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The influence of subjective social status on the relationship between positive outcome expectations and experimentation with cigarettes

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Abstract

Purpose—In Texas, Mexican American (MA) adolescents, and in particular boys, are at increased risk of experimenting with cigarettes compared to their black or white counterparts. Positive outcome expectations (POE), the functional social significance ascribed to cigarettes, and subjective social status (SSS), the adolescents' subjective views of where they lie in the school-based social hierarchy, are independent predictors of smoking. The goal of this study was to test the hypothesis that SSS moderates the relationship between POE and experimentation with cigarettes.

Methods—Moderating effects of SSS were examined using a between-subjects 2 by 2 ANOVA and unconditional logistic regression analyses. Using a prospective study design, we followed 1,142 MA adolescents aged 11 to 13. Participants completed a baseline survey at home, which assessed POE, SSS, and smoking and were followed via telephone at 6 monthly intervals over a 12 month period to assess changes in smoking behavior.

Results—At follow-up, there were 99 new experimenters. Consistent with our hypothesis, adolescents who reported moderate-low SSS and who held POE at baseline were more likely to have experimented with cigarettes at either follow-up than their peers with moderate-low SSS who held less POE (OR=1.92, CI: 1.02–3.58). There was no association between outcome expectations and experimenting among adolescents with high SSS (OR=1.79, CI: 0.73–4.36). Low SSS boys were more likely to experiment than girls and high SSS boys.

Conclusions—The results of this study indicate that adolescents with moderate-low SSS hold different outcome expectations about smoking than their higher SSS peers. The results underscore the possibility that moderate-low SSS adolescents view behaviors such as smoking as a way to achieve higher SSS and thereby increase their peer social standing. Our results suggest that, in addition to tailoring intervention efforts by gender, placing adolescents of similar social standing to one another within the school into intervention groups that are led by a peer-nominated peer may increase the overall effectiveness of these peer-led prevention efforts.

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Introduction

Cigarette smoking continues to be the number one cause of preventable death in the United States [1]. Smoking initiation typically occurs during adolescence [2], and is thought of as part of a trajectory, with experimenting with cigarettes as one of the initial stages [3,4]. It is estimated that roughly 4,400 youth aged 12–17 years try cigarettes for the first time every day [5] and that every day another 1,140 adolescents become regular smokers [6]. In Houston Texas, where the present investigation was conducted, cross-sectional data indicate that Hispanic, the majority of whom are of Mexican origin, and white adolescents report comparable rates of ever smoking (Hispanic: 68.2%; 95% Confidence Interval (CI): 64.2–72.2 & white: 63.6% CI: 52.3–75.3), and higher rates than their black (53.4%; CI: 49.4–58.4) peers [7]. In addition, US-born Mexican origin men and women who reside in Houston Texas report higher smoking rates than previously reported for Hispanics based on statewide and nationwide surveys [8]. This underscores the possibility that Hispanic adolescents, and in particular Mexican origin adolescent boys, living in Houston Texas, are at risk for smoking escalation as adults.

Over the last 20 years, our understanding of the risk factors that lead to experimenting with cigarettes and ultimately smoking initiation among adolescents has advanced substantially. Much of this research underscores the importance of the school social context [9,10], the role of peer influence and relationships [11–13] and the functional social significance ascribed to cigarettes [14]. For example, subjective social status (SSS), the adolescent's subjective view of where he or she lies in the school-based social hierarchy [15], predicts smoking behavior [16], as do positive outcome expectations (POE) [17], which are the beliefs about the positive consequences of engaging in a specific behavior (i.e. thinking that smoking will help one feel more comfortable at parties) [18,19]. Although researchers continue to identify different risk factors that lead to smoking initiation, how these different risk factors operate together is less well understood. Because low SSS youth are more likely to experiment than their high SSS peers [16] it is possible that low SSS youth hold different beliefs about smoking than high SSS youth. In addition, children who believe that smoking will yield socially beneficial outcomes, such as looking more mature, dealing more effectively with stress and feeling more comfortable at parties, are more likely to smoke than children who do not share these beliefs [17]. It is possible that youth with lower SSS may be those youth who believe that there are social benefits associated with smoking. Therefore a youth's perceptions of SSS may modify his or her belief about the social benefits associated with smoking.

Thus, the current study examined whether Mexican origin youth who report moderate-low SSS perceive smoking cigarettes as a means of increasing their social standing among their peers, using prospective data and a moderator variable model approach. In general, a moderator variable (sometimes referred to as a modifier variable) influences the direction and/or strength of the relation between an independent variable and the dependent variable [20,21]. Accordingly, the study hypothesis was that SSS moderates the influence of POE on experimenting with cigarettes. Specifically, among adolescents with high SSS there is no relationship between POE and experimenting with cigarettes, but among adolescents with moderate-low SSS, the relationship will be significant and positive. The hypothesis was tested using baseline assessments (from an ongoing prospective study) of SSS and POE among Mexican origin adolescents enrolled in a longitudinal study who had not experimented with cigarettes at baseline, but who did report experimentation with cigarettes at follow-up. A more refined understanding of how factors in the school context influence experimenting with cigarettes and will assist in continued refinement of school-based prevention intervention programs.

Methods

Participants in this study are part of an ongoing prospective longitudinal study examining factors associated with smoking initiation among Mexican origin youth between 11 and 13 years of age. The participants were drawn from a population-based infrastructure (a prospective cohort) of Mexican American households created by the Department of Epidemiology at The University of Texas M. D. Anderson Cancer Center beginning in July 2001. Participants resided in predominantly (at least 75% according to 2000 census) Mexican American neighborhoods in Houston. Families were recruited into the cohort through random-digit telephone dialing, block-walking, intercept (such as at health fairs), or networking through already enrolled participants. A detailed description of the recruitment methodology has been published [8].

Households with potential age-eligible participants were identified from the cohort database. The potential participants' parents or legal guardians were called to assess interest in the study. In households in which there were two or more age-eligible children, the child who had had his or her birthday most recently was invited to participate in the study. Home interviews were scheduled with all parents/legal guardians who agreed to participate. A pair of bilingual interviewers visited the home, explained the goals and scope of the study, obtained written informed consent from the child's parent/legal guardian and informed assent from the child, and enrolled the child. Just over 90% of all parents with age-eligible children who were contacted agreed to enroll their child in the study, resulting in 1,328 adolescents enrolled at baseline. On average, the households from which the children were drawn were enrolled into the cohort one year (mean=1.03 years; SD=1.17) prior to the child enrolling in the current study. All children received a $25.00 gift card for their participation. The institutional review board at The University of Texas M. D. Anderson Cancer Center approved all aspects of this study.

Data collection

After consenting to join the study, each participant completed a 5-minute personal interview during which basic demographic (gender, age, nativity status (U.S. or Mexico) data were collected. At the end of the interview, the child's height and weight were taken. The participant was then handed a personal digital assistant (PDA) with which to complete the remainder of the survey. To further ensure the participants' privacy, one research interviewer sat with the child to answer questions as needed, while the other completed a personal interview with the child's parent. The survey assessed smoking status, subjective social status, and outcome expectations. Parents were provided with sample questions during the consenting process, but were informed that they would not have access to their child's survey responses. Six months after baseline assessment, the first follow-up data were collected and one year after the baseline the second follow-up data were collected. These data were collected via personal interview over the telephone and assessed changes in smoking status.

Dependent variable

The outcome variable of interest in this study was experimentation with cigarettes assessed at the first follow-up (six-months following baseline) and second follow-up (one year following baseline). Experimentation was assessed using two questions, "Have you ever smoked a whole cigarette?" and "Have you ever tried a cigarette, even a puff?" Participants who responded negatively ('no") to the two questions at baseline, but who responded positively ("yes") to either question at first or second follow-up were categorized as experimenters.

Participants who reported having experimented at first follow-up, but not having experimented at second follow-up were classified as experimenters. All the other participants were categorized as never smokers. In addition, participants, who reported experimentation, current

smoking or having quit at baseline, on the Minnesota Smoking Index (MSI) [22], were excluded from the analysis.

Independent variable

Outcome expectations are the perceived consequences of engaging in a certain behavior [23] and were assessed using a 7-item scale developed by Dalton et al. [17] at baseline. The internal consistency reliability of the POE scale reported by the authors [17] and for the current study sample were the same (Cronbach's alpha = 0.88). A copy of the items can be found in Appendix A. The 7-items were averaged to create a summary score for POE (see Table 1). Higher scores indicate more positive perceived consequences ascribed to smoking behavior.

Moderator variable

Subjective Social Status, SSS, the adolescent's subjective view of where he or she lies in the school-based social hierarchy, was assessed using a version of the MacArthur Scale of Subjective Social Status adapted for adolescents [15] at baseline. This 10-point scale is constructed in the shape of a ladder with the following descriptions and instructions. "At the top of the ladder are kids who are the best off – get good grades, have lots of friends, or do well at sports. At the bottom, are kids who are worst off – get poor grades, have few friends, or do poorly in sports. Choose the one rung where you think you are on the ladder." When testing the hypothesis that SSS moderates the influence of positive expectations on experimenting with cigarettes, SSS was examined as a continuous variable. However, to examine the relationship between POE and experimenting within levels of SSS, the SSS score was dichotomized based on a median split. Of the 1,142 participants, 569 (49.8%) them placed themselves at the top of the ladder (rungs 9 and 10) and were categorized as high SSS participants (573 or 50.2%). All others were categorized as moderate-low SSS participants.

Control variables are variables that may influence the outcome of the analysis and are therefore held constant so as to minimize their effects. Many studies have shown that smoking behavior is influenced by gender and age [24,25,26], therefore both were included as control variables in the study. Age was entered in its continuous format.

Statistical analysis

Associations between gender, SSS category, and experimenter status were assessed using chi-square tests of association. Mean differences in age, SSS, and the POE scale by experimenter status were assessed using the Mann-Whitney Test (Table 1). To determine if SSS moderates the influence of POE on experimentation we followed methodologies outlined by Baron and Kenny [20] and Kraemer et al [21]. For this analysis, both SSS and POE were examined as continuous variables. An interaction term between SSS and POE was first created. The interaction term and the two main effects (SSS and POE) were simultaneously entered as between-subject variables into 2 × 2 ANOVA, adjusting for the control variables.

Having established moderation (presence of a significant interaction term) the sample was stratified on SSS. Next two unconditional logistic regressions were completed to examine the relationship between POE and experimentation, within levels of SSS, adjusting for the control variables (Table 2). Finally, a one-way ANOVA was conducted to assess mean differences in POE based on level of SSS and experimental smoking status (Table 3).

A total of 1,328 adolescents between 11 and 13 years of age were enrolled into the study. Sixteen participants withdrew from the study between baseline and the second follow-up. Since the outcome of interest is new experimentation, 144 participants who reported having experimented, smoked more than once a month, or who reported having quit smoking at baseline were excluded from the analysis. Twenty-six participants had not completed either

the first follow-up or the second follow-up. Thus, the final sample was 1,142 adolescents. There were no significant differences between the 26 participants lost to follow-up and those included in the current analyses in terms of their gender, age, SSS or POE (data not shown).

The participants in the current analysis included 599 (52.5%) girls and 543 (47.5%) boys. At baseline 484 (42.4%) were 11 years old, 364 were 12 years old (31.9%) and the remaining 294 (25.8%) were thirteen. The majority, 742 (65%), were born in the US; all others 400 (35%) were born in Mexico.

Results

On average just over six months (6.15 months; 2.01 standard deviations (SD)) had elapsed between baseline and first follow-up and just over one year (13.16 months, 2.78 (SD)) had elapsed between baseline and second follow-up. The average age of the participants at first follow-up was approximately 12 years (12.36, 1.01 (SD)) and at second follow-up was 13 years (12.96, 0.91 (SD)). Overall, 1043 (91.3%) participants had not experimented with cigarettes and 99 (8.7%) participants had experimented. Table 1 presents bivariate associations and mean differences between experimenter status assessed at follow-up and demographic characteristics, SSS, and POE assessed at baseline. Among the experimenters, about 66% were boys compared to 46% among never smokers ($p<0.01$). New experimenters were slightly older than never smokers (12.3 years vs. 11.8 years) ($p<0.01$). Compared to never smokers, experimenters held more POE about smoking (Mean=1.33, 0.42 (SD) vs. Mean=1.20, 0.35 (SD); $p<0.01$) and a higher proportion reported low SSS (63.6% vs. 48.9%; $p<0.01$).

We followed methodologies outlined by Baron and Kenny [20] and Kraemer et al [21] to test for moderation. First, we established that regardless of the level of SSS, SSS was not correlated with POE (for high SSS Spearman's rho = 0.03; p=0.42 and for moderate-low SSS Spearman's rho = 0.08; p=0.07). Second, using SSS in its continuous format we examined the interaction between SSS and POE. After controlling for the participants' gender and age, we found that SSS moderated the influence of positive outcome on experimenting with cigarettes. The interaction effect, as measured by eta^2 was found to be 7% and was significant $F(52,1063) =1.56$, $p<0.01$, as was the main effect for POE $F(15,1063)=1.80$, $p=0.03$; partial $eta^2 = 3\%$. But the main effect for SSS was not significant $F(9,1063)=1.78$, $p=0.07$; partial $eta^2 = 2\%$.

Table 2 presents the results from the multivariate logistic regression analyses stratified by SSS. Boys with moderate-low SSS were 2.36 times (95% CI: 1.32–4.22) more likely to have experimented with cigarettes than girls with moderate-low SSS. In the high SSS group this was not significant. Interestingly, among children with high SSS, gender was not associated with experimenting with cigarettes.

Consistent with our hypothesis, among adolescents with moderate-low SSS, holding POE was associated with a significantly increased likelihood of experimenting with cigarettes (OR=1.92, CI: 1.02–3.58; $p<0.04$). However, among participants with high SSS the relationship was not significant (OR=1.79, CI: 0.73–4.36; p=0.20).

These results were confirmed by analyzing mean scores on POE by experimentation status and SSS (Table 3). Based on post-hoc analysis of the mean differences on POE, children with high SSS who have never experimented report a lower mean on positive expectations than their peers with moderate-low SSS, regardless of their experimenter status (High SSS, non-experimenters: M=1.17, 0.32 (SD) vs. a) Low SSS, experimenters M=1.37, 0.44 (SD) and b) Low SSS non-experimenters M =1.24, 0.37 (SD); Tukey HSD $p < 0.05$ for both).

In addition, among children with moderate-low SSS, experimenters reported higher means on POE than never smokers (M=1.37, 0.44 (SD) vs. M=1.24, 0.37 (SD); Tukey HSD $p<0.01$).

Among children with high SSS, there was no significant difference in mean POE between experimenters and never smokers (M=1.25, 0.35 (SD) vs. M=1.17, 0.32 (SD), Tukey HSD p=0.54). Among experimenters, there was no significant difference in mean POE between children with high and moderate-low SSS (M=1.25, 0.35 (SD) vs. M=1.37, 0.44 (SD), Tukey HSD p=0.35. Similarly, among never smokers, mean POE was not significantly different by SSS (M=1.25, 0.35 (SD) vs. M=1.24, 0.37 (SD), Tukey HSD p=0.99).

Discussion

The a priori hypothesis that subjective social status moderates the influence of POE on experimenting with cigarettes was confirmed. Mexican origin adolescents who report moderate-low SSS and who hold POE are more likely to experiment with cigarettes than their peers with moderate-low SSS who hold less positive expectations. There was no association between outcome expectations and experimenting among adolescents with high SSS. These results lend support to the hypothesis that Mexican origin adolescents with moderate-low SSS may view behaviors like smoking as a way to achieve higher SSS and thereby increase their popularity and peer social standing.

The results from the current study are consistent with previous findings. Several studies have demonstrated that POE associated with smoking predict smoking behavior. For example, POE were associated with being susceptible to smoking [17] as well as with current smoking [27]. However, comparatively fewer studies have examined the role of SSS in adolescent smoking, and specifically in Hispanic adolescents. Finkelstein et al. [16] found that among adolescents in grades 7 through 12, those with lower social status were at increased risk of smoking at baseline and initiating smoking during the subsequent year.

The results from the current study based on Mexican origin adolescents extend our understanding of how the two risk factors we examined operate together. Popular middle school students are more likely to smoke than their less popular peers [16,28], especially in schools where there is a high prevalence of smoking [9]. In recent studies more than 60% of the adolescents aged 9 to 13 years said the primary reason for experimenting with cigarettes was the belief that smoking would make them popular [29], while the perception that smokers have more friends was strongly associated with smoking behavior among middle school adolescents [30]. The present study extends these results, because the analytic approach we used demonstrates that the adolescents' perceptions of the social benefits associated with smoking vary with their social standing.

We also found that moderate-low SSS boys were more likely to be new experimenters than moderate-low SSS girls, whereas high status boys were no more or less likely to smoke than high status girls. Our results are consistent with previous research [e.g. 26]. Interestingly, the observed gender differences among the MATCh adolescents are consistent with the gender differences in smoking rates reported by the adult participants in the larger cohort, from where are participants are drawn currently smoke [8]. Our results suggest that interventions for Mexican origin youth need to be tailored by gender.

The current study has both strengths and limitations. The prospective study design allowed us to examine experimentation at follow-up among participants who had not experimented at baseline. In addition, unlike most studies that have used friendship nomination approaches [9,31] to examine social status with the school context, in the current study a self-reported measure that assesses self-perception of social standing was employed. Regardless of how social standing was assessed [9,15,31], the construct significantly predicts experimenting with cigarettes, suggesting both are valid assessment approaches.

Other strengths of the study are that participants were from a population-based cohort and included roughly equal numbers of girls and boys. In addition, validated measures were used and the data were collected in the participants' homes using PDAs. PDAs were used, as they enabled the participants to read the questions themselves and answer without their parents hearing or viewing their responses, thereby ensuring their privacy. A final strength of the study is the participants, who represent a large ethnically homogenous and predominantly low-income sample of Mexican origin youth, which is an understudied population.

One limitation of this study stems from the fact that we did not directly measure whether youth perceive cigarettes as a means of increasing their social standing among their peers. We used the measure of POE, as a proxy for this construct. In addition, the anchors on the SSS ladder pertain to grades, athleticism as well as number of friends. Although the adolescents may see smoking as a way of obtaining more friends, it is less likely that they believe smoking will help them get better grades and be more athletic. Therefore, it remains possible that adolescents with moderate-low SSS simply have a different view of smoking than the higher SSS peers, and do not necessarily see smoking as a means of increasing their social standing. In future studies, we intend to directly assess whether or not our participants perceive smoking as a means of increasing their social standing.

Second, because the participants were all of Mexican origin, the results may not generalize to youth from other ethnic backgrounds. Third, because 50% of the parents in the cohort did not report their income and 68% have less than a high school degree, we were unable to control for parental socioeconomic status (SES). Finally, when testing for moderation the question of precedence is paramount [21]. How do we establish that SSS precedes POE or vice versa when both vary over time? Kraemer et al., [21] suggest that one approach is to define thresholds for both risk factors, which are measured over time and therefore potentially crossed at some point in time, as a means of establishing which threshold is passed first. At the moment the current study participants are completing the final assessment in this study in which both SSS and POE are reassessed. Therefore in future analyses we will be able to explore this important limitation thoroughly.

In conclusion, the Mexican origin youth in this study were more likely to experiment with cigarettes if they reported low subjective social status and thought that smoking will yield socially beneficial outcomes, such as looking more mature, dealing more effectively with stress, and feeling more comfortable at parties. These results could be useful when developing peer-led school based interventions designed to prevent smoking among adolescents. Peer-led school-based smoking prevention programs have been at least as effective, if not more effective, than adult-led programs, despite methodological difficulties associated with evaluating their effectiveness [32]. Moreover, programs implemented by peer-nominated adolescents because they are "popular" or "influential" have reduced intentions to smoke among never smokers [33] and reduced the progression to daily smoking among experimenters [34]. Our results suggest that, in addition to tailoring intervention efforts by gender, placing adolescents of similar social standing to one another within the school into intervention groups that are led by a peer-nominated peer may increase the overall effectiveness of these peer-led prevention efforts.

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Appendix A Positive Outcome Expectations

The next questions are about how you think smoking would make you feel. Please tell me how strongly you agree or disagree with the following statements.

I think I would enjoy smoking.			
Strongly disagree	Disagree	Agree	Strongly Agree
I think smoking would give me something to do when I am bored.			
Strongly disagree	Disagree	Agree	Strongly Agree
I think smoking would help me to deal with problems of stress.			
Strongly disagree	Disagree	Agree	Strongly Agree
I think smoking would help me to stay thin.			
Strongly disagree	Disagree	Agree	Strongly Agree
I think smoking would help me to feel more comfortable at parties.			
Strongly disagree	Disagree	Agree	Strongly Agree
I think smoking would be relaxing.			
Strongly disagree	Disagree	Agree	Strongly Agree
I think smoking would make me look more mature.			
Strongly disagree	Disagree	Agree	Strongly Agree

Reference:

Dalton MA, Sargent JD, Beach ML, et al. Positive and negative outcome expectations of smoking: Implications for prevention. Prev Med 1999;29:460–465.

Table 1

Baseline demographic characteristics by experimenter status at follow-up (N=1142)

Characteristic	Never Smokers (N = 1,043)		Experimenters (N = 99)		P-value[a]
	N	%	N	%	
Gender					
Boys	478	45.8	65	65.7	
Girls	565	54.2	34	34.3	< 0.01
Age					
11 years	464	44.5	20	20.2	
12 years	334	32.0	30	30.3	
13 years	245	23.5	49	49.5	
Subjective Social Status					
Low	510	48.9	63	63.6	
High	533	51.1	36	36.4	< 0.01
	Mean	**SD**	**Mean**	**SD**	
Age (years)	11.8	0.80	12.3	0.81	< 0.01
Range	11 to 13		11 to 13		
Positive Outcome Expectations	1.20	0.35	1.33	0.42	< 0.01
Range	1.0 to 3.1		1.0 to 2.7		
Subjective Social Status	8.32	1.62	8.10	1.42	
Range	1 to 10		1 to 7		

[a] P-values for gender and subjective social status are based on chi-square tests of association; p-values for age and positive outcome expectations are based on Mann-Whitney tests.

Table 2

Multivariate analyses of experimenting with cigarettes stratified by SSS (N=1142)[a]

	Subjective Social Status			
	High (N = 569)		Low (N = 573)	
Baseline Characteristic	**OR**	**CI**	**OR**	**CI**
Male	1.88	0.94–3.75	2.36	1.32–4.22
Positive Outcome Expectations	1.79	0.73–4.36	1.92	1.02–3.58

[a] Adjusted for age at baseline

OR=Odds Ratio; CI=95% Confidence Interval

Table 3

Mean level of positive outcome expectations by level of SSS and experimental smoking status (N=1142)

	Subjective Social Status				
	High (N = 569)		Low (N = 573)		P-value
Experimenter Status at Follow-up	**Mean (SD)**	**CI**	**Mean (SD)**	**CI**	
Experimenter (N = 99)	1.25 (0.35)	1.13–1.37	1.37 (0.44)	1.26–1.48	0.351
Never smoker (N = 1043)	1.17 (0.32)	1.14–1.20	1.24 (0.37)	1.21–1.27	0.005
P-value	0.537		0.029		

CI=95% Confidence Interval

Note: High SSS never smokers report a lower mean on positive outcome expectations than low SSS experimenters (p=0.000).

There are no differences on positive outcome expectations means between high SSS experimenters and low SSS never smokers (p=0.999).