and pharmacotherapy interventions versus those not interested in regard to sociodemographic and smoking-related characteristics using *t* tests (continuous) and chi-square tests (categorical). Binary logistic regression was used to examine factors associated with interest in each of the intervention strategies with forced entry of the factors of interest, including age, ethnicity, gender, parental education, motivation to quit, confidence in quitting, readiness to quit, perceived harm, depressive symptoms, motivators for smoking, and smoking level (daily vs nondaily). SPSS 17.0 was used for all data analysis. Significance was set at $\alpha = .05$ for all tests.

RESULTS

Table 1 describes participant characteristics of the study sample and compares nondaily versus daily smokers. Of all smokers, 541 (66.0%) were nondaily smokers. Among nondaily smokers, the average number of days of smoking in the past 30 days was 9.49 ($SD = 9.24$). Bivariate analyses were used to examine differences between nondaily and daily smokers. Nondaily smokers, in comparison with daily smokers, were more likely to have come from homes where parents had at least a bachelor's degree (41.0% vs 32.1%, $\chi^2[1, 799] = 5.97, p = .02$). Nondaily smokers were more confident in quitting ($t[793] = 19.57, p < .001$) and motivated to quit ($t[793] = 9.24, p < .001$) and more likely to intend to quit in the next month (42.8% vs 8.8%, $\chi^2(1, 684) = 89.03, p < .001$). They were less likely to smoke for self-confidence ($t[798] = -3.73, p < .001$), boredom ($t[748] = -7.39, p < .001$), and affect regulation ($t[798] = -9.09, p < .001$).

Table 2 shows bivariate analyses examining use of and interest in different smoking cessation strategies among nondaily and daily smokers. Overall, a higher percentage of daily smokers ($n = 88$; 24.9%) than nondaily smokers ($n = 106$; 17.9%) have never tried to quit smoking ($\chi^2[1, 806] = 6.75, p = .01$). More nondaily smokers ($n = 324$; 54.6%) than daily smokers ($n = 173$; 49.0%) have attempted to quit smoking without assistance ($\chi^2[1, 806] = 2.18, p = .04$). Nondaily smokers, in comparison with daily smokers, were less likely to have used behavioral interventions (5.9% vs 20.7%, $\chi^2[1, 946] = 47.78, p < .001$) and pharmacotherapy (9.1% vs 33.4%, $\chi^2[1, 806] = 87.99, p < .001$). Nondaily smokers, in comparison with daily smokers, were less likely to be interested in using traditional behavioral interventions (21.6% vs 27.5%, $\chi^2[1, 820] = 3.83, p = .03$) and pharmacotherapy (40.3% vs 68.2%, $\chi^2[1, 795] = 59.71, p < .001$). However, there were no significant differences in interest in technology-based behavioral interventions between the 2 groups (34.1% vs 39.2%, $\chi^2[1, 807] = 2.16, p = .16$).

Interest in Traditional Behavioral Interventions

Table 3 compares participant characteristics in relation to interest in each intervention type. Interest in traditional behavioral interventions was related to being older ($t[814] = -3.12, p = .002$), lower confidence in quitting ($t[816] = 3.40, p = .001$), higher motivation to quit ($t[814] = -2.67, p = .008$), greater perceived harm of smoking ($\chi^2[1, 816] = 4.42, p = .02$), having depressive symptoms ($\chi^2[1, 817] = 12.90, p < .001$), and smoking for boredom ($t[818] = -2.50, p = .01$) and affect regulation ($t[818] = -2.47, p = .01$). Binary logistic regression was then used to model factors associated with interest in each intervention strategy. Significant correlates of interest in traditional behavioral interventions included older age (odds ratio [OR] = 1.04, 95% confidence interval [CI; 1.01, 1.07], $p = .02$), lower parental education (OR = 0.65, CI [0.44, 0.94], $p = .02$), lower confidence in quitting (OR = 0.91, CI [0.86, 0.97], $p = .004$), higher motivation to quit (OR = 1.11, CI [1.04, 1.18], $p = .002$), and screening positive for depressive symptoms (OR = 1.77, CI [1.24, 2.52], $p = .002$).

Interest in Technology-Based Behavioral Interventions

Interest in technology-based behavioral interventions was related to lower confidence in quitting ($t[803] = 2.94, p = .001$), higher motivation ($t[805] = -2.06, p = .006$), depressive symptoms ($\chi^2[1, 804] = 7.24, p = .004$), and smoking for social reasons ($t[805] = -2.72, p = .007$), self-confidence ($t[805] = -2.06, p = .04$), boredom ($t[805] = -3.01, p = .003$), and affect regulation ($t[805] = -2.01, p = .04$; Table 3). Binary logistic regression indicated that interest in technology-based interventions was associated with lower confidence (OR = 0.92, CI [0.87, 0.97], $p = .004$), higher motivation (OR = 1.10, CI [1.04, 1.16], $p = .001$), depressive symptomatology (OR = 1.43, CI [1.04, 1.95], $p = .03$), and smoking for social reasons (OR = 1.06, CI [1.01, 1.12], $p = .04$).

Interest in Pharmacotherapy

Interest in pharmacotherapy was related to being older ($t[790] = -3.39, p = .001$), being female ($\chi^2[1, 794] = 5.30, p = .01$), being non-Hispanic white ($\chi^2[1, 794] = 7.71, p = .004$), lower confidence in quitting ($t[791] = 9.15, p < .001$), less likelihood of being ready to quit in the next month ($\chi^2[1, 781] = 11.53, p < .001$), being a daily smoker ($\chi^2[1, 795] = 59.71, p$

< .001), and smoking for self-confidence ($t[793] = -2.27, p = .02$), boredom ($t[793] = -4.67, p < .001$), and affect regulation ($t[793] = -5.06, p < .001$; Table 3). Having significant depressive symptoms was also marginally associated with interest in pharmacotherapy ($t[793] = -1.85, p = .07$). Binary logistic regression modeling indicated that correlates of interest in pharmacotherapy interventions included being white (OR = 2.65, CI [1.53, 4.59], $p < .001$), lower confidence (OR = 0.84, CI [0.79, 0.89], $p < .001$), higher motivation (OR = 1.13, CI [1.06, 1.19], $p < .001$), screening positive for depression (OR = 1.38, CI [1.01, 1.91], $p = .04$), and being a daily smoker (OR = 1.83, CI [1.22, 2.75], $p = .004$).

COMMENT

This study compares and contrasts use of and interest in smoking cessation strategies among nondaily and daily college student smokers, accounting for other important sociodemographic and smoking-related factors. Although half of smokers had not used any assistance in their attempts to quit, daily as compared with nondaily smokers were more likely to have used various cessation strategies and were more likely to be interested in pharmacotherapies. However, nondaily smokers were as interested as daily smokers in behavioral interventions.

More nondaily smokers than daily smokers reported having attempted to quit smoking. This may be a result of some of the nondaily smokers in our sample previously being more regular smokers, and thus their status as a nondaily smoker is an artifact of having made a quit attempt. Unfortunately, we did not assess whether nondaily smokers were previously smoking at higher levels. It may also reflect that nondaily smokers are more confident in their ability to quit and may have made prior quit attempts as a result. Moreover, half of smokers in this sample—both daily and nondaily—reported having never used any cessation assistance in prior quit attempts, which is in line with prior research indicating that over two thirds of young adults who had attempted to quit did so without using some form of assistance.⁴⁷ This highlights the concern that young people in general may not believe that cessation aids are suitable for them. One population-based survey found that 2 major barriers to uptake of services for the general population were preferring to quit without help and a belief that a particular service would not help.⁴⁸ Given the need to effect cessation early in life, altering these perceptions is critical.

Interestingly, nondaily smokers were as interested in behavioral interventions—both traditional and technology-based—as daily smokers, after controlling for important covariates. These findings highlight the perceived appropriateness of behavioral interventions for both daily and nondaily smokers. Behavioral interventions have been tested among college student smokers, although very limited research has applied these interventions to nondaily college student smokers. Prior research has found that students prefer motivational styles of behavioral counseling rather than direct advice to quit smoking²⁸ and that group-based counseling and peer counselors enhance cessation and relapse prevention among college smokers.^{29,30}

Technology-based interventions are cost-effective, accessible, and appealing to a young adults.³¹ Between 34% and 39% of our sample indicated interest in technology-based interventions. Moreover, nondaily and daily smokers in the present study were equally interested in using them. Given the interest in these interventions, prior research demonstrating their effectiveness among nondaily and daily smokers,³⁵ and the fact that technology-based interventions are cost-effective and easy to implement, this is a particularly promising medium for service delivery.

Daily smokers reported more interest in pharmacotherapy; thus, it seems as though college student smokers were largely able to decipher which intervention approaches were appropriate for them. The Clinical Practice Guidelines⁴⁹ recommend pharmacotherapy for adult smokers in general, with the caveat that pharmacotherapy may not be appropriate for certain subpopulations including light or intermittent smokers. Thus, it is noteworthy that college student smokers are able to identify appropriate strategies for cessation.

However, it is also worth noting that all smokers, nondaily and daily, reported highest interest in pharmacotherapy. Although there are data that indicate that nondaily smokers can abstain from tobacco use for days without exhibiting signs of withdrawal,²⁵ there are also studies that suggest that intermittent tobacco users may experience sudden urges to smoke and difficulty with achieving cessation as a result of physiologic addiction.²⁶ Recent research has documented that the college student smoker population is quite heterogeneous in terms of frequency of smoking, their reasons for smoking, and their experience of addiction.⁵⁰ Thus, certain pharmacotherapies might be appropriate for some nondaily smokers. Future research is needed to ascertain the extent to which these approaches are appropriate and effective for nondaily smokers.

Common factors were associated with interest in the different smoking cessation aids—particularly lower confidence and higher motivation to quit. Prior research has found that high motivation is related to interest in cessation services, which coincides with our findings.⁵¹ However, higher confidence in ability to quit has been shown to be related to cessation services,⁵¹ which contradicts the current results. Other findings included that having depressive symptoms was related to interest in all intervention types; smoking for social reasons related to interest in technology-based interventions; whites were more interested in pharmacotherapy; and students from homes with less educated parents were more interested in traditional behavioral interventions. None of these findings have been previously documented.

Limitations

This study has limited generalizability due to the sample being drawn from 2 colleges in the Midwest, primarily Caucasians. This is particularly important because ethnic minority populations are more likely to be nondaily smokers and were underrepresented.²³ Also, because nonrespondent information was not assessed, we cannot infer how this sample differs from nonrespondents. There was also some missing information as a result of participants inaccurately following the survey skip pattern. The large sample size (a strength of the study) allowed for us to detect subtle differences in psychosocial and smoking-related characteristics. Despite these limitations, these findings provide strong support for continued

investigation of differences in use of and interest in cessation services among daily and nondaily college student smokers.

Conclusions

Although daily smokers are more likely to have used cessation aids, nondaily and daily smokers are equally interested in behavioral cessation interventions. Other factors associated with interest in cessation strategies included being less confident, more motivated, and screening positive for depressive symptoms. Present findings suggest that behavioral interventions seem to be appealing to the broad range of college student smokers. Moreover, further exploration of the appropriateness of pharmacotherapies for nondaily smokers need to be explored, as these approaches were of most interest to college student smokers—both daily and nondaily.

Acknowledgments

This research was funded by ClearWay Minnesota (Clear-Way Minnesota Grant: RC-2007–0024). The authors would like to thank Boynton Health Services at the University of Minnesota.

References

1. US Department of Health and Human Services. Healthy People 2010: With Understanding and Improving Health and Objectives for Improving Health. 2. Washington, DC: US Government Printing Office; 2000.
2. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System Survey Data. Atlanta, GA: US Department of Health and Human Services; 2008.
3. Pierce JP, White MM, Messer K. Changing age-specific patterns of cigarette consumption in the United States, 1992–2002: association with smoke-free homes and state-level tobacco control activity. *Nicotine Tob Res.* 2009; 11:171–177. [PubMed: 19246423]
4. Centers for Disease Control and Prevention. Prevalence of current cigarette smoking among adults and changes in prevalence of current and some day smoking—United States, 1996–2001. *MMWR Morbid Mortal Weekly Rep.* 2003; 52:303–307.
5. Substance Abuse and Mental Health Services Administration (SAMHSA). National Survey on Drug Use and Health. Rockville, MD: Division of Population Surveys, Office of Applied Studies; 2008. Available at: <http://www.oas.samhsa.gov/nsduh/2k8nsduh/2k8Results.cfm> [Accessed December 1, 2010]
6. Shiffman S. Light and intermittent smokers: background and perspective. *Nicotine Tob Res.* 2009; 11:122–125. [PubMed: 19246630]
7. Luoto R, Uutela A, Puska P. Occasional smoking increases total and cardiovascular mortality among men. *Nicotine Tob Res.* 2000; 2:133–139. [PubMed: 11072451]
8. Garfinkel L, Stellman SD. Smoking and lung cancer in women: findings in a prospective study. *Cancer Res.* 1988; 48:6951–6955. [PubMed: 3180103]
9. Jimenez-Ruiz C, Kunze M, Fagerstrom KO. Nicotine replacement: a new approach to reducing tobacco-related harm. *Eur Respir J.* 1998; 11:473–479. [PubMed: 9551757]
10. Schane RE, Ling PM, Glantz SA. Health effects of light and intermittent smoking: a review. *Circulation.* 2010; 121:1518–1522. [PubMed: 20368531]
11. US Department of Health and Human Services. The Health Consequences of Smoking: A Report of the Surgeon General. Washington, DC: Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, US Department of Health and Human Services; 2004.
12. An LC, Berg CJ, Klatt CM, et al. Symptoms of cough and shortness of breath among occasional young adult smokers. *Nicotine Tob Res.* 2009; 11:126–133. [PubMed: 19264863]

13. Etter JF. Associations between smoking prevalence, stages of change, cigarette consumption, and quit attempts across the United States. *Prev Med.* 2004; 38:369–373. [PubMed: 14766121]
14. Choi WS, Okuyemi KS, Kaur H, Ahluwalia JS. Comparison of smoking relapse curves among African-American smokers. *Addict Behav.* 2004; 29:1679–1683. [PubMed: 15451137]
15. Okuyemi KS, Ahluwalia JS, Richter KP, Mayo MS, Resnicow K. Differences among African American light, moderate, and heavy smokers. *Nicotine Tob Res.* 2001; 3:45–50. [PubMed: 11260810]
16. Tong EK, Ong MK, Vittinghoff E, Perez-Stable EJ. Nondaily smokers should be asked and advised to quit. *Am J Prev Med.* 2006; 30:23–30. [PubMed: 16414420]
17. Rutten LJ, Augustson EM, Doran KA, Moser RP, Hesse BW. Health information seeking and media exposure among smokers: a comparison of light and intermittent tobacco users with heavy users. *Nicotine Tob Res.* 2009; 11:190–196. [PubMed: 19264865]
18. Berg CJ, Lust KA, Sanem JR, et al. Smoker self-identification versus recent smoking among college students. *Am J Prev Med.* 2009; 36:333–336. [PubMed: 19201148]
19. Evans NJ, Gilpin E, Pierce JP, et al. Occasional smoking among adults: evidence from the California tobacco survey. *Tobacco Control.* 1992; 1:169–175.
20. Okuyemi KS, Harris KJ, Scheibmeir M, Choi WS, Powell J, Ahluwalia JS. Light smokers: issues and recommendations. *Nicotine Tob Res.* 2002; 4(suppl 2):S103–S112. [PubMed: 12573172]
21. Zhu SH, Sun J, Hawkins S, Pierce J, Cummins S. A population study of low-rate smokers: quitting history and instability over time. *Health Psychol.* 2003; 22:245–252. [PubMed: 12790251]
22. White HR, Bray BC, Fleming CB, Catalano RF. Transitions into and out of light and intermittent smoking during emerging adulthood. *Nicotine Tob Res.* 2009; 11:211–219. [PubMed: 19246434]
23. Hassmiller KM, Warner KE, Mendez D, Levy DT, Romano E. Nondaily smokers: who are they? *Am J Public Health.* 2003; 93:1321–1327. [PubMed: 12893622]
24. Hennrikus DJ, Jeffery RW, Lando HA. Occasional smoking in a Minnesota working population. *Am J Public Health.* 1996; 86:1260–1266. [PubMed: 8806378]
25. Rubinstein ML, Benowitz NL, Auerback GM, Moscicki AB. Withdrawal in adolescent light smokers following 24-hour abstinence. *Nicotine Tob Res.* 2009; 11:185–189. [PubMed: 19246428]
26. DiFranza JR, Wellman RJ. A sensitization-homeostasis model of nicotine craving, withdrawal, and tolerance: integrating the clinical and basic science literature. *Nicotine Tob Res.* 2005; 7:9–26. [PubMed: 15804674]
27. Food and Drug Administration. Recommendations for Use of Prostep (Nicotine Transdermal Patch). Rockville, MD: US Department of Health and Human Services; 2001.
28. Gemmell L, Diclemente CC. Styles of physician advice about smoking cessation in college students. *J Am Coll Health.* 2009; 58:113–119. [PubMed: 19892647]
29. Ramsay J, Hoffmann A. Smoking cessation and relapse prevention among undergraduate students: a pilot demonstration project. *J Am Coll Health.* 2004; 53:11–18. [PubMed: 15266725]
30. Klatt C, Berg CJ, Thomas JL, Ehlinger E, Ahluwalia JS, An LC. The role of peer e-mail support as part of a college smoking-cessation website. *Am J Prev Med.* 2008; 35(suppl 6):S471–S478. [PubMed: 19012841]
31. Travis H, Lawrance K. Randomized controlled trial examining the effectiveness of a tailored self-help smoking-cessation intervention for post-secondary smokers. *J Am Coll Health.* 2008; 57:437–443. [PubMed: 19114383]
32. Obermayer JL, Riley WT, Asif O, Jean-Mary J. College smoking-cessation using cell phone text messaging. *J Am Coll Health.* 2004; 53:71–78. [PubMed: 15495883]
33. Escoffery C, McCormick L, Bateman K. Development and process evaluation of a web-based smoking cessation program for college smokers: innovative tool for education. *Patient Educ Couns.* 2004; 53:217–225. [PubMed: 15140462]
34. Riley W, Obermayer J, Jean-Mary J. Internet and mobile phone text messaging intervention for college smokers. *J Am Coll Health.* 2008; 57:245–248. [PubMed: 18809542]
35. An LC, Klatt C, Perry CL, et al. The RealU online cessation intervention for college smokers: a randomized controlled trial. *Prev Med.* 2008; 47:194–199. [PubMed: 18565577]

36. American College Health Association. . American College Health Association: National College Health Assessment Spring 2007 Reference Group data report (abridged). *J Am Coll Health*. 2008; 56:469–479. [PubMed: 18400658]
37. Centers for Disease Control and Prevention. Youth risk behavior surveillance: National College Health Risk Behavior Survey—United States, 1995. *MMWR Surveill Summ*. 1997; 46(SS-6):1–54. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/00049859.htm>.
38. American College Health Association. . American College Health Association: National College Health Assessment Spring 2008 Reference Group data report (abridged). *J Am Coll Health*. 2009; 57:477–488. [PubMed: 19254888]
39. Office of Applied Studies. The NSDUH Report. Rockville, MD: Substance Abuse and Mental Health Services Administration (SAMHSA); 2006.
40. Biener L, Abrams DB. The Contemplation Ladder: validation of a measure of readiness to consider smoking cessation. *Health Psychol*. 1991; 10:360–365. [PubMed: 1935872]
41. Maibach EW, Maxfield A, Ladin K, Slater M. Translating health psychology into effective health communication. *J Health Psychol*. 1996; 1:261–277. [PubMed: 22011991]
42. Prochaska, JO.; DiClemente, CC. *Advances in Cancer Control—1983*. New York, NY: Alan R. Liss; 1984. Self change processes, self-efficacy and decisional balance across five stages of smoking cessation; p. 131-140.
43. Kroenke K, Spitzer RL, Williams JB. The Patient Health Questionnaire–2: validity of a two-item depression screener. *Med Care*. 2003; 41:1284–1292. [PubMed: 14583691]
44. Lowe B, Kroenke K, Grafe K. Detecting and monitoring depression with a two-item questionnaire (PHQ-2). *J Psychosom Res*. 2005; 58:163–171. [PubMed: 15820844]
45. Piko BF, Wills TA, Walker C. Motives for smoking and drinking: country and gender differences in samples of Hungarian and US high school students. *Addict Behav*. 2007; 32:2087–2098. [PubMed: 17317024]
46. Wills TA, Sandy JM, Shinar O. Cloninger's constructs related to substance use level and problems in late adolescence: a mediational model based on self-control and coping motives. *Exp Clin Psychopharmacol*. 1999; 7:122–134. [PubMed: 10340152]
47. Solberg LI, Asche SE, Boyle R, McCarty MC, Thoele MJ. Smoking and cessation behaviors among young adults of various educational backgrounds. *Am J Public Health*. 2007; 97:1421–1426. [PubMed: 17600256]
48. Paul CL, Wiggers J, Daly JB, et al. Direct telemarketing of smoking cessation interventions: will smokers take the call? *Addiction*. 2004; 99:907–913. [PubMed: 15200586]
49. Fiore, MC.; Jaen, CR.; Baker, TB. *Treating Tobacco Use and Dependence: 2008 Update*. Clinical Practice Guideline. Rockville, MD: Public Health Service, US Department of Health and Human Services; 2008.
50. Sutfin EL, Reboussin BA, McCoy TP, Wolfson M. Are college student smokers really a homogeneous group? A latent class analysis of college student smokers. *Nicotine Tob Res*. 2009; 11:444–454. [PubMed: 19264866]
51. Weber D, Wolff LS, Orleans T, Mockenhaupt RE, Massett HA, Vose KK. Smokers' attitudes and behaviors related to consumer demand for cessation counseling in the medical care setting. *Nicotine Tob Res*. 2007; 9:571–580. [PubMed: 17454713]

TABLE 1

Participant Characteristics

Variable	Total			Nondaily smoker			Daily smoker			p			
	M	SD	n	%	M	SD	n	%	M		SD	n	%
t Tests													
Age	20.49	1.99			20.37	1.87			20.73	2.18			.020
CPD on smoking days	5.24	4.94			3.11	3.16			8.93	5.29			< .001
Confidence to quit	6.51	3.63			8.01	2.93			3.65	3.08			< .001
Motivation to quit	7.42	3.21			8.15	2.72			6.04	3.59			< .001
Motives for smoking													
Social reasons	7.88	3.58			7.99	3.52			7.67	3.70			.230
Self-confidence	6.39	2.96			6.11	2.78			6.93	3.22			< .001
Boredom	4.90	2.42			4.46	2.21			5.74	2.56			< .001
Affect regulation	13.31	5.34			12.12	4.95			15.59	5.43			< .001
χ ² Tests													
Gender													.390
Male			302	37.8			201	38.3			101	37.0	
Female			496	62.2			324	61.7			172	34.7	
Ethnicity													.170
Other			94	11.8			68	12.9			26	9.5	
Non-Hispanic white			705	88.2			458	87.1			247	90.5	
Parent education													.017
< Bachelor's degree			496	62.1			310	59.0			186	67.9	
Bachelor's degree			303	37.9			215	41.0			88	32.1	
Ready to quit, 30 days													< .001
No			480	70.2			242	57.2			238	91.2	
Yes			204	29.8			181	42.8			23	8.8	
Perceived harm													.190
No			307	39.1			193	37.4			114	42.2	
Yes			479	60.9			323	62.6			156	57.8	
Depressive symptoms													.940

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Variable	Total			Nondaily smoker			Daily smoker			<i>p</i>
	<i>M</i>	<i>SD</i>	<i>n</i>	%	<i>M</i>	<i>SD</i>	<i>n</i>	%	<i>n</i>	
No			377	48.0			247	47.9	130	48.1
Yes			409	52.0			269	52.1	140	51.9

Bivariate Analyses of Types of Cessation Strategies Used By and of Interest to Nondaily and Daily College Student Smokers,

TABLE 2

Cessation strategy	Ever used strategy				Interest in strategy			
	Nondaily smokers		Daily smokers		Nondaily smokers		Daily smokers	
	n	%	n	%	n	%	n	%
Never tried to quit	106	17.9	88	24.9	—	—	—	—
Quit without assistance	324	54.6	173	49.0	—	—	—	—
Behavioral interventions	35	5.9	73	20.7	173	36.4	147	44.5
Traditional behavioral interventions	—	—	—	—	105	21.6	92	27.5
Group counseling/Class	6	1.0	13	3.7	64	13.2	48	14.2
Individual counselor	9	1.5	12	3.4	81	16.6	77	22.8
Quitline/Telephone counseling	5	0.8	11	3.1	54	11.1	46	13.8
Talk to health care provider	18	3.0	60	17.0	—	—	—	—
Technology-based behavioral interventions	—	—	—	—	162	34.1	130	39.2
Web-based program	11	1.9	14	4.0	133	27.4	113	33.7
E-mail interaction	—	—	—	—	95	19.6	73	21.8
Instant messaging	—	—	—	—	64	13.2	43	12.8
Social networking	—	—	—	—	82	17.0	80	23.8
Text messaging	—	—	—	—	64	13.2	38	11.3
Pharmacotherapy	54	9.1	118	33.4	190	40.3	221	68.2
NRT	—	—	—	—	—	—	—	—
Patch	28	4.7	67	19.0	155	32.1	179	53.4
Gum	26	4.4	56	15.9	162	33.5	165	49.4
Lozenges	4	0.7	18	5.1	111	23.0	135	40.9
Other	—	—	—	—	—	—	—	—
Zyban	13	2.2	36	10.2	102	21.2	133	39.8
Chantix	16	2.7	47	13.3	173	36.4	147	44.5

Note. NRT = nicotine replacement therapy. χ^2 tests used for bivariate analyses.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

TABLE 3

Bivariate Analyses Examining Factors Related to Smoking Cessation Intervention Strategies

Variable	Traditional behavioral interventions						Technology-based behavioral interventions						Pharmacotherapy interventions										
	Not Interested			Interested			Not Interested			Interested			Not Interested			Interested							
	M	SD	n	%	M	SD	n	%	p	M	SD	n	%	p	M	SD	n	%	p				
<i>t</i> Tests																							
Age	21.95	4.94			23.28	5.79			.002	22.02	4.98			22.70	5.56			21.49	4.41	.070	.001		
Confidence to quit	6.31	3.65			5.29	3.63			.001	6.32	3.70			5.53	3.58			7.24	3.34	.001	< .001		
Motivation to quit	7.10	3.31			7.80	2.87			.008	7.02	3.39			7.67	2.87			7.18	3.34	.006	.550		
Motives for smoking																							
Social reasons	7.60	3.80			7.92	3.60			.290	7.41	3.71			8.15	3.77			7.61	3.69	.007	.830		
Self-confidence	6.27	3.21			6.50	2.96			.370	6.15	3.14			6.62	3.07			6.07	3.12	.040	.020		
Boredom	4.83	2.60			5.37	2.68			.010	4.78	2.62			5.36	2.63			4.50	2.56	.003	< .001		
Affect regulation	13.08	5.72			14.24	5.77			.010	13.12	5.79			13.96	5.60			12.33	5.71	.040	< .001		
<i>χ</i> ² Tests																							
Gender									.050												.010		
Male			238	38.3			60	30.5				198	38.5			95	32.5			155	40.5	134	32.6
Female			384	61.7			137	69.5				316	61.5			197	67.5			228	59.5	277	67.4
Ethnicity									.130														.004
Other			59	9.5			25	12.7				49	9.5			31	10.6			52	13.6	31	7.5
Non-Hispanic white			563	90.5			172	87.3				465	90.5			261	89.4			331	86.4	380	92.5
Parent education									.010														.520
< Bachelor's degree			386	62.1			140	71.4				321	62.5			197	67.7			245	64.1	264	64.2
Bachelor's degree			236	37.9			56	28.6				193	37.5			94	32.3			137	35.9	147	35.8
Ready to quit, 30 days									.290														< .001
No			430	70.4			142	72.8				357	70.8			208	72.0			246	65.6	311	76.6
Yes			181	29.6			53	27.2				147	29.2			81	28.0			129	34.4	95	23.4
Perceived harm									.020														.130
No			253	40.9			64	32.5				211	41.2			100	34.4			155	40.7	150	36.6
Yes			366	59.1			133	67.5				301	58.8			191	65.6			226	59.3	260	63.4
Depressive symptoms									< .001														.070