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Short Communication

Peer, parent and media influences on adolescent smoking by developmental stage

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ABSTRACT

Previous studies of social influences on adolescent smoking have focused on peers and parents, using data collected prior the 1998 Master Settlement Agreement. This study used the 2004 wave of the National Youth Tobacco Survey to examine associations between peer smoking, smoking at home, tobacco-related media exposure, and smoking behavior during early and middle adolescence. Findings indicate that peer smoking and smoking at home remain strongly associated with current smoking among early and middle adolescents, controlling for gender, race/ethnicity and exposure to tobacco industry and anti-tobacco media. The magnitude of the association between peer smoking and current smoking decreases from early adolescence to middle adolescence while the association between smoking at home and current smoking is static across developmental stage. Exposure to tobacco-related media is associated with increased current and former smoking in both early and middle adolescence.

1. Introduction

Approximately 80% of tobacco use begins in adolescence (Centers for Disease Control and Prevention, 2007), a developmental stage encompassing physical, psychological, and cognitive growth in the transition from childhood to adulthood (Smetana, Campione-Barr, & Metzger, 2006). National studies (Centers for Disease Control and Prevention, 2006; Marshall et al., 2006) identify salient periods of tobacco use in early adolescence (ages 10 to 13) and middle adolescence (ages 14 to 17) which map to the social contexts of middle school and high school.

Primary socialization theory posits that adolescents learn normative and deviant behavior from three main sources: family, school, and peers (Oetting & Donnermeyer, 1998). Peer influence is a consistent predictor of smoking onset among adolescents (Abroms, Simons-Morton, Haynie, & Chen, 2005; Bauman & Ennett, 1996; Chassin, Presson, Sherman, Corty, & Olshavsky, 1984b; Conrad, Flay, & Hill, 1992; Simons-Morton, Chen, Abroms, & Haynie, 2004) and smoking initiation among adolescents has been described as a "prevalence-driven" behavior (Rowe, Chassin, Presson, Edwards, & Sherman, 1992) whereby an adolescent's perception of smoking prevalence among his or her friends is more highly correlated with his or her own smoking than the actual prevalence of smoking (Bauman & Ennett, 1996). Studies indicate that parental influence remains important while peer influence on smoking appears to increase during adolescence (Bauman, Carver, & Gleiter, 2001; Chassin, Presson, Montello, Sherman, & McGrew, 1986; Chassin, Presson, & Sherman, 1984a). Few studies address the influence of schools on adolescent smoking (Kobus, 2003), though school bonding and success or failure in school may affect the selection of peer groups and their influence on smoking behavior (Kelly & Donohew, 1999).

Media can also serve as an important normative influence on adolescent behavior (Arnett, 1995; Kelly & Donohew, 1999; Wakefield, Flay, Nichter, & Giovino, 2003). Tobacco advertising and smoking in movies, magazines and other media increase positive attitudes about smoking, intention to smoke, and smoking initiation among youth (Sargent et al., 2005; Wakefield et al., 2003; Wellman, Sugarman, DiFranza, & Winickoff, 2006). Anti-tobacco media efforts have also been shown to be effective in reducing smoking among adolescents, specifically younger adolescents (Farrelly et al., 2002; Farrelly, Niederdeppe, & Yarsevich, 2003; Wakefield et al., 2003).

Currently, there are few studies of the magnitude of normative influences on smoking across adolescent age or developmental stage (Bauman et al., 2001; Chassin et al., 1986; Krosnick & Judd, 1982; Wang, Fitzhugh, Westerfield, & Eddy, 1995). Cross-sectional studies have found that peer influence on adolescent smoking increases across age while parent influence remains constant (Chassin et al., 1986; Krosnick & Judd, 1982). Longitudinal studies report no significant change in the magnitude of peer and parental influence on smoking behavior across grade or age (Bauman et al., 2001; Chassin et al., 1986). These studies do not directly address the developmental periods that distinguish adolescent research (Smetana et al., 2006) which may map better to changes in adolescent socialization (Oetting, 1999). In addition, they fail to control for the normative influence of media and rely on data collected prior to the

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1998 Master Settlement Agreement (MSA), which restricted tobacco industry marketing to American youth (Daynard, Parmet, Kelder, & Davidson, 2001).

This study uses data from the 2004 National Youth Tobacco Survey (Centers for Disease Control and Prevention, 2004) to estimate associations between peer smoking, smoking at home, exposure to tobacco-related media and current and former smoking behavior in early adolescence and middle adolescence.

2. Methods

The National Youth Tobacco Survey (NYTS) is a self-administered survey of U.S. middle and high school students in the fifty states and the District of Columbia that provides estimates of current tobacco use among youth; the survey design, sampling, and results from the 2004 NYTS have been described elsewhere (Bloch et al., 2005). The 2004 wave of the NYTS was conducted at 267 schools in the spring semester of 2004 with a response rate of 88%; the full survey sample included 27,933 respondents aged 9 to 21 years and data were weighted to provide nationally-representative estimates (Bloch et al., 2005).

2.1. Participants

The current analysis includes 22,111 students aged 10–17 years who provided complete data on demographics, smoking behavior, peer smoking, smoking at home, and exposure to tobacco-related media; this represents 85% of the sample of students aged 10–17 years. Respondents over the age of 18 were excluded, as the legal ability to purchase cigarettes may alter normative influences on smoking behavior. Demographic characteristics and socializing influences of the respondents are displayed in Table 1.

Table 1
Demographic characteristics of NYTS 2004 (n = 22,111).

	Prevalence	(95% CI)
Gender		
Male	47.87	(46.54–49.20)
Female	52.11	(50.78–53.45)
Age group		
Early adolescence (10–13 years)	37.52	(33.22–41.82)
Middle adolescence (14–17 years)	62.48	(58.18–66.78)
Race/ethnicity		
White	69.20	(64.87–73.53)
Black	14.66	(11.33–17.99)
Hispanic	5.32	(3.89–6.76)
Other race[a]	10.82	(9.52–12.12)
Number of four closest friends who smoke		
0 or not sure	67.39	(65.35–69.44)
1	11.97	(11.34–12.60)
2	8.58	(7.94–9.21)
3	5.05	(4.56–5.54)
4	7.01	(6.16–7.87)
Smoking at home		
No	60.17	(58.03–62.30)
Yes	39.83	(37.70–41.97)
Smoking status		
Never	65.87	(63.39–68.36)
Former	20.13	(18.91–21.36)
Current	13.99	(12.44–15.55)
	Mean	(95% CI)
Exposure to tobacco advertising		
Range: 0–14	7.54	(7.42–7.66)
Exposure to anti-tobacco media		
Range: 0–20	5.48	(5.35–5.62)

[a] Includes American Indian or Alaska Natives, Asians and Native Hawaiian or Other Pacific Islanders, as well as individuals who selected more than one race/ethnicity.

2.2. Measurement

2.2.1. Smoking behavior

Smoking behavior was assessed using two items from the 2004 NYTS measuring lifetime cigarette use and the number of cigarettes smoked in the past 30 days. Current smokers were defined as ever smokers (>1 puff in their entire life) who had smoked cigarettes on one or more of the preceding 30 days. Former smokers were defined as ever smokers (>1 puff in their entire life) who had not smoked on any of the preceding 30 days. The reference group, never smokers, was defined as individuals who had smoked 0 cigarettes in their entire life and had not smoked on any of the preceding 30 days.

2.2.2. Demographics

Age was coded to correspond to two developmental stages of adolescence described in the literature: ages 10–13 years were grouped as early adolescents and 14–17 years were grouped as middle adolescents (Smetana et al., 2006). Gender was treated as a dichotomous variable (0 = male, 1 = female). Race/ethnicity was coded as an indicator variable with 4 categories: "white," "black or African American," "Hispanic," and "other race." White was considered the reference group for race categories. "Other race" included American Indian or Alaska Natives, Asians and Native Hawaiian or Other Pacific Islanders, as well as individuals who selected more than one race/ethnicity.

2.2.3. Peer smoking

The primary exposure was peer smoking, measured by the respondent's report of the number of his or her four closest friends who smoke (0–4). Peer smoking was treated as a continuous variable and the response of "Not sure" was treated as having zero friends who smoke.

2.2.4. Smoking at home

Others smoking at home was considered a proxy for parent smoking and was assessed using the question "Does anyone who lives with you now smoke cigarettes?"; the variable was binary, with the reference group being "no."

2.2.5. Exposure to tobacco-related media

Media exposure to tobacco advertising was coded as an index of four survey items related to television, movies, internet, and in-store marketing. These survey items had 3 or 4 response categories (e.g., 0 = no exposure; 4 = high exposure). The resulting index for exposure to tobacco advertising had a range of 0–14. Media exposure to anti-smoking messages was coded as an index of five items related to television, radio, internet, billboards and signs, and print media. Again, these survey items had 3 or 4 response categories (e.g., 0 = no exposure; 4 = high exposure). The resulting index for exposure to anti-smoking media messages had a range of 0–20. Participants with index scores in the top quartile of these measures were categorized as having high exposure to these media; for tobacco advertising, this translated to having a score greater than 10 and for anti-smoking messages, a score greater than 8.

2.3. Analyses

Statistical analyses to account for data weighting by primary sampling unit and sampling stratum were conducted using survey commands in STATA, version 10 (www.stata.com). List-wise deletion was used to achieve a sample with complete data. Odds ratios for peer smoking, demographic variables, and other socialization influences were calculated using bivariate and multivariate logistic regression models for the outcomes current smoking and former smoking compared to never smoking (data available upon request). Multinomial multivariate logistic regression models were used to calculate