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The Influence of the Social Environment on Youth Smoking Status

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Abstract

Objective—Youth smoking is complex with multilevel influences. While much is known about certain levels of influence on youth smoking, the lack of focus on institutional influences is notable. This study evaluated the effects of ambient smoking attitudes and behaviors in schools on individual youth smoking.

Method—Data from the 2012 Florida Youth Tobacco Survey (n=67,460) were analyzed. Multinomial logistic regression was used to investigate individual and aggregated school-level factors that were associated with a youth being classified as a “susceptible nonsmoker” (SN) or “current smoker” (CS) relative to a “non-susceptible nonsmoker” (NN).

Results—The aggregated percentage of regular smokers at a school, ambient school level positive smoking perceptions, and the standardized difference between individual and school-level positive smoking perceptions were statistically significant in the fully adjusted model. We also found an increased risk of being a SN relative to a NN for Hispanic youth. Moreover, our approach to modeling institutional-level factors raised the pseudo r-squared from 0.05 to 0.14.

Conclusion—These findings suggest the importance of ambient smoking attitudes and behaviors on youth smoking. Prevention efforts affecting ambient smoking attitudes may be beneficial.

Introduction

Youth cigarette smoking continues to be an important public health concern in the United States (Centers for Disease Control and Prevention, 2010; U.S. Department of Health and Human Services, 2014). Youth smoking is complex with multilevel influences impacting the likelihood that an individual youth will smoke. An extensive literature exists for many of the levels of influence identified by the ecological model of health behavior (Glanz et al, 2002) and youth smoking status. For example, intrapersonal attitudes and behaviors (Carvajal et

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al., 2000; Conrad et al., 1992; Flay et al., 1998; Lopez et al., 2010), peer and family influence as a function of interpersonal processes and primary groups (Bauman et al., 2001; Clark et al., 1999; Gritz et al., 2003; Kegler et al., 2002; Landrine et al., 1994), neighborhood and built environment influences as community factors (Goldade et al., 2012; Pickett and Pearl, 2001), and public policy initiatives to increase taxes on tobacco products (Lando et al., 2005), ban indoor smoking (Siegel et al., 2008), and restrict advertising and point of sale purchases of tobacco products to minors (DiFranza et al., 2006; Gostin, Amo, & Brandt, 1997; Kessler et al., 1996; Willemsen & deZwart, 1999) have all shown direct influence on youth smoking. However, the lack of focus on institutional influences, particularly the influence of the school environment, on youth smoking is a notable exception to this otherwise extensive body of work.

The institutional influence of the school environment on susceptibility to youth risk behaviors, like smoking, is particularly important given the proportion of waking hours adolescents spend at school (Flannery, Williams and Vazsonyi, 1999; Fuller & Clarke, 1994; Stewart, 2008). Although studies have examined the effect of perceived peer attitudes and behaviors on youth smoking (Maxwell, 2002; Prinstein, Boergers, and Spirito, 2001; Urberg et al., 1990), we found no studies exploring the effect of the school environment via the aggregate attitudes and behaviors of students who may or may not be friends with a focal respondent.

The school environment can influence smoking through passive exposure social attitudes and behaviors regarding smoking. Positive social attitudes regarding smoking can be expressed in two main ways by either direct or indirect endorsements of smoking behavior (Nosek, 2007; Petty & Brinol, 2006). Direct endorsement of smoking behavior could be captured by engaging in smoking with or without expressing pro-smoking attitudes (i.e. the act of smoking provides advertisement of the behavior). Conversely, indirect endorsement of smoking behavior would be captured by expressing pro-smoking attitudes with or without engaging in smoking behaviors (Huijding et al., 2005). It is possible that one or both mechanisms affect youth smoking status.

This study addresses the relative dearth of knowledge about how the school environment affects youth smoking. Specifically, we examined the following research questions: (1) Does exposure to explicit peer smoking influence youth smoking status? We predict that youth smoking status will vary by the percentage of smokers in the focal respondent's school net of individual demographic characteristics. Second, does exposure to peer attitudes regarding social benefits of smoking influence youth smoking status? We predict that youth smoking status will vary as a function of differences in exposure to positive social perceptions regarding smoking in the school environment. Further, we predict that this effect will increase after adjusting for the difference between individual and aggregate implicit positive social perceptions regarding smoking in the school environment.

Materials and Methods

Data from the 2012 Florida Youth Tobacco Survey (FYTS) were analyzed. The Florida Youth Tobacco Survey is a school-based survey administered annually by the Florida

Department of Health. The sample includes students across the state of Florida in middle (38,989 students) and high schools (36,439 students), using a two-stage cluster probability design. The complex sampling design included a random sampling of public middle and high schools across the state and random sampling of classrooms selected within each selected school. All students clustered in the selected classrooms were invited to participate in the survey. Data were collected from 66 counties in Florida, with two counties excluded due to unrepresentative sampling or abstention. The overall survey response rate for middle schools was 77 percent, and the overall survey response rate for high schools was 73 percent (accessed March 5, 2015 <http://www.floridahealth.gov/statistics-and-data/survey-data/fl-youth-tobacco-survey/index.html>).

Individual level variables

Individual level variables included both demographic variables and a measure for in-home smoking. Demographic variables included participant age in years, race/ethnicity, sex (male =1; female =0), type of housing (single family home=0; apartment/trailer/etc.= 1), and a measure of attending a school located in non-metro/rural area according to the U.S. Department of Agriculture Economic Research Service Rural-Urban Continuum Code (rural =1; urban=0). The options for race/ethnicity included non-Hispanic White, non-Hispanic Black, Hispanic, Asian or Pacific Islander, and American Indian or other race. We also included a dichotomous measure of in-home smoking to assess smoking by at least one other individual in the respondent's home (yes=1, no=0).

Focal Independent Variables: Scaled Individual and School-Level Characteristics

The key independent variables in the full analysis were: (1) the percentage of students in the focal respondent's school who reported ever smoking regularly and (2) the standardized difference between individual and school-level positive smoking attitudes. The two focal independent variables included the percentage of students in the respondent's school who indicated ever smoking regularly and the average aggregate positive smoking attitudes in the respondent's school. The positive smoking attitude questions included three measures assessing whether youth believed that young people who smoke: “have more friends,” “look cool or fit in,” and “feel more comfortable at parties.” These questions were asked on a 4-point scale with higher values indicating more positive agreement with these statements ($\alpha=0.68$).

Given the variation in the difference between individual and school level positive smoking attitudes (Equation 1), we standardized these scores to have a mean of zero and a standard deviation of one to compare across youths and schools (Equation 2). The resulting score from Equation 2 is used in the fully adjusted model analysis (Model 3).

Equation 1: Difference between individual and school level positive smoking perceptions

$$diff_{ij} = \left(attitudes_{student_i} - \bar{x}_{attitudes_{school_j}} \right)$$

Equation 2: Standardized difference between individual and school level positive smoking perceptions

$$\delta_z = \frac{\text{diff}_{ij} - \bar{x}_{\text{diff}_{ij}}}{se_{\text{diff}_{ij}}}$$

This measurement strategy builds upon the method used by Hatzenbuehler and colleagues (2014) and scales for the relative difference between individual attitudes and the ambient level of attitudes surrounding the focal individual. This strategy enables analyses across two levels without necessitating nested models while also scaling for the relative effects of personal implicit attitudes to aggregate values.

Our other focal independent variable is the school-level average of the percentage of students in the respondent's school who reported ever smoking regularly (i.e. - responding "Yes" to "Have you ever smoked cigarettes daily, that is, at least one cigarette every day for 30 days?"). Using this measurement, a one-unit increase is equivalent to a 1% increase in the percentage of students in the focal respondent's school who have ever smoked regularly.

Two school-level control variables were also created and include the percentage of students who had been exposed to anti-smoking ads on at least 10 days in the past month and the percentage of students who reported getting mostly A's in school.

Dependent Variable

Youth smoking status was the main outcome of this study. Youth smoking status was measured as a three-level categorical variable. Each respondent was categorized as a current smoker (CS, n=6,108), a susceptible nonsmoker (SN, n=17,607), or a non-susceptible nonsmoker (NN, n=43,745). Current smokers were defined as individuals who had smoked in the past month. Susceptible nonsmokers were respondents who indicated they would either be smoking within the next year; they would be smoking within the next 5 years, or would smoke if given a cigarette by a friend. Non-susceptible nonsmokers included youth who responded "definitely not" to all three susceptibility questions and were not current smokers. Respondents who reported a prior history of smoking, but who were not currently smoking, were excluded from the present analysis (n=650; 0.9%) These former smokers did not comprise a large enough group for comparative analyses.

Statistical Analyses

Weighted multinomial logistic regression analyses were used to assess the relative likelihood of each level of smoking status given the same set of predictors. Due to the large sample size and relatively low amount of missing data (<5% per item), we limited our analyses to respondents with complete information through listwise deletion. The final analytic sample included 68,110 respondents. All analyses were weighted to account for the complex survey design.

Three models were examined. The outcome for each model was the individual smoking status variable. The first model included the individual demographic characteristics and in-

home smoking variable (Model 1). The second model included the school-level variables only (Model 2). The final, fully adjusted, model (Model 3) combined the variables in Models 1 and 2, as well the standardized difference between individual and school level average positive social perceptions about smoking.

Results

Table 1 includes the weighted means for all variables in the full sample and by smoking status. Current smokers were significantly different from both non-susceptible nonsmokers and susceptible nonsmokers by age (slightly older), sex (more males), race (higher proportion NH White, lower proportion NH Black), housing type (fewer residing in single family homes), rural residency (more rural), and higher rates of in-home smoking. Current smokers were also more likely to come from schools with a higher percentage of ever smokers, higher average positive smoking perceptions, and higher values on the standardized difference in perceptions measure. Among the two groups of nonsmokers, susceptible nonsmokers were more likely to be Hispanic, less likely to be NH Black, more likely to have a smoker in the home, and have higher values on the standardized difference in perceptions measure than non-susceptible nonsmokers.

Demographics Model

SN vs. NN. In the demographics only model (Model 1; Table 2), increased age (AOR=1.03, $p<0.001$), male gender (AOR=1.09, $p<0.001$), and in-home smoking (AOR=1.70, $p<0.001$), increased the likelihood of being a susceptible nonsmoker (SN) relative to a non-susceptible nonsmoker (NN). The relationship between race/ethnicity and smoking status for SNs, relative to NN, was more complicated with decreased risk for NH Blacks (AOR=0.76, $p<0.001$) and Asian or Pacific Islanders (AOR=0.75, $p<0.001$), but increased risk for Hispanic youth (AOR=1.26, $p<0.001$) compared to NH Whites. American Indian and other race individuals did not differ from NH White youth.

CS vs. NN. As seen with SN in the demographics only model, increased age (AOR=1.40, $p<0.001$), male gender (AOR=1.28, $p<0.001$), and in-home smoking (AOR=3.37, $p<0.001$), increased the likelihood of being a current smoker (CS) relative to a non-susceptible nonsmoker (NN). However, additional effects were seen for both living in a non-single family home (AOR=1.62, $p<0.001$) and living in a rural area (AOR=1.43, $p<0.001$), which increased the likelihood of being a CS relative to a NN. Unlike with SN, Hispanics (AOR=0.86, $p<0.05$), NH Blacks (AOR=0.40, $p<0.001$), and Asian or Pacific Islanders (AOR=0.61, $p<0.001$) were all less likely to be CS relative to NN. American Indian and other race individuals did not differ from NH White youth.

The demographics only model explained 5.07% of the variance in smoking status.

School-Level Model

In the school-level variable model (Model 2), the average positive social perception of smoking (AOR=3.33, $p<0.001$) increased the odds of being an SN versus a NN. Both the average positive social perception of smoking (AOR=6.80, $p<0.001$) and the percentage of

students who had ever been regular smokers in the focal respondent's school (AOR=1.11, $p<0.001$) increased the risk of being a CS relative to a NN.

The school-level model explained 2.31% of the variance in smoking status.

Full Model

SN vs. NN. In the fully adjusted model (Model 3), increased age (AOR=1.03, $p<0.001$), male gender (AOR=1.08, $p<0.05$), and in-home smoking (AOR=1.55, $p<0.001$), increased the likelihood of being a susceptible nonsmoker (SN) relative to a non-susceptible nonsmoker (NN). NH Blacks (AOR=0.64, $p<0.001$) and Asian or Pacific Islanders (AOR=0.69, $p<0.001$) were less likely to be SN, while Hispanic youth (AOR=1.19, $p<0.001$) were more likely to be SN than NH Whites relative to NN. American Indian and other race individuals did not differ from NH White youth. Moreover, in the fully adjusted model, the percentage of ever smokers in the focal respondent's school (AOR=1.01, $p<0.05$) increased the likelihood of being a SN relative to an NN. Further, increased values for the standardized difference between individual and school-level positive social perceptions of smoking (AOR=2.11, $p<0.001$) strongly increased the likelihood of being a SN relative to an NN.

CS vs. NN. As seen with SN in the fully adjusted model, increased age (AOR=1.32, $p<0.001$), male gender (AOR=1.17, $p<0.01$), and in-home smoking (AOR=2.90, $p<0.001$), increased the likelihood of being a current smoker (CS) relative to a non-susceptible nonsmoker (NN). Like the demographics model, additional effects were seen for both living in a non-single family home (AOR=1.58 $p<0.001$) and living in a rural area (AOR=1.18, $p<0.01$) increasing the likelihood of being a CS relative to a NN. Unlike the demographics model for SN, Hispanics no longer differ from NH Whites in the fully adjusted model. However, NH Blacks (AOR=0.35, $p<0.001$), and Asian or Pacific Islanders (AOR=0.53, $p<0.001$) were still less likely to be CS relative to NN. American Indian and other race individuals did not differ from NH White youth. Moreover, the percentage of ever smokers in the focal respondent's school (AOR=1.08, $p<0.001$) increased the likelihood of being a CS relative to an NN in the fully adjusted model. Further, increased values for the standardized difference between individual and school level positive social perceptions of smoking sharply increased (AOR=3.00, $p<0.001$) the likelihood of being a CS relative to an NN.

The fully adjusted model explained 13.78% of the variance in smoking status.

Discussion and Conclusion

The purpose of this paper was to address how the institutional effects of social attitudes about smoking and smoking behavior at the school-level affect individual youth smoking status. This paper adds to the literature in three important ways. First, this paper demonstrates that pro-smoking attitudes and behaviors at the institutional level in the social environment are important and can strongly influence youth smoking status above and beyond individual factors. Second, we find that endorsements of pro-smoking attitudes have particularly increased effects for Hispanic youth with regard to being susceptible non-

smokers. Finally, this paper introduces a novel way of modeling institutional effects by scaling the differences between individual attitudes and behaviors with aggregate measures of attitudes and behaviors in order to model individual outcomes influenced by the social environment within institutions. Taken together, these findings suggest that the effects of aggregated attitudes and behaviors towards smoking may be useful in explaining some variation in youth smoking status influenced by social environments within institutions.

Our study adds to the extensive work on multilevel influences on youth smoking. Our study is the first to extend the multilevel influences on youth smoking literature to include school-level institutional factors as well. With this modeling strategy, it is possible to model effects at each of the levels of influence in the ecological model of health behavior (Glanz et al, 2002). We encourage future scholars to use this method to extend our findings both with regard to predicting youth smoking status and to modeling the ecological model of health behavior in other contexts.

Limitations

The contributions of this study must be viewed in light of its limitations. The most notable limitation involves the generalizability of the study. Although this study used a large sample of racially and ethnically diverse youths in the state of Florida, it is possible that the patterns observed may not be generalizable to youth in other states, or nationally. The methods used in this study could be used in large nationally representative samples of youth (e.g., National Youth Tobacco Survey) to generalize outside the state of Florida.

Although our modeling strategy allowed us to model the ambient institutional effects of the school environment, by lacking respondent friend nominations within and across schools we were unable to disentangle the effects of attitudes and behaviors of peers that are friends (chosen friends) from those who are non-friend peers (schoolmates that may not be friends). Peer assignment to schools is nonrandom based on socioeconomic and geographic factors that may alter the impact of peer effects due to differences in possible peer networks. Additionally, recent work by Angrist (2014) highlights the challenges of attributing peer effects in non-experimental data. Although we lack an experimental setting, we believe that our model examines reasonable associations by using the standardized difference between individual and school-level positive smoking perceptions while controlling for several individual and school-level contributing factors that influence smoking. Future research with studies that include responses of students clustered in schools and peer nominations of friends should attempt to tease out the distinction between interpersonal processes (influence of peer-friends) and institutional factors (influence of non-friend peers in the school environment) both in and outside of experimental settings. Despite these limitations, this is the first known study to employ this method to model the ambient institutional effects of the school environment on youth smoking status.

Conclusion

In sum, both pro-smoking attitudes and behaviors in the social environment are important institutional factors that can influence youth smoking status. We find that these effects hold while controlling for both individual and school-level characteristics. Future research should

focus on more comprehensively gauging the institutional effects of attitudes and behaviors within youth social environments to best target prevention and cessation strategies for at-risk youth.

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References

- Angrist JD. The perils of peer effects. *Labour Economics*. 2014; 30:98–108.
- Bauman KE, Carver K, Gleiter K. Trends in parent and friend influence during adolescence: the case of adolescent cigarette smoking. *Addictive behaviors*. 2001; 26(3):349–361. [PubMed: 11436927]
- Carvajal SC, Wiatrek DE, Evans RI, Knee CR, Nash SG. Psychosocial determinants of the onset and escalation of smoking: cross-sectional and prospective findings in multiethnic middle school samples. *Journal of adolescent health*. 2000; 27(4):255–265. [PubMed: 11008088]
- Centers for Disease Control and Prevention (CDC). US Department of Health and Human Services, Public Health Service, CDC. Atlanta, GA: 2010. 2010 National Adult Tobacco Survey Methodology Report.
- Clark PI, Scarisbrick-Hauser A, Gautam SP, Wirk SJ. Anti-tobacco socialization in homes of African-American and white parents, and smoking and nonsmoking parents. *Journal of Adolescent Health*. 1999; 24(5):329–339. [PubMed: 10331839]
- Conrad KM, Flay BR, Hill D. Why children start smoking cigarettes: predictors of onset. *British journal of addiction*. 1992; 87(12):1711–1724. [PubMed: 1490085]
- DiFranza JR, Wellman RJ, Sargent JD, Weitzman M, Hipple BJ, Winickoff JP. Tobacco promotion and the initiation of tobacco use: assessing the evidence for causality. *Pediatrics*. 2006; 117(6):e1237–e1248. [PubMed: 16740823]
- Flannery DJ, Williams LL, Vazsonyi AT. Who are they with and what are they doing? Delinquent behavior, substance use, and early adolescents' after-school time. *American Journal of Orthopsychiatry*. 1999; 69(2):247. [PubMed: 10234390]
- Flay BR, Phil D, Hu FB, Richardson J. Psychosocial predictors of different stages of cigarette smoking among high school students. *Preventive medicine*. 1998; 27(5):A9–A18. [PubMed: 9808813]
- Fuller B, Clarke P. Raising school effects while ignoring culture? Local conditions and the influence of classroom tools, rules, and pedagogy. *Review of educational research*. 1994; 64(1):119–157.
- Glanz, K.; Rimer, B.; Lewis, FM. *Theory, Research and Practice*. 3rd edn. Jossey-Bass; San Francisco: 2002. Health behavior and health education.
- Goldade K, Choi K, Bernat DH, Klein EG, Okuyemi KS, Forster J. Multilevel predictors of smoking initiation among adolescents: findings from the Minnesota Adolescent Community Cohort (MACC) study. *Preventive medicine*. 2012; 54(3):242–246. [PubMed: 22245269]
- Gostin LO, Arno PS, Brandt AM. FDA regulation of tobacco advertising and youth smoking: historical, social, and constitutional perspectives. *JAMA*. 1997; 277(5):410–418. [PubMed: 9010174]
- Gritz ER, Prokhorov AV, Hudmon KS, Jones MM, Rosenblum C, Chang CC, de Moor C. Predictors of susceptibility to smoking and ever smoking: a longitudinal study in a triethnic sample of adolescents. *Nicotine & Tobacco Research*. 2003; 5(4):493–506. [PubMed: 12959787]
- Hatzenbuehler ML, Bellatorre A, Lee Y, Finch BK, Muennig P, Fiscella K. Structural stigma and all-cause mortality in sexual minority populations. *Social Science & Medicine*. 2014; 103:33–41. [PubMed: 23830012]

- Huijding J, de Jong PJ, Wiers RW, Verkooijen K. Implicit and explicit attitudes toward smoking in a smoking and a nonsmoking setting. *Addictive behaviors*. 2005; 30(5):949–961. [PubMed: 15893091]
- Kegler MC, McCormick L, Crawford M, Allen P, Spigner C, Ureda J. An exploration of family influences on smoking among ethnically diverse adolescents. *Health education & behavior*. 2002; 29(4):473–490. [PubMed: 12137240]
- Kessler DA, Witt AM, Barnett PS, Zeller MR, Natanblut SL, Wilkenfeld JP, Schultz WB. The Food and Drug Administration's regulation of tobacco products. *New England Journal of Medicine*. 1996; 335(13):988–994. [PubMed: 8782508]
- Lando HA, Borrelli B, Klein LC, Waverley LP, Stillman FA, Kassel JD, Warner KE. The landscape in global tobacco control research: a guide to gaining a foothold. *American Journal of Public Health*. 2005; 95(6):939. [PubMed: 15914813]
- Landrine H, Richardson JL, Klonoff EA, Flay B. Cultural diversity in the predictors of adolescent cigarette smoking: the relative influence of peers. *Journal of behavioral medicine*. 1994; 17(3): 331–346. [PubMed: 7932684]
- Lopez B, Huang S, Wang W, Prado G, Brown CH, Zeng G, Pantin H. Intrapersonal and ecodevelopmental factors associated with smoking in Hispanic adolescents. *Journal of Child and Family Studies*. 2010; 19(4):492–503.
- Maxwell KA. Friends: The role of peer influence across adolescent risk behaviors. *Journal of Youth and adolescence*. 2002; 31(4):267–277.
- Nosek BA. Implicit–explicit relations. *Current Directions in Psychological Science*. 2007; 16(2):65–69.
- Petty, RE.; Brinol, P. A metacognitive approach to “implicit” and “explicit” evaluations: Comment on Gawronski and Bodenhausen. 2006.
- Pickett KE, Pearl M. Multilevel analyses of neighbourhood socioeconomic context and health outcomes: a critical review. *Journal of epidemiology and community health*. 2001; 55(2):111–122. [PubMed: 11154250]
- Prinstein MJ, Boergers J, Spirito A. Adolescents' and their friends' health-risk behavior: Factors that alter or add to peer influence. *Journal of pediatric psychology*. 2001; 26(5):287–298. [PubMed: 11390571]
- Siegel M, Albers AB, Cheng DM, Hamilton WL, Biener L. Local restaurant smoking regulations and the adolescent smoking initiation process: results of a multilevel contextual analysis among Massachusetts youth. *Archives of pediatrics & adolescent medicine*. 2008; 162(5):477–483. [PubMed: 18458195]
- Stewart EB. School structural characteristics, student effort, peer associations, and parental involvement the influence of school-and individual-level factors on academic Achievement. *Education and Urban Society*. 2008; 40(2):179–204.
- Urberg KA, Shyu SJ, Liang J. Peer influence in adolescent cigarette smoking. *Addictive behaviors*. 1990; 15(3):247–255. [PubMed: 2378284]
- US Department of Health and Human Services. The health consequences of smoking—50 years of progress: A report of the surgeon general. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; Atlanta, GA: 2014. p. 17
- Willemsen MC, de Zwart WM. The effectiveness of policy and health education strategies for reducing adolescent smoking: a review of the evidence. *Journal of adolescence*. 1999; 22(5):587–599. [PubMed: 10527530]

Highlights

- Pro-smoking attitudes and behaviors in the social environment are important institutional factors that can strongly influence youth smoking status.
- Ambient school-level attitudes and behaviors predict youth smoking susceptibility net of individual factors.
- Hispanic youth have increased risk of being susceptible nonsmokers relative to non-susceptible nonsmokers compared to non-Hispanic White youth.

Table 1

Weighted Means or Percentages of Individual and School Level Predictors of Youth Smoking Status

	Full Sample	Non-susceptible Nonsmoker	Susceptible Nonsmoker	Current Smoker	P-Value
<i>Demographics</i>					
Age at Interview	14.66	14.52	14.63	15.86	0.000
Male	50%	49%	51%	55%	0.000
Female	50%	51%	49%	45%	0.000
Non-Hispanic White	45%	44%	45%	55%	0.000
Non-Hispanic Black	21%	24%	18%	12%	0.000
Hispanic	28%	26%	32%	28%	0.000
Asian or Pacific Islander	2%	2%	2%	2%	0.000
American Indian or Other Race	4%	3%	4%	4%	0.001
Doesn't Live in a Single Family House	34%	32%	34%	42%	0.000
Rural	6%	6%	6%	10%	0.000
<i>Smoking in the Home</i>					
In-Home Family Smoking	30%	25%	36%	54%	0.000
<i>School-Level Predictors^e</i>					
Percentage of Students Who Have Ever Smoked Regularly	4.79%	4.51%	4.74%	7.30%	0.000
Average Positive Social Perception of Smoking Score	1.88	1.87	1.89	1.93	0.000
Percentage High Exposure to Anti-Smoking Ads	29.28%	29.26%	29.20%	29.63%	0.000
Percentage of Students Who Get Mostly A's	31.84%	32.16%	31.45%	30.48%	0.000
<i>Difference between Personal & School-Level Attitudes</i>					
Standardized Difference between Individual and School Positive Smoking Perception	-0.01	-0.26	0.39	0.77	0.000
N	67,460	43,745	17,607	6,108	
Weighted Percentage of Sample	100.00%	66.59%	25.04%	8.37%	

Notes:^a NN refers to non-susceptible nonsmokers;^a SN refers to susceptible nonsmokers;^c CS refers to current smokers;^d values with “%” indicate percentages, all other values represent means;^e School-level predictors are listed at the aggregate level for the school that the respondent attends;^f p-values of differences in means or proportions obtained by F-tests (means) or Chi-squared tests (proportions)

Table 2

Predictors of Smoking Susceptibility and Current Smoking Relative to (Non-susceptible) Nonsmokers, Adjusted Odds Ratios and 95% Confidence Intervals Reported

	Susceptible Nonsmoker			Current Smoker		
	Demographics Model 1	School-Level Model 2	Full Model Model 3	Demographics Model 1	School-Level Model 2	Full Model Model 3
<i>Demographics and In-Home Smoking</i>						
Age at Interview	1.03 (1.02,1.05)		1.03 (1.01,1.05)	1.40 (1.37,1.44)		1.32 (1.28,1.37)
Male	1.09 (1.04,1.15)		1.08 (1.02,1.14)	1.28 (1.16,1.40)		1.17 (1.06,1.30)
Non-Hispanic Black	0.76 (0.71,0.83)		0.64 (0.59,0.70)	0.40 (0.34,0.48)		0.35 (0.29,0.42)
Hispanic	1.26 (1.18,1.35)		1.19 (1.11,1.28)	0.86 (0.76,0.97)		0.89 (0.78,1.00)
Asian or Pacific Islander	0.75 (0.66,0.86)		0.69 (0.60,0.80)	0.61 (0.47,0.79)		0.53 (0.40,0.72)
American Indian or Other Race	1.09 (0.97,1.21)		0.98 (0.88,1.11)	1.03 (0.87,1.22)		0.92 (0.76,1.11)
Doesn't Live in a Single Family House	1.06 (0.99,1.13)		1.04 (0.97,1.11)	1.62 (1.48,1.77)		1.58 (1.44,1.74)
In-Home Family Smoking	1.70 (1.60,1.80)		1.55 (1.45,1.65)	3.37 (3.09,3.67)		2.90 (2.64,3.20)
Rural	1.06 (0.99,1.13)		1.05 (0.97,1.13)	1.43 (1.29,1.59)		1.18 (1.04,1.33)
<i>School-Level Variables</i>						
Percentage of Students Who Have Ever Smoked Regularly		1.00 (0.99,1.00)	1.01 (1.00,1.02)	1.11 (1.10,1.12)		1.08 (1.07,1.10)
Average Positive Social Perception of Smoking Score		3.33 (2.52,4.42)		6.80 (4.20,11.02)		
Percentage High Exposure to Anti-Smoking Ads		1.00 (1.00,1.00)	1.00 (0.99,1.00)	1.00 (1.00,1.01)		1.00 (0.99,1.01)
Percentage of Students Who Get Mostly A's		1.00 (1.00,1.00)	1.00 (0.99,1.00)	1.00 (1.00,1.00)		1.00 (0.99,1.00)
<i>Difference between Personal & School-Level Attitudes</i>						
Standardized Difference between Individual and School Positive Smoking Perception			2.11 (2.04,2.18)			3.00 (2.85,3.17)
F-Statistic	124.86	115.06	159.85	124.86	115.06	159.85
F Degrees of Freedom	(18, 665)	(8, 675)	(26, 657)	(18, 665)	(8, 675)	(26, 657)
P-Value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R-Squared	0.0507	0.0231	0.1378	0.0507	0.0231	0.1378

Notes:

^a School-level predictors are listed at the aggregate level for the school that the respondent attends;

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Standardized difference calculated by subtracting school average positive social perceptions of smoking score from individual score then standardizing the difference relative to the whole sample.;

Effects with $p < 0.05$ significance appear in bold