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The Associations of Body Image, Anxiety and Smoking among Mexican Origin Youth

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Abstract

Purpose—Among Mexican origin teenagers, anxiety is associated with cigarette experimentation, while among girls and young women from other ethnic groups the desire to be thin is associated with smoking. However, little is known about the associations of body image concerns with smoking in Mexican origin youth, particularly when accounting for anxiety.

Methods—In 2005-06, 1,328 Mexican origin adolescents aged 11 to 13 years enrolled in a cohort study to examine non-genetic and genetic factors associated with cigarette experimentation. In 2008-09, 1,154 participants completed a follow-up when they reported their smoking status, anxiety and body image. Height and weight were measured. In 2010-11, 1,001 participants completed another follow-up when they reported their smoking status. Multivariate multinomial regression models were computed to examine associations between smoking behavior assessed in 2010-11 and body image score, anxiety, and body mass index (BMI) assessed in 2008-09, controlling for gender, country of birth, age, and parental education.

Results—Of the 892 participants with complete data, 48% were boys, 74% were US-born and in 2008-09, were 14.29 years (SD=1.00) old. Having smoked less than a whole cigarette was associated with being male (OR=1.53), older age (OR=1.42), a BMI <85th percentile (OR=1.93) and poor body image (OR=1.12). Having smoked more than one cigarette was associated with

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The analyses presented in this manuscript were presented at the Society for Research on Nicotine and Tobacco meeting held in Houston, Texas in March 2012 and at the Society for Social Behavioral Medicine meeting held in New Orleans, Louisiana in April 2012.

Implications and Contributions: We found body image concerns and anxiety to be independent risk factors in smoking initiation among Mexican origin youth. Associations between body image and smoking did not differ by gender. Thus, our findings suggest the importance of gender-appropriate smoking prevention programs with emphasis on overall mental wellness for both genders.

being male (OR=3.54), older age (OR=1.86), anxiety (OR=1.04), and poor body image (OR=1.11).

Conclusions—Poor body image and anxiety were independently associated with cigarette experimentation among Mexican origin youth. Implications for the design of culturally appropriate smoking prevention messages are discussed.

Keywords

Body image; Anxiety; Smoking; Adolescents; Mexican origin youth

Introduction

Adolescence is the developmental period with the highest risk for smoking initiation (1, 2). Once started, the behavior is likely to track into adulthood (3, 4), increasing the risk of cardiovascular disease and various cancers (2, 5). Adolescence is also a time of physical and social changes, which, for some, may induce and/or accompany feelings of body dissatisfaction and anxiety (6, 7, 8). The belief that smoking can be used as a method of weight control has long existed (9). This belief has been consistently reported as early as adolescence (10, 11). Belief in the link between body weight control and smoking tends to be more common among adolescent smokers compared to non-smokers (12), and is often cited as a reason for smoking initiation among this age group (13, 14). Thus, with the psychosocial changes characteristic of adolescence, coupled with the belief in smoking as a method of weight control, it follows that adolescents with body image concerns, compared to those more satisfied with their bodies, are at an elevated risk of smoking initiation. Previous research has documented significant associations between weight concerns and smoking initiation (15, 16), with findings consistently more pronounced for adolescent girls than boys (16).

The heightened risk of anxiety during adolescence is associated with both affective dispositions such as body image, as well as the initiation of unhealthy habits, such as smoking. Anxiety has been shown to be associated with both poor body image (17) and smoking initiation in adolescents (18, 19). Less clear is the extent to which accounting for anxiety diminishes the association between body image and smoking. After adjustment for overall negative affectivity in one study, significant associations remained between negative body image and smoking initiation (20).

Whereas the body image-smoking association has been studied for some ethnicities, the association between body image and smoking has been largely understudied in Mexican origin youth. Although it is commonly believed that Hispanic adolescents have fewer body concerns than whites, particularly when girls of both ethnicities are compared, evidence suggests otherwise. One study by Robinson and colleagues found Hispanic adolescent girls to have poorer body image than non-Hispanic whites (21). In another, Neumark-Sztainer et al. reported the lowest body satisfaction among Hispanic adolescent girls, compared to non-Hispanic white, Asian-American, and Native American girls (22). Furthermore, as with more diverse samples, previous research suggests an association between anxiety and smoking among Mexican origin youth (19). Rates of smoking among Hispanic youth are

among the highest across ethnic groups, being comparable to those of non-Hispanic whites (23). Thus, the identification of risk factors for smoking initiation, such as body-related concerns, can inform targeted interventions in this high-risk population. The purpose of this paper is to evaluate the impact of negative body image on smoking initiation in a prospective cohort study of Mexican origin youth, while adjusting for anxiety. Drawing on previous research, we hypothesized that: 1) Poor body image will be associated with trying cigarettes (i.e. having smoked less than one cigarette) and continued use (i.e. repeat experimentation to daily smoking), after adjusting for anxiety; and 2) Higher levels of anxiety will be associated with trying cigarettes and continued use. Additionally, we explore both anxiety and body image as possible mediators in their individual associations with smoking experimentation and continuation—i.e., the possibility that one might mediate the other's association with smoking behavior. Given the discrepancy between common belief and recent research on gender and body image in Hispanic youth, we also explore the impact of their interaction on smoking behavior in Mexican origin adolescents.

Methods

Study Design

In 2005, Mexican origin adolescents were enrolled in a prospective study of smoking behavior (24). Participants were recruited from a large population-based cohort of Mexican-American households in the Houston metropolitan area launched in 2001 and maintained by the Department of Epidemiology at the University of Texas M.D. Anderson Cancer Center. Household members were recruited into this cohort using door-to-door recruitment, probability random-digit dialing, intercepts, and networking approaches. Analysis of the pooled recruitment methods revealed no significant differences between the sample and the census tract from which they were drawn, with respect to language preference, country of origin, years living in the US, and household income (25). A detailed description of the cohort recruitment methods has been previously published (26).

Three thousand households with age-eligible adolescents between the ages of 11 and 13 years were identified from the cohort database. Of the first 1,425 contacted, just over 90% of parents and legal guardians (N=1,328) provided written consent while the child provided written assent prior to enrolling in the study. The Institutional Review Board at The University of Texas M.D. Anderson Cancer Center granted approval for the study.

Data Collection

Data were collected via a personal interview in the home on three occasions: at baseline in 2005-06; at follow-up 1 in 2008-09; and at follow-up 2 in 2010-11. Procedures were identical for all three data collection periods: after a 5-minute interview in which demographic information was obtained, participants completed a survey on a personal digital assistant (PDA). Smoking-related and anxiety constructs were identical for all time points. However, body image constructs were assessed only at the first and second follow-ups. Because of the longitudinal nature of this study, only participants who provided data at follow-up 2 were considered (N=1,001 or 75% of those enrolled at baseline). Participants were given the choice of either an English or Spanish interview. They received gift

certificates in the amount of \$25 after baseline and each of the follow-up interviews. A detailed description of the baseline data collection procedures has been published elsewhere (24).

Measures

For gender and country of birth, female and Mexico served as the reference categories, respectively. Age was entered as a continuous variable at each data collection time, but has been categorized in this analysis, with the youngest age group of less than or equal to 13 serving as the reference. Socio-economic status was assessed using highest parental educational attainment rather than household income--both of which are valid markers of SES--as more than 40% of parents did not report income, while the majority reported educational attainment. SES was categorized as: "less than high school," "high school/General Educational Development equivalency" or "more than high school," with those with the lowest level of attainment serving as the reference category. In this analysis, all child demographics were assessed at follow-up 1, while parental SES was assessed when the parent enrolled in the population-based cohort of Mexican-American households.

Body Mass Index (follow-up 1) was calculated using the height and weight measurements taken by trained interviewers at the first follow-up. SECA scales and stadiometers were used following a standard protocol. Participant BMI's were dichotomized, with lean and normal BMI (< 85th percentile) in one category serving as the referent group and overweight and obese (> the 85th percentile) in another (27).

Anxiety (follow-up 1) was assessed using Spielberger's trait anxiety scale (28). Trait anxiety refers to a relatively stable proneness to anxiety (28). The scale has 20 items that assess trait anxiety, with response options ranging from "not at all" to "very much so" on a 4-point scale. The scale has been validated in US Spanish-speaking samples (29) and has been shown to have good reliability based on data from our participants (Cronbach's alpha=0.86). Participant anxiety scores reflect a composite of all item scores. For descriptive purposes, scores were classified into two categories based on suggested clinical diagnostic cut-off points--greater than or equal to the 85th percentile and less than the 85th percentile, with the latter serving as the reference category (30).

Body image (follow-up 1) was assessed using 10 items from the Body Shape Questionnaire (31). The questionnaire has been validated (31), and has been shown to have good internal reliability within our sample (Cronbach's alpha=0.70). Participants were to answer "no," "not sure," or "yes," which were entered as a scale ranging from 1 to 3, respectively. Mean scores were computed for each participant, with higher scores indicating poorer body image.

Smoking status at follow-up 2 was determined using the Minnesota Smoking Index (32). The questionnaire assesses current and past smoking behavior over the participants' lifetime. For the purposes of this analysis, we considered only participants who had tried smoking or currently smoked, but not those who had quit. Responses were recoded into three categories—"never tried," "Puffers" (those who had tried a cigarette, but not a complete one), and "Experimenters" (those who had had a cigarette or more), with "never tried" serving as the

reference. Smoking categories were derived using guidelines described in Audrain-McGovern et al. (33).

Statistical Analyses

We calculated frequencies for all demographic variables, as well as BMI, anxiety, and smoking status. Mean and standard deviations were calculated for anxiety and body image. Using Student's t-tests and ANOVA, we examined mean differences in body image by smoking status and covariates (Table 1). We conducted Pearson's χ^2 tests and ANOVA to evaluate the differences in body image and covariates (demographics, BMI, and anxiety) by smoking status (Table 2). Post-hoc pairwise comparisons—sidak, bonferroni, and scheffe corrections--were performed for all statistically significant ANOVA results. Lastly, we conducted multinomial logistic regression to examine the relationship between smoking status and body image, controlling for all covariates (Table 3), with “never tried” serving as the base category to which the latter two are compared. Alpha was set at a .05 level.

Results

Table 1 depicts the means and standard deviations of body image by demographic characteristics, BMI, anxiety, and smoking status. The overall body image score mean was 1.90 (SD=2.29). Boys reported lower levels of concern with body image with a mean score of 1.45 (SD=1.93), compared to the mean of 2.32 (SD=2.50) for girls ($F=33.43$, $df=1$, $p<0.001$). Overall, older participants reported higher mean scores on body image concerns. Specifically, those 13 and younger and 14 year olds had mean scores of 1.82 (SD=2.16) and 1.59 (SD=2.07), respectively; 15 year-olds and those 16 and older reported higher means of 2.23 (SD=2.51) and 2.15 (SD=2.48), respectively ($F=4.24$, $df=3$, $p=0.005$). US-born youth reported more concerns with body image, with means of 1.99 (SD=2.35), compared to 1.65 (SD=2.12) for Mexican-born youth ($F=3.96$, $df=1$, $p=.047$). There were no significant differences in body image by parental education. Higher BMI was associated with poorer body image, with those at and above the 85th percentile reporting a mean of 2.68 (2.50), compared to 1.11 (SD=1.73) for those with lower BMIs ($F=117.91$, $df=1$, $p<0.001$). Anxiety was also shown to be associated with body image, with a mean of 1.77 (SD=2.17) for those with anxiety scores below the 85th percentile, compared to 3.46 (SD=3.01) for more anxious participants ($F=37.25$, $df=1$, $p<0.001$).

The prevalence of smoking behavior by predictor and covariates is presented in Table 2. Overall, 16.4% of participants reported being a puffer, and 13.5% reported being an experimenter. Smoking behavior differed significantly by gender, with only 8.3% of girls, compared to 19.1% of boys being classified as experimenters ($\chi^2=23.85$, $p<0.001$). Cigarette use at the highest measured levels increased steadily with age. Just 5.5% of those 13 and younger were classified as experimenters, compared to 24.5% of those 16 and over ($\chi^2=52.23$, $p<0.001$). There were no significant differences in smoking behavior by country of birth, parental education, or BMI. However, there were significant differences for anxiety. Of those falling below the 85th percentile for anxiety, 15.8% were puffers, compared to 19.7% of more anxious youth. Similarly, 12.55% of less anxious youth, compared to 23.9% of more anxious youth, were experimenters ($\chi^2=9.09$; $p=0.011$). Anxiety means also

increased along with smoking levels--from 37.43 ($F=10.56$, $df=2$, $SD=9.38$) for those who have never tried a cigarette to 41.60 ($SD=9.13$) among experimenters ($p<0.001$). Scores for negative body image also increased with levels of cigarette use, with a mean of 1.76 ($SD=2.15$) at the lowest smoking levels, and 2.33 ($SD=2.56$) at the highest ($F=10.56$, $df=2$, $p=0.017$).

In Table 3 we present the results for the multinomial logistic regression analysis for smoking status. Boys were more likely be puffers ($OR_{\text{puffer}}=1.53$ 95%CI: 1.04-2.25), as well experimenters ($OR_{\text{experimenter}}=3.54$ 95% CI: 2.25-5.57). Older age was also predictive of both levels of smoking behavior ($OR_{\text{puffer}}=1.42$; 95% CI=1.18-1.72; $OR_{\text{experimenter}}=1.86$; 95% CI: 1.50-2.31). Higher BMI, on the other hand, showed a protective effect for puffing ($OR_{\text{puffer}}=0.52$; 95% CI: 0.34-0.78), but not further on the smoking continuum. After controlling for gender, age, country of birth, parental education, BMI, and body image, anxiety was associated with being a repeat experimenter ($OR_{\text{experimenter}}=1.04$; 95% CI: 1.02-1.07), but not trying less than a cigarette. Poor body image, after controlling for all covariates including anxiety, was predictive of both being a puffer ($OR_{\text{puffer}}=1.12$; 95% CI=1.03-1.23) and continuing experimentation ($OR_{\text{experimenter}}=1.11$; 95% CI: 1.00-1.23).

Discussion

This study examined the complex relationships among body image, anxiety, and smoking behavior among Mexican origin youth as they experience adolescence. In our sample, nearly 30% of youth had at least tried a cigarette, with nearly half of these having smoked one or more cigarettes. As predicted from our first hypothesis, body image concerns were associated with increased odds of future cigarette use. In line with our second hypothesis, anxiety was associated with having smoked one or more cigarettes; however this association did not hold for those who smoked less than a cigarette. Overall, these findings suggest that efforts to curtail smoking experimentation and initiation can benefit from taking into account determinants such as body image concerns and anxiety.

The associations of both anxiety and body image concerns with smoking behavior have been documented in previous research among youth of other ethnic backgrounds (16). Furthermore, previous research has suggested a direct association between anxiety and body image concerns (17). Less clear, however, is the extent to which the association between body image and later smoking is mediated by anxiety, or whether body image itself is a mediator between anxiety and smoking. We conducted a mediational analysis and Sobel test (data not shown). Results did not suggest body image to be a mediator between anxiety and smoking; in our analysis anxiety does not lie on the causal pathway between body image and smoking. From this we can conclude that the relationship between body image and smoking experimentation or continuation cannot be explained by the anxiety often felt by youth unhappy with their bodies, nor can we conclude that anxiety leads to smoking due to body image concerns. This suggests the plausibility that smoking among some in this cohort may be more a reflection of a widespread belief in the use of smoking as a way to attain a more desirable body or maintain control over one's weight while undergoing hormonal and other features of adolescence. That is, body image concerns may precipitate a belief in smoking as means of weight control, leading to experimentation or continuation. Smoking, in this case,

would be more an expression of utility, and less so of anxiety. Further research is needed on the perceptions and motives underlying mechanisms by which body image and smoking are tied to weight control in Mexican origin youth.

Furthermore, in addition to the analyses shown, we examined a possible interaction between gender and body image on smoking status. Research has shown that the associations between weight concerns and smoking in adolescents are both more extreme and consistent in females (16). Our results, however, showed no evidence of gender differences in this population. Associations of body image, and both levels of smoking were comparable for both boys and girls in our sample. Overall, previous research suggests that boys and girls have different reasons for smoking initiation and continuation, and that the extent to which a particular reason influences smoking—i.e., various psychosocial or environmental factors—may vary by gender (16, 34). In our sample, however, while girls had significantly higher scores for body dissatisfaction compared to boys, this did not necessarily equate to a stronger association between body image and smoking. Given that the population from which our sample was drawn has youth of various levels of acculturation, in future analyses we intend to assess gender-body image interactions as they relate to smoking within the context of acculturation, which may reveal more nuanced results. One study of a multi-ethnic Latino youth sample found that compared to the least acculturated in the sample, acculturated girls who thought they were too fat had higher rates of cigarette use (35). It is thus conceivable that as Mexican origin girls become acculturated, those that develop poor body image are more likely to turn to cigarettes as a way to cope with their bodily dissatisfaction. In such a case, gender patterns in the association between body image and smoking behavior may resemble those found in previous studies, particularly those based on primarily white youth samples.

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. This population is largely understudied and underserved. Our sample also included comparable numbers of boys and girls. The gender balance is particularly pertinent given that research on body image in adolescents tends to focus on girls. Furthermore, all our covariates were assessed with validated tools and standardized protocols using PDA for privacy. Given the sensitive nature of some of the questions, it is also a strength that all data were collected using personal digital assistants, which ensured that participants read and answered the questions without concern for their parents hearing or seeing their responses. A final strength of the study is its prospective design. The overwhelming majority of studies on body image and smoking behavior in adolescents have been cross-sectional, thus limiting the direction of and interpretability of associations found among body image, other psychosocial covariates, and smoking behavior. Our study focuses on body image, adjusting for the affect of anxiety, and its prediction of later smoking along a continuum of experimentation levels. Our ability to chronologically assess the causal direction provides more definitive bases for the design of anti-smoking interventions in Mexican origin youth.

Our study has some limitations. For one, participants in our sample were all of Mexican origin. The homogeneity of our sample is also a limitation in that it hinders the

generalizability to other demographics, including other Hispanic youth from different countries of origin. Furthermore, smoking behavior was assessed via self-report and unverified using biological samples. Smoking, therefore, may be underreported. However, use of the PDA for data collection provided a secure non-invasive approach away from parental eyes for reporting purposes. Evidence suggests, however, that the validity of self-reported data tends to increase when participants believe biological samples may be requested (36), which we did for other purposes in our study.

Overall, our results may have implications for smoking prevention in Mexican origin youth. They highlight the importance of addressing body image as a factor in smoking initiation. Furthermore, while additional research is needed to confirm this, they suggest the belief that body image concerns can be assuaged through smoking may motivate some Mexican origin youth to experiment with cigarettes. Our results also confirm that along with body image, anxiety independently predicts subsequent smoking initiation. Given the independent predictive power of both body image and anxiety, smoking prevention efforts could benefit from an overall emphasis on positive body image and mental wellness. Our results, furthermore, suggest that contrary to what may be garnered from other studies, the associations between body image and smoking are not necessarily stronger in girls of Mexican origin, compared to boys. Thus, smoking prevention messaging and programs that address body dissatisfaction could benefit all Mexican origin youth, regardless of gender. Further research is needed, however, to devise gender-appropriate messaging focusing on positive body image and smoking prevention.

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References

1. Substance Abuse and Mental Health Services Administration (SAMHSA). [Accessed on [7-10-12)] National Survey on Drug Use and Health. 2009. Available at <http://oas.samhsa.gov/nsduh.htm#NSDUHinfo>
2. United States Department of Health and Human Services. Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; Atlanta: 2012.
3. Kelder SH, Perry CL, Klepp KI, Lytle LL. Longitudinal tracking of adolescent smoking, physical activity, and food choice behaviors. *American Journal of Public Health*. 1994; 84:1121–1126. [PubMed: 8017536]
4. Paavola M, Vartiainen E, Haukkala A. Smoking, Alcohol Use, and Physical activity: a 13-year Longitudinal Study Ranging from Adolescence into Adulthood. *Journal of Adolescent Health*. 2004; 35:238–244. [PubMed: 15313507]

5. Centers for Disease Control and Prevention. Annual Smoking-Attributable Mortality, Years of Potential Life Lost, and Productivity Losses—United States, 2000–2004. *Morbidity and Mortality Weekly Report*. 2008; 57(45):1226–1228. [PubMed: 19008791]
6. Brodie DA, Bagley K, Slade PD. Body image perception in Pre- and Postadolescent Females. *Perceptual and Motor Skills*. 1994; 78:147–154. [PubMed: 8177653]
7. deCastro JM, Goldstein SJ. Eating Attitudes and Behaviors of Pre- and Postpubertal Females: Clues to the Etiology of Eating Disorders. *Physiology and Behavior*. 1995; 58:15–23. [PubMed: 7667413]
8. Wittchen HU, Stein MB, Kessler RC. Social Fears and Social Phobia in a Community Sample of Adolescents and Young Adults: Prevalence, Risk Factors, and Comorbidity. *Psychol Med*. 1999; 29:309–323. [PubMed: 10218923]
9. Amos A, Haglund M. From Social Taboo to “torch of freedom”: The Marketing of Cigarettes to Women. *Tobacco Control*. 2000; 9:3–8. [PubMed: 10691743]
10. Boles SM, Johnson PB. Gender, Weight Concerns, and Adolescent Smoking. *Journal of Addictive Diseases*. 2001; 20:5–14. [PubMed: 11318397]
11. Cavallo DA, Duhig AM, McKee S, et al. Gender and Weight Concerns in Adolescent Smokers. *Addictive Behaviors*. 2006; 31:2140–146. [PubMed: 16567058]
12. Bean MK, Mitchell KS, Speizer IS, et al. Rural Adolescent Attitudes Toward Smoking and Weight Loss: Relationship to Smoking Status. *Nicotine & Tobacco Research*. 2008; 10:279–286. [PubMed: 18236292]
13. Dowdell EB, Santucci ME. Health Risk Behavior Assessment: Nutrition, Weight, and Tobacco Use in One Urban Seventh-grade Class. *Public Health Nursing*. 2004; 21:128–136. [PubMed: 14987212]
14. Nichter M, Nichter M, Vuckovic N, et al. Smoking as a Weight-Control Strategy among Adolescent Girls and Young Women: A Reconsideration. *Medical Anthropology Quarterly*. 2004; 18:305–324. [PubMed: 15484966]
15. Chesley EB, Roberts TA, Auinger P, et al. Longitudinal impact of weight-related intentions with the initiation and maintenance of smoking among adolescents. *Journal of Adolescent Health*. 2004; 34:130.
16. Potter BK, Pederson LL, Chan SSH, et al. Does a Relationship Exist between Body Weight, Concerns about Weight, and Smoking among Adolescents? An Integration of the Literature with an Emphasis on Gender. *Nicotine & Tobacco Research*. 2004; 6:397–425. [PubMed: 15203775]
17. Kostanski M, Gullone E. Adolescent Body Image Dissatisfaction: Relationships with Self-esteem, Anxiety, and Depression Controlling for Body Mass Index. *Journal of Child Psychiatry and Psychology*. 1998; 39:255–262.
18. Patton GC, Carlin JB, Coffey C, et al. Depression, Anxiety, and Smoking Initiation: A Prospective Study over 3 Years. *American Journal of Public Health*. 1998; 88:1518–1522. [PubMed: 9772855]
19. Wilkinson AV, Shete S, Bondy ML, et al. Exposure to Smoking Imagery in the Movies and Experimenting with Cigarettes among Mexican Origin Youth. *Cancer Epidemiology, Biomarkers and Prevention*. 2009; 18:3435–42.
20. Stice E, Shaw H. Prospective Relations of Body Image, Eating, and Affective Disturbances to Smoking Onset in Adolescent Girls. *Journal of Consulting and Clinical Psychology*. 2003; 71:129–135. [PubMed: 12602433]
21. Robinson TN, Killen JD, Litt IF. Ethnicity and Body Dissatisfaction: Are Hispanic and Asian Girls at Increased Risk for Eating Disorders? *Journal of Adolescent Health*. 1996; 19:384–393. [PubMed: 8969369]
22. Neumark-Sztainer D, Croll J, Story M, et al. Ethnic/Racial Differences in Weight-Related Concerns and Behaviors among Adolescent Boys and Girls: Findings from Project EAT. *Journal of Psychosomatic Research*. 53:963–974. [PubMed: 12445586]
23. Centers for Disease Control and Prevention. [Accessed on [6-26-12]] Youth Risk Behavior Survey. 2011. Available at: www.cdc.gov/yrbs
24. Wilkinson AV, Waters AJ, Vasudevan V, et al. Correlates of Smoking Susceptibility among Mexican Origin Youth. *BMC Public Health*. 2008; 26:337. [PubMed: 18822130]
25. Saunders, KM. Unpublished Master’s Thesis. 2005. Evaluation of Recruitment Strategies for Obtaining a Representative Cohort of Urban Mexican Americans.

26. Wilkinson AV, Spitz MR, Strom SS, et al. Effects of Nativity, Age at Migration, and Acculturation on Smoking among Adult Houston Residents of Mexican Descent. *American Journal of Public Health*. 2005; 95:1043–1049. [PubMed: 15914831]
27. Centers for Disease Control and Prevention. [Accessed on [6-26-12]] About BMI for Children and Teens. 2011. Available at: http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html
28. Spielberger CD. Assessment of State and Trait Anxiety: Conceptual and Methodological Issues. *Southern Psychologist*. 1985; 2:6–16.
29. Spielberger CD, Gonzalez-Reigosa F, Martinez-Urrutia A, et al. Development of the Spanish Edition of the State-Trait Anxiety Inventory. *Interamerican Journal of Psychology*. 1971; 5:145–158.
30. Mind Garden, Inc.. [Accessed on [3-11-13]] State-Trait Anxiety Inventory for Children. Available at: <http://www.mindgarden.com/products/staisch.htm>
31. Cooper PJ, Taylor MJ, Cooper CG, et al. The Development and Validation of the Body Shape Questionnaire. *International Journal of Eating Disorders*. 1986; 6:485–494.
32. Pechacek TF, Murray DM, Luepker RV, et al. Measurement of Adolescent Smoking Behavior: Rationale and Methods. *Journal of Behavioral Medicine*. 1984; 7:123–140. [PubMed: 6716469]
33. Audrain-McGovern J, Rodriguez D, Tercyak KP, et al. Identifying and Characterizing Adolescent Smoking Trajectories. *Cancer Epidemiology, Biomarkers, and Prevention*. 2004; 13:2023–2034.
34. Flay DR, Phil D, Frank B, et al. Psychosocial Predictors of Different Stages of Cigarette Smoking among High School Students. *Preventive Medicine*. 1998; 27:A9–A18. [PubMed: 9808813]
35. Nieri T, Kulis S, Keith VM, Hurdle T. Body Image, Acculturation, and Substance Abuse among Boys and Girls in the Southwest. *The American Journal of Drug and Alcohol Abuse*. 2005; 31:617–639. [PubMed: 16320438]
36. Murray DM, O'Connell CM, Schmid LA, et al. The Validity of Smoking Self-reports by Adolescents: A Reexamination of the Bogus Pipeline Effect. *Addictive Behaviors*. 1987; 12:7–15. [PubMed: 3565116]

Table 1

Means and standard deviations for Body Image by demographic characteristics, body mass index, trait anxiety, and smoking status (N=892)

	Body Image		
	Mean	SD	p-value
Overall	1.90	2.29	
Gender			<0.001
Female	2.32	2.50	
Male	1.45	1.93	
Age (Years)			0.006 ^a
13	1.82	2.16	
14	1.59	2.07	
15	2.23	2.51	
16	2.15	2.48	
Country of Birth			0.047
Mexico	1.65	2.12	
US	1.99	2.35	
Parental Education			0.166
< HS	1.82	2.23	
HS	1.91	2.29	
> HS	2.21	2.50	
Body Mass Index			<0.001
<85 th %	1.11	1.73	
85 th %	2.68	2.50	
Trait Anxiety			<0.001
<85 th %	1.77	2.17	
85 th %	3.46	3.01	
Smoking Status			0.017 ^b
Never	1.76	2.15	
Puffer	2.16	2.58	
Experimenter	2.33	2.56	

^aSignificant difference between ages 14 and 15

^bSignificant difference between “never” and “experimenter”

Table 2

Smoking Status Prevalence by Demographic Characteristics, Body Mass Index, Trait Anxiety, and Body Image (N=892)

	N (%)	Smoking Status			p-value
		Never N (%)	Puffer N (%)	Experimenter N (%)	
Overall		628 (70.40)	144 (16.14)	120 (13.45)	
Gender					<0.001
Female	468 (52.47)	356(76.07)	73 (15.60)	39 (8.33)	
Male	424 (47.53)	272 (64.15)	70 (16.75)	78 (19.10)	
Age (Years)					<0.001
13	219 (24.55)	184 (84.02)	23 (10.50)	12 (5.48)	
14	302 (33.86)	226 (74.83)	45 (14.90)	31 (10.26)	
15	265 (29.71)	157 (59.24)	57 (21.51)	51 (19.25)	
16	106 (11.88)	61 (57. 55)	19 (17.92)	26 (24.53)	
Country of Birth					0.391
Mexico	232 (26.01)	171 (73.71)	35 (15.09)	26 (11.21)	
US	660 (73.99)	457 (69.24)	109 (16.52)	94 (14.24)	
Parental Education					0.975
< HS	588 (65.92)	416 (70.75)	94 (15.99)	78 (13.27)	
HS	146 (16.37)	100 (68.49)	26 (17.81)	20 (13.70)	
> HS	158 (17.71)	112 (70.89)	24 (15.19)	22 (13.92)	
Body Mass Index					0.068
<85 th %	442 (49.55)	302 (68.33)	84 (19.00)	56 (12.67)	
85 th %	450 (50.45)	326 (72.44)	60 (13.33)	64 (14.22)	
Trait Anxiety					0.011
<85 th %	821 (92.04)	588 (71.62)	130 (15.83)	103 (12.55)	
85 th %	71 (7.96)	40 (56.34)	14 (19.72)	17 (23.94)	
Mean (SD)	38.26 (9.49)	37.43 (9.38)	39.06 (9.62)	41.60 (9.13)	<0.001 ^a
Range	20-71				
Body Image					0.017 ^a
Mean (SD)	1.90 (2.29)	1.76 (2.15)	2.16 (2.58)	2.33 (2.56)	
Range	0-10				

^a Significant difference between “never” and “experimenter”

Table 3

Multinomial Regression for smoking status (N=892)

	AOR	95% CI	p-value
Puffer			
Gender	1.53	1.04-2.25	0.031
Age	1.42	1.18-1.72	<0.001
Country of Birth	1.25	0.81-1.93	0.306
Parental Education	0.97	0.77-1.24	0.834
Body Mass Index	0.52	0.34-0.78	0.002
Trait Anxiety	1.01	0.99-1.03	0.270
Body Image	1.12	1.03-1.23	0.013
Experimenter			
Gender	3.54	2.25-5.57	<0.001
Age	1.86	1.50-2.31	<0.001
Country of Birth	1.45	0.88-2.38	0.143
Parental Education	1.03	0.79-1.34	0.819
Body Mass Index	0.78	0.50-1.22	0.276
Trait Anxiety	1.04	1.02-1.07	0.001
Body Image	1.11	1.00-1.23	0.040