Published in final edited form as:

Am J Prev Med. 2009 May ; 36(5): 389–394.e2. doi:10.1016/j.amepre.2009.01.028.

Young Adult Smoking Behavior:

A National Survey

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Abstract

Background—Young adults have the highest smoking rate of any age group in the U.S., and new strategies to decrease young adult smoking are needed. The objective of the current study was to identify psychographic and demographic factors associated with current smoking and quitting behaviors among young adults.

Methods—Attitudes, social groups, and self-descriptors, including supporting action against the tobacco industry, advertising receptivity, depression, alcohol use, and other factors associated with smoking were tested for associations with smoking behaviors in a 2005 cross-sectional survey of 1528 young adults (aged 18–25 years) from a web-enabled panel. Analyses were conducted in 2007.

Results—Being older was associated with current smoking, whereas having some higher education and being African American or Hispanic were negatively associated with smoking. Supporting action against the tobacco industry was negatively associated with smoking (AOR=0.34 [95% CI=0.22, 0.52]). Perceived usefulness of smoking, exposure to smokers, increased perceived smoking prevalence, receptivity to tobacco advertising, binge drinking, and exposure to tobacco advertising in bars and clubs were associated with smoking. Supporting action against the tobacco industry was associated with intentions to quit smoking (AOR= 4.43 [95% CI=2.18, 8.60]).

Conclusions—Young adults are vulnerable to tobacco-industry advertising. Media campaigns that denormalize the tobacco industry and appeal to young adults appear to be a powerful intervention to decrease young adult smoking.

Introduction

Smoking prevention efforts have almost entirely concentrated on primary prevention in adolescents aged ≤ 18 years despite the fact that young adults (aged 18–24 years) have long been a top priority for the tobacco industry.^{1–6} Smoking prevention efforts aimed at both adolescents and those aged >18 years are important because the process of smoking initiation takes several years, extending well into young adulthood.^{7–10} Many adolescent experimenters

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No financial disclosures were reported by the authors of this paper.

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and occasional smokers either quit smoking or progress to addiction as young adults.^{1,11–13} Social and nondaily smoking patterns are common among young adults,^{14–18} so not all of them progress to addiction, but a substantial proportion of the young adult population remains at risk for future smoking.^{19,20} Recent data suggest that at least 20% of smokers became regular smokers as young adults.¹³ Because public health research on young adult smoking is relatively new, little is known about what strategies will successfully counter tobacco-industry marketing campaigns aimed at young adults.

One promising strategy is the “tobacco industry denormalization”^{21,22} approach, pioneered by the CA Department of Health Services,²³ which educates the public about the deceptive practices of the tobacco industry in order to motivate action against smoking and to increase the relevance of tobacco issues. Industry denormalization, the core strategy of the truth[®] campaign in Florida,^{24,25} and nationally,^{26–29} is associated with reduced adolescent smoking. Attitudes associated with exposure to tobacco-industry denormalization media campaigns were negatively associated with smoking behavior among young adults, and they were positively associated with intentions to quit smoking among young adult smokers in CA.³⁰ The generalizability of this result remains open to question because CA had a media campaign in place for over a decade (one that included tobacco-industry denormalization messages) at the time of the current study, so one could question whether these results would generalize to the young adult population in the U.S. as a whole. The current study uses a national sample to examine whether the CA results generalize. These results are that attitudes associated with tobacco-industry denormalization are negatively associated with smoking and positively associated with intentions to quit among young adult smokers.

Methods

A cross-sectional survey of 1528 young adults (aged 18–25 years) was conducted using a web-enabled panel maintained by the research group Knowledge Networks. The web-enabled panel members were recruited from a random digit-dialing sample of the U.S. population and provided with free Internet access in exchange for completing surveys. The panel closely tracks U.S. population demographics, attitudes, and behaviors, and it is comparable to random digit dialing surveys.³¹ Because of the recruitment and “payment” procedures, the panel includes people without ready access to the Internet and is more likely to represent the population than voluntary Internet samples.³¹ The smoking rate in the panel in 2002 was 24.7%, comparable to the 23.2% adult smoking prevalence in the 2002 National Health Interview Survey. Panel members aged 18–25 years were recruited for the current study; of 1669 requests, 1325 completed surveys (79.3% response rate). In addition, 203 former Knowledge Networks panel members aged 18–25 years were recruited to achieve the desired sample size of 1500. All surveys were completed via the Internet between September and November 2005; analyses were completed in 2007.

Measures

Smoking behavior—Because young adults are at the transition point between adolescence and adulthood, two measures of current smoking were used: the adult definition of current smokers (have smoked ≥ 100 cigarettes in their lifetime and now smoke cigarettes either every day or on some days) and the youth definition (have smoked ≥ 1 cigarette in the past 30 days). Among current smokers by the adult definition, intention to quit smoking was defined as responding that they intended to quit smoking within the next 6 months. Having made a serious quit attempt was defined as having quit for ≥ 1 month during the past year.

Independent variables—Four items measuring attitudes associated with exposure to tobacco-industry denormalization campaigns were adapted from the Legacy Media Tracking

Survey.²⁶ Questions were adapted from marketing research conducted by the tobacco industry, 1,2,30,32 including 11 questions from an R.J. Reynolds segmentation study measuring attitudes about smoking and secondhand smoke,³³ and 37 measures from a Philip Morris young adult segmentation study.³⁴ Six items from the Impulsive Sensation Seeking Scale from the Zukerman–Kuhlman Personality Questionnaire were integrated with the personality questions from the tobacco-industry survey.³⁵ Questions on exposure to smokers, exposure to tobacco advertising, depression, and advertising receptivity were included, as described previously.³⁰ Binge drinking was measured by asking how often respondents had ≥ 5 alcoholic drinks on one occasion. Perceived prevalence of smoking was measured by respondents' estimates of how many people their age smoke. See Appendix A (available online at www.ajpm-online.net) for more information on these measures.

Statistical Analysis

Exploratory factor analysis and scoring—Because of the large number of independent variables, preliminary factor analyses were performed on attitudes about smoking, future goals, personality characteristics, exposure to smokers, and depression, in order to reduce the data. Factors with eigenvalues >1 were selected, and within each factor, items with factor loadings >0.70 were selected for scoring. For each factor, the average score on the 5-point Likert scale for all included items was calculated to create scores to maximize generalizability and consistency.³⁶ Logit plots were created to examine whether a linear relationship between each score and the logit of smoking in the past 30 days was present. If the relationship was linear, the variable was treated as a continuous predictor in subsequent analyses. If the relationship was not linear, scores were recoded into categoric or binary variables based on the distribution of the data and the logit plot.

Factor analysis yielded one factor that contained three items that matched the measure of “supporting action against the tobacco industry” in the current CA study.³⁰ The fourth item in the CA study: *NOT smoking is a way to express independence*, had a factor loading of only 0.412, so this item was not included in the score in the present study. The score was recoded as a binary item with an average score of ≥ 4 on the Likert scale coded as 1 and average scores <4 coded as zero. The same process was used to determine factors and scores for the other sets of questions related to smoking attitudes, personality, and future priorities (see Appendix A, available online at www.ajpm-online.net).

Regressions—Bivariate logistic regression was used to determine the relationships between the variables in Appendix A and demographic variables in order to predict current smoking (using both adult and teen definitions, $n=1528$). The current smokers (by adult definition, $n=455$) were analyzed to determine factors associated with intention to quit and having made a serious quit attempt.

Predictors with a bivariate association with smoking outcomes with $p<0.25$ were entered into multivariate logistic regression models.³⁷ In multivariate analyses, predictors with $p>0.05$ were eliminated using backward stepwise logistic regression, except for the demographic factors that were forced into all models (age, gender, race/ethnicity, education, marital status, income). All data were weighted with post-stratification weights so that estimates would be generalizable to the national population of young adults. All analyses were performed using SPSS version 14.0.

Results

In all, 28.9% of young adults surveyed were current smokers by the adult definition, and 30.8% were current smokers by the teen definition. The sample was 50% male, 62% non-Hispanic white, 18% Hispanic, 14% non-Hispanic African American, and 7% non-Hispanic other race/

ethnicity or two or more races/ethnicities. High school or less was the education level for 51.5% of respondents. Most (80%) had never married. Of the 455 current smokers, 40% (181) reported that they intended to quit smoking in the next 6 months, and 29% (132) had made a serious quit attempt in the past year.

Logistic Regressions

Table 1 summarizes the relationships between predictor variables and both adult and teen definitions of smoking (data not shown for individual demographic variables). Supporting action against the tobacco industry was strongly negatively associated with current smoking as established by the adult definition (AOR=0.38 [95% CI=0.24, 0.60]) and the teen definition (AOR=0.31 [95% CI=0.20, 0.47]). Among demographics, being older was associated with current smoking, whereas having a bachelor's degree or more or being of African-American or Hispanic race/ethnicity were negatively associated with current smoking. Perceived smoking usefulness, exposure to smokers, increased perceived prevalence of smoking, receptivity to tobacco advertising, binge drinking, and exposure to tobacco advertising in bars were associated with current smoking.

Factors associated with lack of an intention to quit or not having made a serious quit attempt in the past year among the current smokers are summarized in Table 2. Supporting action against the tobacco industry was strongly associated with intentions to quit smoking (AOR=4.43 [95% CI=2.18, 8.60]; reverse outcome reported in Table 2) but not with having made a serious quit attempt in the past year. Among demographics, being male or in one of the higher income categories was associated with greater intention to quit but not with actual quitting behavior. Both having higher income and being of Hispanic ethnicity were associated with having made a quit attempt. Being of African-American race was associated with greater intent to quit but not with quitting behavior in multivariate analyses. Advertising receptivity, exposure to smokers, and —being hip were all associated with a lack of intent to quit smoking. Exposure to smokers, materialism, assertiveness, and exposure to tobacco advertising in bars were negatively associated with serious quit attempts.

Discussion

This study is limited by the fact that it used a panel sample of young adults in the U.S., which may differ from a random national sample of young adults in unmeasured ways. However, random digit-dialing methods are increasingly less effective at reaching young adults for many reasons. For example, in 2008, the Harris Poll found that over one third of young adults aged 18–29 years reported using only a cell phone or the Internet for all phone calls (http://www.harrisinteractive.com/harris_poll/index.asp?PID=890). The smaller size of the current smoking subgroup may have limited the ability to detect significant associations with quitting behavior. Interactions were not included in the current analysis because none were hypothesized in the literature; future studies should consider theory-driven interactions. The study is limited by its cross-sectional design; the observed associations do not prove causality between the measured attitudes and smoking behavior.

This study provides confirmation in a national sample of CA results³⁰ that supporting action against the tobacco industry, as reflected by agreement with the statements: *Taking a stand against smoking is important to me*; *I would like to see cigarette companies go out of business*; and *I want to be involved with efforts to get rid of cigarette smoking* is negatively associated with current smoking and positively associated with intentions to quit smoking. Tobacco-industry denormalization campaigns have been shown to decrease youth smoking in several studies.^{21,24,38–40} The current results suggest that denormalization media campaigns, such as the national truth campaign,^{26–29} may also be associated with young adult smoking behavior. An association between these attitudes and having made a serious past quit

attempt was not observed. Whether intentions to quit smoking in the future result in actual cessation should be investigated prospectively.

Several other factors associated with young adult smoking behavior were identified. Consistent with other studies,^{41–44} exposure to smokers (family members, friends, coworkers, and social contacts) was strongly associated with current smoking and negatively associated with quitting intention and attempts among young adults. Tobacco-industry marketing strategies that attempt to create smoker-friendly social environments, through activities such as bar promotions,^{1,3–6,18,20,30,45} exploit this vulnerability. Young adult homes, workplaces, and social environments are also important venues for public health interventions to decrease smoking uptake and to promote cessation. Countermarketing campaigns that decrease the social acceptability of smoking may directly address the effects of smoker-friendly social environments created by tobacco marketing.

Our data support the conclusion that young adults continue to be vulnerable to the effects of tobacco advertising.²⁰ Receptivity to tobacco advertising was associated with current smoking and negatively associated with intent to quit smoking. Exposure to tobacco advertising in bars was associated with current smoking and having not made a serious quit attempt, independent of alcohol use. Advertising restrictions, such as those in the 1998 Master Settlement Agreement,⁴⁶ contain loopholes that allow advertising in “adult-only” venues, exempting most tobacco-industry bar promotions, which expanded rapidly in the 1990s.^{5,47} Attendance at “adults only” promotional events is associated with young adult smoking behavior.⁴ The current results highlight the importance of bars and clubs as venues for recruitment of new smokers and promotion of regular smoking.

Attitudes attesting to the usefulness of smoking either as a social lubricant or as a means to reduce stress were strongly associated with current smoking but not with quitting. It may be that believing smoking is useful is more important in promoting smoking uptake than in deterring quitting. In contrast, some factors associated with personality types and general attitudes were significantly associated with quitting intentions and quitting behavior, but not with current smoking, and should be explored further.

Conclusion

This study demonstrates a strong association between attitudes reflecting tobacco-industry denormalization and smoking behavior among young adults. In addition, exposure to smokers and advertising is associated with young adult smoking and quitting behavior. Strong anti-tobacco media campaigns that denormalize tobacco may be useful interventions to decrease young adult smoking. Tobacco policies such as advertising restrictions should take into account not only the protection of youth but also the recruitment of new smokers through advertising to young adults. Social environments such as bars and clubs are important venues for public health efforts to address young adult smoking.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

This work was supported by the Flight Attendant Medical Research Institute and National Cancer Institute Grant CA-87472. The sponsors played no role in the conduct of the research or preparation of the manuscript.

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Table 1

Associations with current smoking behavior, all respondents N=1528

Variable	Established current smoking (adult definition) OR (95% CI)		Current smoking (past 30 days) OR (95% CI)	
	Unadjusted	Adjusted ^a	Unadjusted	Adjusted
Smoking attitudes				
Supporting action against tobacco industry	0.20 (0.15, 0.27) ***	0.38 (0.24, 0.60) ***	0.19 (0.14, 0.25) ***	0.31 (0.20, 0.47) ***
Smoking usefulness	5.70 (4.73, 6.87) ***	4.81 (3.82, 6.07) ***	4.91 (4.14, 5.83) ***	3.68 (3.02, 4.49) ***
SHS danger to nonsmokers	0.31 (0.25, 0.39) ***		0.29 (0.23, 0.36) ***	0.74 (0.53, 1.05)
Advertising receptivity	2.79 (2.41, 3.22) ***	1.59 (1.32, 1.92) ***	2.50 (2.18, 2.87) ***	1.41 (1.19, 1.67) ***
Exposure to smokers scale	6.21 (4.95, 7.80) ***	2.65 (1.92, 3.67) ***	5.11 (4.12, 6.33) ***	2.23 (1.64, 3.03) ***
Depressed mood	1.66 (1.32, 2.10) ***	0.70 (0.48, 1.03)	1.88 (1.49, 2.37) ***	
Personality factors				
Sensation seeking	1.22 (1.15, 1.29) ***		1.23 (1.16, 1.30) ***	
Gender equity	1.00 (0.80, 1.25)		1.00 (0.80, 1.24)	
Materialism	1.08 (0.83, 1.40)		1.16 (0.90, 1.51)	
Assertiveness	1.09 (0.86, 1.38)		1.01 (0.80, 1.27)	
Attention seeking	0.95 (0.75, 1.21)		1.13 (0.89, 1.44)	
Easy spender	1.38 (1.18, 1.62) ***		1.53 (1.31, 1.79) ***	
Stressed	1.35 (1.20, 1.53) ***		1.43 (1.26, 1.62) ***	
General attitudes				
Future security important	1.30 (1.02, 1.64) *		1.28 (1.01, 1.61) *	
Being hip important	1.41 (1.11, 1.78) **		1.63 (1.30, 2.06) ***	
Parenting/marriage important	0.91 (0.73, 1.13)		1.09 (0.87, 1.35)	
Binge drinking	1.78 (1.60, 1.97) ***	1.26 (1.07, 1.48) **	1.87 (1.68, 2.07) ***	1.41 (1.21, 1.65) ***
Exposed to advertising in bars	1.33 (1.22, 1.45) ***	1.16 (1.01, 1.33) *	1.38 (1.26, 1.50) ***	1.21 (1.06, 1.38) **
Perceived prevalence of smoking	1.30 (1.24, 1.37) ***	1.20 (1.11, 1.31) ***	1.24 (1.18, 1.30) ***	1.10 (1.02, 1.19) *

^a All multivariate models also included age, education, race/ethnicity, gender, marital status, and income* $p < 0.05$;** $p < 0.01$;

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Table 2
Quitting behavior among current smokers (by adult definition), N=451

Variable	No intention to quit OR (95% CI)		No serious quit attempt in past year OR (95% CI)	
	Unadjusted	Adjusted ^d	Unadjusted	Adjusted
Smoking attitudes				
Supporting action against tobacco industry	0.24 (0.14, 0.43) ***	0.23 (0.12, 0.46) ***	0.94 (0.53, 1.65)	
Smoking usefulness	1.07 (0.84, 1.37)		1.28 (0.98, 1.65)	
SHS danger to nonsmokers	0.67 (0.46, 0.99) *		0.79 (0.52, 1.19)	
Advertising receptivity	1.57 (1.24, 1.99) ***	1.52 (1.15, 2.00) **	1.57 (1.24, 2.00) ***	
Exposure to smokers scale	2.14 (1.51, 3.04) ***	2.15 (1.38, 3.33) **	2.99 (1.99, 4.48) ***	1.33 (1.00, 1.77) ***
Depressed mood	0.77 (0.52, 1.14)		1.11 (0.73, 1.69)	3.54 (2.17, 5.77) ***
Personality factors				
Sensation seeking	1.14 (1.03, 1.26) **		1.03 (0.93, 1.15)	
Gender equity	0.94 (0.64, 1.37)		1.32 (0.88, 1.99)	
Materialism	1.17 (0.74, 1.83)		1.71 (1.01, 2.87) *	2.64 (1.33, 5.24) **
Assertiveness	0.63 (0.43, 0.94) *		1.67 (1.06, 2.62) *	2.02 (1.14, 3.56) *
Attention seeking	0.93 (0.62, 1.41)		1.07 (0.68, 1.68)	
Easy spender	0.96 (0.74, 1.24)		1.04 (0.79, 1.37)	
Stressed	1.00 (0.82, 1.23)		1.08 (0.86, 1.34)	
General attitudes				
Future security important	0.53 (0.36, 0.79) **	0.56 (0.33, 0.93) *	1.75 (1.11, 2.74) *	
Being hip important	1.23 (0.83, 1.84)	1.86 (1.08, 3.21) *	0.66 (0.43, 0.997) *	0.40 (0.23, 0.69) **
Parenting/marriage important	0.69 (0.47, 1.01)		1.16 (0.77, 1.74)	
Binge drinking	1.19 (1.004, 1.41) *	1.25 (1.00, 1.56)	1.01 (0.84, 1.21)	
Exposed to advertising in bars	1.10 (0.96, 1.27)		1.23 (1.04, 1.44) *	1.28 (1.05, 1.57) *
Perceived prevalence of smoking	1.00 (0.92, 1.10)		1.08 (0.98, 1.19)	

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$

^a All multivariate models also included age, education, race/ethnicity, gender, marital status, and income