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Exposure to pro-tobacco messages and smoking status among Mexican origin youth

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Abstract

Introduction—Though several studies have found a positive relationship between exposure to tobacco advertising and/or promotional marketing and smoking status among youth, few have examined these relationships specifically for youth of Mexican origin. The current analysis examines the relationship between perceived exposure to pro-tobacco messages and progression through the smoking continuum from trying to repeated use in a cohort of Mexican origin youth ages 14 to 19.

Methods—Data were collected via personal in-home interviews at two time points – in 2008-09 and 2010-11 (N=942). Smoking status, exposure to pro-tobacco messages from five major media sources, demographic variables and established risk factors for adolescent smoking were measured at both waves. Data were analyzed using Pearson's chi-square tests, ANOVA, and multinomial logistic regression.

Results—Adolescent perception of the number of pro-tobacco messages seen in 2008-09 was unrelated to smoking less than one cigarette assessed in 2010-11. However, having seen a higher number of pro-tobacco messages was significantly associated with being more likely to have smoked more than one cigarette (OR=1.21; 95% CI: 1.03-1.42) controlling for demographic factors and known psychosocial risk factors of smoking behavior.

Conclusion—Results suggest that the more pro-tobacco messages Mexican origin youth are able to recall, the further their progression through the smoking trajectory a year later. These youth are clearly susceptible to pro-tobacco messaging, and our results underscore the need to restrict all forms of messaging that promote tobacco use.

Introduction

Cigarette smoking continues to be the number one cause of preventable death in the United States (U.S. Department of Health and Human Services [DHHS], 2012) and the tobacco

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Declaration of Interests

None declared.

industry relies heavily on marketing and advertising to expand and maintain its market share of smokers. In 2006 alone, the tobacco industry spent \$12.5 billion (Federal Trade Commission, 2009) on advertising, marketing, and promotional campaigns designed to encourage people to use tobacco, including \$0.3 billion on advertising in newspapers, magazines, and billboards at point of purchase. Although the Family Smoking Prevention and Tobacco Control Act of 2009 prevents the tobacco industry from directly marketing to youth, exposure to tobacco related advertising, as well as the use of the media to create positive images of tobacco product use, remains an important risk factor for smoking initiation among adolescents and young adults (U.S. DHHS, 2012).

Though there is a large body of literature examining tobacco messaging and smoking status among youth, only a handful of studies have examined these relationships over time (Lovato, Watts, & Stead, 2011). Existing longitudinal studies have examined the impact of exposure to advertising in magazines, billboards, other print advertisement, television, radio, and advertising in retail outlets among youth who have not tried cigarettes at baseline. These studies suggest that earlier exposure to pro-tobacco messaging is associated with both increased cognitive susceptibility to smoking (Gritz et al., 2003; Weiss et al., 2006) (a construct that combines peer influence with behavioral intentions (Pierce, Choi, Gilpin, Farkas, & Merritt, 1996), and a strong and valid marker for smoking initiation (Spelman et al., 2009), and smoking initiation (Gritz et al., 2003; Hanewinkel, Isensee, Sargent, & Morgenstern, 2011; Henriksen, Schleicher, Feighery, & Fortmann, 2010; Pucci & Siegel, 1999).

Even fewer studies have examined these relationships among Hispanic youth overtime. Gritz et al. (2003) reported an association between exposure to tobacco advertising and smoking initiation among a cohort of tri-ethnic adolescents (N=659). However, they did not find a significant relationship among the Hispanic adolescents in their sample (n=134). Though no other existing longitudinal study has specifically examined differences by ethnicity, Henriksen et al. (2010) noted that after controlling for the influence of exposure to tobacco advertising, Hispanic youth had higher odds of having initiated smoking at the 12 month follow-up as compared to their non-Hispanic peers.

Given that the tobacco industry specifically targets minority populations (Yerger, Przewoznik, & Malone, 2007), the current rapid growth of the Hispanic population in the US in general (Ennis, Ríos-Vargas, & Albert, 2011), and the Mexican origin population in particular (Ennis et al., 2011), the paucity of research examining the relationships among pro-tobacco marketing and smoking status among Hispanic youth is puzzling. Clearly, research in this area examining this underserved and understudied population is timely and warranted. To fill this important gap in the literature, we utilized longitudinal data to examine the relationship between self-report of exposure to pro-tobacco messages and progression through the smoking continuum from trying (i.e., having smoked less than a cigarette) to repeated use in a population of Mexican American youth ages 14 to 19. We addressed the following research question: Are the number of pro-tobacco messages Mexican origin youth report seeing earlier related to smoking status a year later, even after controlling for known demographic and psychosocial risk factors for smoking? We

hypothesized that increased exposure to pro-tobacco messages will be positively related to having smoked less than a cigarette and more than one cigarette a year later.

Methods

Participant Recruitment and Data Collection Procedures

Participants for the current study were recruited from an on-going population-based cohort of Mexican American households established by the Department of Epidemiology at The University of Texas M.D. Anderson Cancer Center in July 2001, known as the Mexican American Cohort Study (MACS). Initial recruitment into the MACS took place through probability random digit dialing, door-to-door recruitment, intercepts (e.g. community-based events such as health fairs and celebrations) and networking. A detailed description of the MACS data collection has been published elsewhere (Wilkinson et al., 2005).

In 2005-06, MACS households with age eligible adolescents (i.e. between the ages of 11 and 13) were identified, and parents or legal guardians were contacted to assess interest in participation in the Mexican American Tobacco Use in Children (MATCH) study. The central goal of MATCH was to examine non-genetic and genetic factors associated with smoking initiation. A total of 3000 MACS households were identified; of the first 1,425 potential households contacted, just over 90% agreed to allow their child to participate in the study (N=1,328). In households with two or more eligible children, the child with the most recent birthday was selected for enrollment into the study.

Survey data were collected via personal interviews that took place in the family home. In addition, at the end of the baseline interview, all participants provided a saliva sample to be used for genotyping. Several steps were taken to ensure that the participants were able to fully understand the survey. We developed and extensively pre-tested the survey in both Spanish and English. Based on pre-testing we revised the survey language to make it easier to understand and developed a glossary of words, available in both English and Spanish, that the participants referred to while completing the survey. Two bilingual trained interviewers went to participant homes. While one interviewer conversed with the parent (typically the mother), the other sat with the adolescent to answer questions if they arose. After a brief personal interview in which acculturation and demographic data were collected, the adolescents were given a personal digital assistant (PDA) to complete a survey in order to assure confidentiality of their responses from their parents. A detailed description of MATCH data collection procedures has been published (Wilkinson et al., 2008). The IRB at UT MD Anderson approved all aspects of this study.

Of the 1,328 participants who enrolled in the study at baseline (wave 1), 1,154 (87%) participated in wave 2, and 1,000 (75%) participated in wave 3. The data utilized here were drawn from adolescents participating in waves 2 (2008-09) and 3 (2010-11) of MATCH. Of these 1,000 adolescents, 35 were excluded from analyses because they reported that they had quit smoking, and another 23 were excluded because they were missing data on parental educational status. Thus, full data were available on a total of 942 participants, all of whom were included in the analyses.

Measures

Smoking status—The main outcome of interest was coded as a three level variable based on responses to the Minnesota Smoking Index (Pechacek et al., 1984) where participants report their smoking experience on a 12-point scale ranging from 0 (never tried) to 12 (quit more than 12 months ago). Participants who reported that they had never tried cigarettes formed the first level called “never tried,” those who reported having a puff or more but less than a whole cigarette formed the second level called “less than a cigarette,” and participants who reported having smoked more than one cigarette (occasionally, monthly, and weekly) were placed in the third level called “more than one cigarette”.

Tobacco advertising exposure—Exposure to pro-tobacco messages from five major media sources (billboards, television ads and/or shows, radio ads and/or programs, posters, and newspapers and/or magazine ads) was assessed through the following item “During the last month have you seen or heard messages that are FOR SMOKING on any of the following? The item was based on a measure developed by Murray, Prokhorov, and Harty (1994). Amount of exposure was determined by summing the number of media sources adolescents’ checked in response to this question, with scores ranging from 0 to 5. Exposure to anti-tobacco messages from five major media sources (billboards, television ads and/or shows, radio ads and/or programs, posters, and newspapers and/or magazine ads) was assessed through the following item “During the last month have you seen or heard messages that are AGAINST SMOKING on any of the following? The item was based on a measure developed by Murray, Prokhorov, and Harty (1994). Amount of exposure was determined by summing the number of media sources adolescents’ checked in response to this question, and scored as none (no exposure) or some (at least one).

Covariates—We controlled for several demographic variables associated with smoking behavior, as well as several established predictors of adolescent smoking behaviors. Demographic variables included age, gender, country of birth (either USA or Mexico), and socioeconomic status (SES). Age was entered as continuous variable, female served as the reference category for gender, and Mexico served as the reference category for country of birth. SES was assessed as the highest level of parental education attained and divided into three categories: less than high school, high school, and more than high school, with more than high school serving as the reference category.

Household smoking was based on the number of household members with whom the participant currently lives and who smoke, and was coded as a three level variable: none, one, or two or more, with none serving as the reference category. The influence of friend smoking was assessed through the question, “How many of your three closest friends smoke?” and coded as none or some, with none serving as the reference category. Positive outcome expectations from smoking (Dalton, Sargent, Beach, Bernhardt, & Stevens, 1999) were assessed through seven items related to perceived social and functional benefits associated with smoking, such as “I think smoking would make me look more mature.” We assessed one aspect of sensation seeking – drug and alcohol seeking – using a seven-item subscale from the Sensation Seeking Scale for Children (Russo et al., 1993), in which participants were asked to choose the option on each question that most describes how they

feel, for instance “a) I would like to try marijuana” or “b) I would never smoke marijuana.” Subjective social status was measured using the MacArthur Scale of Subjective Social Status adapted for adolescents (Goodman et al., 2001). Higher scores on the three scales reflect higher levels of positive outcome expectations, drug and alcohol seeking behavior, and perceived subjective social status, respectively.

Statistical analysis

Pearson’s chi-square tests were conducted to examine the associations between smoking status and the categorical variables, including gender, age, country of birth, parental educational attainment, and peer and household smoking. Analyses of variance (ANOVAs) were conducted to examine mean differences by smoking status in subjective social status, expectations of positive outcomes from smoking, drug and alcohol sensation seeking, and our main exposure of interest, number of pro-tobacco media messages noted, by smoking status (Table 1). We conducted Pearson chi-square tests and ANOVAs as appropriate to evaluate differences in the covariates and smoking status by number of pro-tobacco media messages reported (Table 2). In order to examine the relationship between earlier exposure to pro-tobacco media messages and later smoking status, we conducted multinomial logistic regression controlling for all covariates of interest and controlling for exposure to anti-tobacco messages, with “never tried” serving as the reference category to which “less than one cigarette” and “more than one cigarette” were compared (Table 3). Alpha was set at a 0.05 level.

Results

Results related to the question of whether demographic and psychosocial characteristics differ according to Mexican origin youths smoking status are presented in Table 1. Of the participants, 667 (70.8%) were identified as never smokers, 151 (16.0%) as having ever smoked less than one cigarette, and 124 (13.2%) as having smoked more than one cigarette. Young women were more likely to have never smoked than young men (75.5% vs. 65.5%), and young men were more likely to have smoked more than one cigarette than young women (18.3% vs. 8.5%; $p<0.001$). Smoking status also varied significantly by age. A higher percentage of the youngest participants reported never smoking compared to their older peers. The percentage reporting experience with smoking cigarettes (both having smoked less than one cigarette and more than one cigarette) increased as age increased ($p<0.001$). Youth who reported that none of their friends smoked were significantly more likely to have never smoked than youth who reported at least one friend who smoked (76.5% vs. 46.7%; $p<0.001$), and participants who reported having at least one friend who smoked were more likely to have smoked less than one cigarette (20.6% vs. 15.0%) and more than one cigarette (32.8% vs. 8.5%) compared to youth with no friends who smoked. Likewise, higher percentages of youth who live with a smoker reported experience with smoking compared to youth who do not live with a smoker ($p<0.001$). Mean levels of subjective social status decreased significantly as the amount of smoking increased ($F=21.24$ ($df=2,939$) $p<0.001$). In contrast, mean levels of positive outcome expectations ($F=63.99$ ($df=2,939$)) and drug and alcohol seeking behaviors ($F=79.01$ ($df=2,939$)) both increased as the amount of smoking increased ($p<0.001$ for both). As expected, the mean number of pro-

tobacco messages the participants reported also increased as the amount of smoking increased ($p<0.001$). There were no significant differences in smoking status among Mexican origin youth based on country of birth or parental education.

Results relevant to the question of whether the number of pro-tobacco messages Mexican origin youth report seeing is related to differences in demographic characteristics, psychosocial characteristics, or smoking status are presented in Table 2. Thirty-three percent of these youth reported seeing no pro-tobacco messages in any media type, 26% reported seeing messages in one type of media, 17% reported seeing pro-tobacco messages in two types of media, 14% reported seeing messages in three types of media, and 9% reported seeing pro-tobacco messages in four or more types of media. Youth with no smoking friends reported seeing pro-tobacco messages in the least number of media types, while youth with at least one friend who smoked reported seeing pro-tobacco messages in the most number of media types ($p=0.004$). Participants with a higher mean subjective social status recalled the least pro-tobacco message outlets ($F=2.39$ ($df=4,937$) $p=0.049$). Higher mean positive outcome expectations from smoking were significantly associated with having seen more pro-tobacco messages ($F=5.57$ ($df=4,937$) $p<0.001$), as were higher mean drug and alcohol seeking behaviors ($F=3.84$ ($df=4,937$) $p=0.004$). Smoking status showed significant trends: the percentage of never smokers decreased as the number of pro-tobacco messages increased and percentages of smokers (i.e. those who had less than one cigarette and those who had more than one cigarette) increased as the number of pro-tobacco messages increased ($p=0.003$). There were no significant differences by gender, age, country of birth, parental education, or number of household smokers in youth for the number of pro-tobacco messages reported.

Table 3 presents the multinomial regression analysis of smoking status, pro-tobacco messaging, and the covariates. Inconsistent with our hypothesis, pro-tobacco messaging was not associated with having smoked less than a cigarette. However, consistent with our hypothesis, seeing a greater number of pro-tobacco media messages across the different media types earlier was associated with an increased likelihood of smoking more than one cigarette a year later ($OR=1.21$; 95% CI: 1.03-1.42). After adjusting for the child's country of birth and the parent's educational attainment, only age, having one household member who smoked, and drug and alcohol seeking (DAS) behaviors were significant among participants who had smoked less than one cigarette ($OR_{age}=1.37$; 95% CI: 1.15-1.62; $OR_{household}=1.95$; 95% CI: 1.16-3.30; $OR_{DAS}=1.28$; 95% CI: 1.11-1.46). In the case of youth who smoked more than one cigarette, all variables except for having two or more household members who smoked were significant after adjusting for country of birth and parent's educational attainment. Males were more likely than females to have smoked more than one cigarette ($OR=1.85$; 95% CI: 1.17-2.92) and older participants were more likely to have smoked more than one cigarette as well ($OR=1.69$; 95% CI: 1.36-2.10). Participants who had at least one friend who smoked were more likely to have smoked more than one cigarette than those who did not ($OR=2.38$; 95% CI: 1.44-3.92). Similarly, participants who had one household member who smoked were more likely to have smoked more than one cigarette than those that had none ($OR=2.30$; 95% CI: 1.26-4.20). Participants with a higher mean subjective social status were less likely to have smoked more than one cigarette ($OR=0.86$; 95% CI: 0.74-0.99), while those with higher mean outcome expectations were

more likely to have smoked more than one cigarette (OR=2.57; 95% CI: 1.59-4.17). Participants with higher mean drug and alcohol seeking behaviors were also more likely to have smoked more than one cigarette (OR=1.35; 95% CI: 1.16-1.57).

Discussion

Unlike previous studies (Gritz et al., 2003; Hanewinkel et al., 2011; Henriksen et al., 2010; Pucci & Siegel, 1999), we did not observe an association between the number of pro-tobacco messages seen in 2008-09 and the first step in the smoking trajectory – having a puff or two, but less than a whole cigarette – assessed a year later. However, we found a robust association between earlier viewing of pro-tobacco messages and smoking more than one cigarette a year later. Even after controlling for several demographic correlates of smoking behavior, several established psychosocial risk factors, as well as exposure to anti-messages, this odds-ratio remained significant. This suggests that recalled exposure to pro-tobacco messages among Mexican origin youth is an important risk factor for repeated tobacco use over time in its own right. Our finding is consistent with existing research examining receptivity to tobacco marketing (Sargent, Gibson, & Heatherton, 2009), which is assessed by the willingness to own products used for tobacco marketing, rather than perceived exposure to pro-tobacco messaging.

Our findings refine our understanding of the relationship between pro-tobacco messaging and tobacco use among Mexican origin youth. In previous studies (Gritz et al., 2003; Hanewinkel et al., 2011; Henriksen et al., 2010; Pucci & Siegel, 1999; Weiss et al., 2006), the definition of non-smokers was consistent across studies, yet the smoking experience of those included in the initiated group was quite broad, encompassing those who had smoked a puff or two as well as regular daily smokers. This may obscure the relationship between exposure to pro-tobacco messages and the various stages in the smoking trajectory, i.e. from intermittent experimenting with cigarettes to regular tobacco use. Our results suggest that for Mexican origin youth at least, exposure to pro-tobacco images, or the ability to recall such exposure, may not impact the decision to try a cigarette for the first time. Rather, being cognizant of pro-tobacco messages, similar to owning or wanting to own tobacco promotional items (Sargent et al., 2009), is associated with continued use of cigarettes and progression toward becoming an established smoker. Pro-tobacco messaging and advertising appears to meet the goal among Mexican origin youth, serving as a cue, reminder, and prompt to those who have tried cigarettes.

It is important to note that these findings held even when we controlled for several risk factors associated with cigarette experimentation, including positive outcome expectations (Dalton et al., 1999; Spelman et al., 2009), subjective social status (Finkelstein, Kubzansky, & Goodman, 2006; Wilkinson, Shete et al., 2009), peer influence (U.S. DHHS, 2012; Wilkinson, Spitz et al., 2009) and family influence (Chalela, Velez, & Ramirez, 2007; Spelman et al., 2009), and sensation seeking tendencies (Adachi-Mejia, Carlos, Berke, Tanski, & Sargent, 2012; Wilkinson et al., 2012). Regardless, the direct association between increasing levels of exposure to pro-tobacco messages in 2008-09 and the progression through the smoking trajectory in 2010-11 was maintained, underscoring the robustness of the impact of pro-tobacco messages on smoking behavior. In the fully adjusted model, the

odds ratio for pro-tobacco messages is 1.22 (95% CI: 1.04-1.43; $p < 0.05$), while in the model in which we adjust for the demographic factors only (gender, age, country of birth and SES), the odds ratio for pro-tobacco messages is 1.33 (95% CI: 1.16-1.53; data not shown). The insignificant change in odds ratios between the two models suggests that the relationship between pro-tobacco messaging and smoking behavior is independent of other established risk factors.

Though we examined potential interactions between sensation seeking tendencies and pro-tobacco messaging, as well as between positive outcome expectations and pro-tobacco messaging, neither was significant. Additional research is needed to gain a better understanding of the psychosocial processes involved. For example, adolescents are generally grappling with developmental tasks related to identity development—who they are, who they want to become, what their values are, etc. (Erikson, 1968; Vandewater, Ostrove & Stewart, 1997). Pro-tobacco messaging is known for portraying smokers as people whom a young person may well want to emulate (attractive, glamorous, high status, sexy, etc.) (Dalton et al, 2002). Thus, it is possible that identity development is importantly related to the attractiveness and influence of pro-tobacco messaging on youth. This, however, is a question that remains to be addressed in future research efforts.

Previous research (Gritz et al., 2003) that utilized a similar method to assess exposure to tobacco messages did not find an association between pro-tobacco messaging and either susceptibility to smoking or experimenting with cigarettes among Hispanics. Three factors may account for this difference. First, we modified the measure that Gritz et al. (2003) used to specifically probe about pro messages separately from anti messages. Accordingly our findings may reflect the relationship between pro-tobacco messaging and smoking behavior more clearly than studies that did not qualifying the nature of the messages.

Second, Gritz et al. (2003) examined the relationship among 134 Hispanic youth in Houston, TX, while the sample size utilized here was 942. Although the relationship between exposure to pro-tobacco messages and smoking status remained significant after adjusting for covariates, the size of the odds ratio (1.22) suggests a moderate to small effect size. Thus, the Gritz et al. (2003) study may simply have lacked power to detect a significant relationship.

Third, youth in our study reside in neighborhoods with at least 80 percent Hispanic residence according to census data (Wilkinson et al., 2005), whereas participants in the Gritz et al. (2003) study were drawn from all of Houston. Because advertisements in predominantly Hispanic areas are more likely to be in Spanish than are advertisements in areas with a more varied ethnic composition, it is possible that the pro-tobacco messages our participants were exposed to were in both English and Spanish, and as a result may have been more salient to the participants in our study.

Our study has several strengths. First, our sample came from a population-based cohort, representing an ethnically homogenous and predominantly low-income population of Mexican origin youth. As a largely understudied and underserved population, empirical findings based on this population are critically needed to expand and refine our knowledge

base. Furthermore, the psychosocial covariates were assessed with validated measures following a standardized protocol. Given the sensitive nature of some of the questions, it is also a strength that all data were collected using PDAs, which ensured that participants read and answered the questions without concern about their parents overhearing or seeing their responses. In addition because we controlled for exposure to anti-tobacco messages, our results present the influence of pro-tobacco messages on behavior, net anti-tobacco messages. A final strength of the study is its prospective design and the differentiation between different stages in the smoking trajectory.

Our study also has some limitations. For one, participants in our sample were all of Mexican origin, which hinders the generalizability to other demographic groups, including other Hispanic youth from different countries of origin. Furthermore, smoking behavior was assessed via self-report and not verified using biological samples. Smoking, therefore, may be underreported. However, the use of PDAs for data collection provided a secure non-invasive approach away from parental eyes for reporting purposes. Furthermore, evidence suggests that the validity of self-reported data tends to increase when participants believe biological samples may be requested (Murray, O'Connell, Schmid, & Perry, 1987), which was the case in our study.

In conclusion, among Mexican origin youth, we find that the more pro-tobacco messages youth are able to recall, the further their progression through the smoking trajectory a year later. Consistent with research that examines receptivity to tobacco marketing (Sargent et al., 2009), increased exposure to pro-tobacco messaging influences progression after initiation, serving as a cue to those who have experience with tobacco, potentially triggering the desire to smoke. Youth are clearly susceptible to pro-tobacco messaging, potentially identify with the positive and desirable images used to promote the products, and see tobacco as a means of achieving increased status or emulating the lifestyles depicted in the pro-tobacco messages and media. Furthermore, this increased exposure remains important in its own right, even after accounting for the sizable effects of other well known demographic and psychosocial risk factors. Our results add to the body of knowledge that underscore the need to better restrict all forms of messaging that promote tobacco use – be it in the form of an advert outside a retail location selling cigarettes, or in a TV show, radio show, or movie that depicts smokers in a positive light.

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Table 1

Demographic and psychosocial covariates by smoking status in 2010-11.

Variable	Smoking Status			p-value	Total N (%)
	Never N (%)	Less than one cigarette N (%)	More than one cigarette N (%)		
Total	667 (70.8%)	151 (16.0%)	124 (13.2%)		942 (100.0%)
Gender				<0.001	
Female	374 (75.6%)	79 (16.0%)	42 (8.5%)		495 (52.5%)
Male	293 (65.5%)	72 (16.1%)	82 (18.3%)		447 (47.5%)
Age in 2010-11				<0.001	
14	12 (92.3%)	1 (7.7%)	0 (0.0%)		13 (1.4%)
15	108 (85.0%)	12 (9.4%)	7 (5.5%)		127 (13.5%)
16	201 (79.4%)	32 (12.6%)	20 (7.9%)		253 (26.9%)
17	209 (68.1%)	59 (19.2%)	39 (12.7%)		307 (32.6%)
18	114 (59.1%)	35 (18.1%)	44 (22.8%)		193 (20.5%)
19	23 (46.9%)	12 (24.5%)	14 (28.6%)		49 (5.2%)
Mean (SD)	16.56 (1.11)	17.00 (1.07)	17.31 (1.05)		16.73 (1.13)
Country of birth				0.542	
Mexico	182 (73.1%)	39 (15.7%)	28 (11.2%)		249 (26.4%)
USA	485 (70.0%)	112 (16.2%)	96 (13.9%)		693 (73.6%)
Parental education				0.744	
< High School	442 (71.4%)	94 (15.2%)	83 (13.4%)		619 (65.7%)
High School	107 (67.3%)	31 (19.5%)	21 (13.2%)		159 (16.9%)
> High School	118 (72.0%)	26 (15.9%)	20 (12.2%)		164 (17.4%)
A friend smokes				<0.001	
None	583 (76.5%)	114 (15.0%)	65 (8.5%)		762 (80.9%)
At least one	84 (46.7%)	37 (20.6%)	59 (32.8%)		180 (19.1%)
No. of household members who smoke				<0.001	
None	413 (75.1%)	78 (14.2%)	59 (10.7%)		550 (58.4%)
One	190 (70.6%)	44 (16.4%)	35 (13.0%)		269 (28.6%)
Two or more	64 (52.0%)	29 (23.6%)	30 (24.4%)		123 (13.1%)

Variable	Smoking Status			p-value	Total N (%)
	Never N (%)	Less than one cigarette N (%)	More than one cigarette N (%)		
Mean (SD)	0.49 (0.70)	0.71 (0.85)	0.83 (0.94)		0.57 (0.77)
Subjective social status				<0.001	
Mean (SD)	7.98 (1.45)	7.53 (1.41)	7.12 (1.55)		7.80 (1.49)
Positive outcome expectations				<0.001	
Mean (SD)	1.22 (0.38)	1.37 (0.52)	1.69 (0.58)		1.30 (0.46)
Drug and alcohol sensation seeking				<0.001	
Mean (SD)	0.72 (1.19)	1.48 (1.78)	2.37 (1.95)		1.06 (1.53)
No. of pro-tobacco messages				<0.001	
Mean (SD)	1.31 (1.32)	1.50 (1.42)	1.90 (1.50)		1.42 (1.37)

Table 2

Demographic, psychosocial covariates and smoking status by number of pro-tobacco media messages reported in 2008-09

Variable	No. of Pro-Tobacco Messages					p-value	Total N (%)
	0 messages N (%)	1 message N (%)	2 messages N (%)	3 messages N (%)	>4 messages N (%)		
Total	313 (33.2%)	249 (26.4%)	160 (17.0%)	136 (14.4%)	84 (8.9%)		942 (100%)
Gender						0.363	
Female	175 (55.9%)	135 (54.2%)	76 (47.5%)	69 (50.7%)	40 (47.6%)		495 (52.5%)
Male	138 (44.1%)	114 (45.8%)	84 (52.5%)	67 (49.3%)	44 (52.4%)		447 (47.5%)
Age in 2010-11						0.838	
Mean (SD)	16.70 (1.11)	16.71 (1.18)	16.74 (1.12)	16.74 (1.11)	16.86 (1.11)		16.73 (1.13)
Country of Birth						0.850	
Mexico	88 (28.1%)	64 (25.7%)	38 (23.8%)	38 (27.9%)	21 (25.0%)		249 (26.4%)
USA	225 (71.9%)	185 (74.3%)	122 (76.3%)	98 (72.1%)	63 (75.0%)		693 (73.6%)
Parental education						0.523	
< High School	213 (68.1%)	170 (68.3%)	96 (60.0%)	84 (61.8%)	56 (66.7%)		619 (65.7%)
High School	51 (16.3%)	40 (16.1%)	31 (19.4%)	27 (19.9%)	10 (11.9%)		159 (16.9%)
> High School	49 (15.7%)	39 (15.7%)	33 (20.6%)	25 (18.4%)	18 (21.4%)		164 (17.4%)
A friend smokes						0.004	
None	274 (87.5%)	200 (80.3%)	123 (76.9%)	102 (75.0%)	63 (75.0%)		762 (80.9%)
At least one	39 (12.5%)	49 (19.7%)	37 (23.1%)	34 (25.0%)	21 (25.0%)		180 (19.1%)
No. of household members who smoke						0.132	
None	187 (59.7%)	152 (61.0%)	96 (60.0%)	72 (52.9%)	43 (51.2%)		550 (58.4%)
One	90 (28.8%)	68 (27.3%)	44 (27.5%)	42 (30.9%)	25 (29.8%)		269 (28.6%)
Two or more	36 (11.5%)	29 (11.6%)	20 (12.5%)	22 (16.2%)	16 (19.0%)		123 (13.1%)
Mean (SD)	0.52 (0.712)	0.53 (0.752)	0.56 (0.814)	0.67 (0.835)	0.71 (0.858)		0.57 (0.774)
Subjective social status						0.049	
Mean (SD)	7.97 (1.50)	7.75 (1.50)	7.78 (1.35)	7.74 (1.46)	7.44 (1.66)		7.80 (1.49)
Positive outcome expectations						<0.001	
Mean (SD)	1.22 (0.41)	1.31 (0.44)	1.31 (0.47)	1.40 (0.53)	1.43 (0.53)		1.30 (0.46)
Drug and alcohol sensation seeking						0.004	
Mean (SD)	0.84 (1.31)	1.02 (1.45)	1.19 (1.69)	1.34 (1.70)	1.33 (1.80)		1.06 (1.53)

Variable	No. of Pro-Tobacco Messages					p-value	Total N (%)
	0 messages N (%)	1 message N (%)	2 messages N (%)	3 messages N (%)	>4 messages N (%)		
Smoking status						0.003	
Never	237 (75.7%)	182 (73.1%)	113 (70.6%)	86 (63.2%)	49 (58.3%)		667 (70.8%)
Less than one cigarette	50 (16.0%)	34 (13.7%)	29 (18.1%)	22 (16.2%)	16 (19.0%)		151 (16.0%)
More than one cigarette	26 (8.3%)	33 (13.3%)	18 (11.3%)	28 (20.6%)	19 (22.6%)		124 (13.2%)

Table 3

Multinomial regression analysis of smoking status in 2010-11 and covariates assessed in 2008-09

Smoking Status ^a	OR	95% CI		p-value
		Lower Bound	Upper Bound	
Less than one cigarette (N=151)				
Gender (female)	1.03	0.71	1.50	0.860
Age	1.37	1.15	1.62	<0.001
A friend smokes (none)	1.36	0.84	2.20	0.215
No. of household members who smoke (none)				
One	1.95	1.16	3.30	0.012
Two or more	1.08	0.71	1.65	0.773
Subjective social status	0.90	0.79	1.02	0.105
Positive outcome expectations	1.25	0.79	1.98	0.345
Drug and alcohol sensation seeking	1.28	1.11	1.46	0.001
Number of pro-tobacco messages	1.07	0.93	1.22	0.362
More than one cigarette (N=124)				
Gender (female)	1.85	1.17	2.92	0.009
Age	1.69	1.36	2.10	<0.001
A friends smokes (none)	2.38	1.44	3.92	0.001
No. of household members who smoke (none)				
One	2.30	1.26	4.20	0.007
Two or more	0.97	0.57	1.63	0.900
Subjective social status	0.86	0.74	0.99	0.045
Positive outcome expectations	2.57	1.59	4.17	<0.001
Drug and alcohol seeking	1.35	1.16	1.57	<0.001
No. of pro-tobacco messages	1.21	1.03	1.42	0.020

Note: Controlling for the child's country of birth, parent's educational attainment, and exposure to anti-tobacco messages (none vs. some).

^aThe reference category is: never tried cigarettes