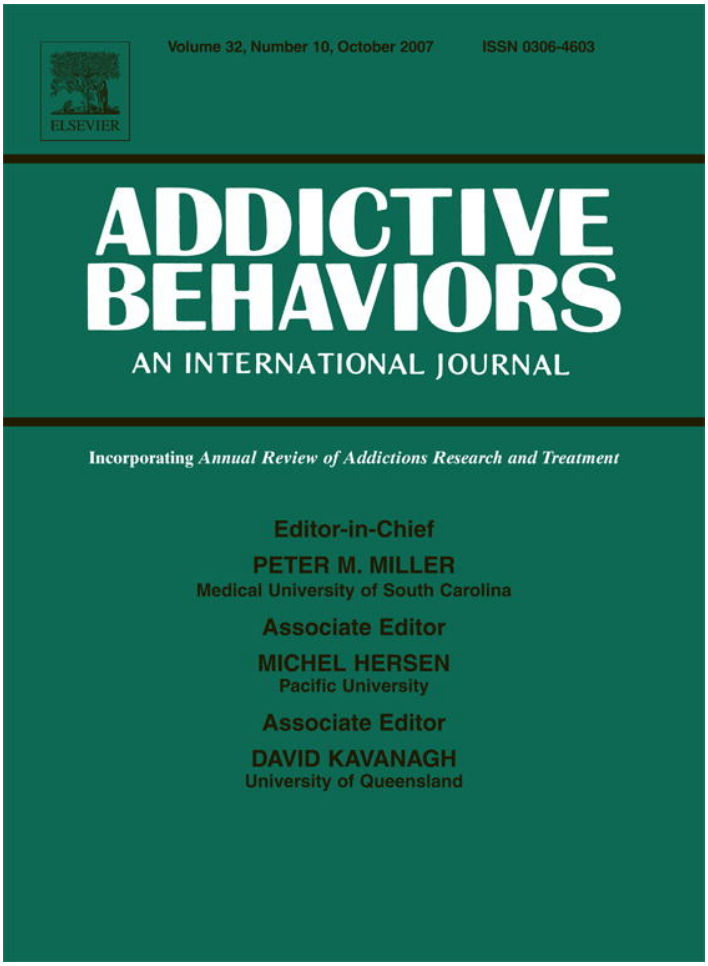

Available online at www.sciencedirect.com
ScienceDirect
Addictive Behaviors 32 (2007) 2311–2316
ADDICTIVE BEHAVIORS

Short communication

Ethnic variation in the association between weight concern and adolescent smoking

Jie Wu Weiss [a,*], Vincent Merrill [a], Ellen R. Gritz [b]

[a] *California State University, Fullerton, USA*
[b] *University of Texas, M.D. Anderson Cancer Center, USA*

Abstract

This study examined differences in associations between weight concern and smoking initiation among culturally diverse adolescents. Statistical analyses were conducted on responses from 3515 students in the 8th and 9th grades from three school districts in Los Angeles County. The restrained eating scale, adapted from the Dutch Eating Behavior Questionnaire, was used to measure students' weight concerns. Our results indicated that weight concern was significantly associated with increased risk for smoking. Those who scored higher on weight concern were approximately 40% more likely to report having tried smoking and smoked in the past 30 days. Compared to White students who reported weight concerns, Asian–American and African–American students were significantly less likely to report having tried smoking whereas Hispanic students were more likely to report having tried smoking. Health educators may wish to design smoking prevention programs which advocate for alternative methods of weight reduction rather than using smoking as a means of weight control.

Keywords: Adolescent smoking; Weight concerns; Ethnic differences

1. Introduction

Weight concern has been identified as a motive for cigarette smoking among adolescents (Crocker et al., 2001). One of the reasons adolescents may start smoking, return to smoking after quitting, or never attempt to quit may be the perceived benefit of smoking for weight control (Gritz, Klesges, & Meyers, 1989; Potter, Pederson, Chan, Aubut, & Koval, 2004).

* Corresponding author. Department of Health Science, California State University, Fullerton, 800 N. State College Blvd., Fullerton, CA 92834, USA. Tel.: +1 714 278 4388.
E-mail address: jweiss@fullerton.edu (J.W. Weiss).

0306-4603/$ - see front matter © 2007 Elsevier Ltd. All rights reserved.
doi:10.1016/j.addbeh.2007.01.020

Ethnicity may also affect weight concern, and thereby indirectly affect smoking. Ethnic differences in weight concern have been explored; for example, African–American girls generally are more satisfied at heavier weights than White girls and are less likely to engage in weight reduction (Neumark-Sztainer, Story, Falkner, Beuhring, & Resnick, 1999). Racial/ethnic differences in smoking prevalence are also well-documented (Cachelin, Weiss, & Garbanati, 2003; Chen & Unger, 1999). For example, about twice as many White as Black adolescents smoke cigarettes, with Hispanic prevalence rates in between (Wiecha, 1996). Asian–American youth have the lowest smoking prevalence rate (Epstein, Botvin, & Diaz, 1998; USDHHS, 1998). Is the lower weight concern among African–Americans and the lower smoking prevalence among African–Americans a coincidence? The goal of this study is to examine differences in associations between weight concern and smoking initiation among culturally diverse adolescents. Including two ethnic groups that have been understudied in this context, Asian–Americans and Hispanics, affords an extensive test of the hypothesized connection between weight concern and smoking.

2. Methods

2.1. Participants

We recruited 3315 students from 4 junior high schools and 6 high schools in three school districts in Los Angeles County. The sample consisted of 8th and 9th graders, with a mean age of 14.1 (SD = ± 1.2) years. Ethnicity and other demographic characteristics of the sample are shown in Table 1. The students completed a paper-and-pencil survey consisting of 149 items during a single class period; surveys were collected immediately upon completion. Details are presented in a paper by Weiss and Garbanati (2006).

2.2. Measures

To assess whether the student had smoked during his or her lifetime, one question was asked: "Have you ever tried smoking, even a few puffs?" Those students who responded "no" and "yes" were respectively coded as 'Non-lifetime smokers' and 'Lifetime smokers'. More than 30% of our participants reported having tried smoking. In contrast, fewer than 6% of the sample reported having smoked during the past 30 days, so we do not report analyses that employ this index of smoking regularity.

Weight concern was measured using the Restrained Eating Scale, one of the subscales in the Dutch Eating Behavior Questionnaire (DEBQ; van Strien, Frijters, Bergers, & Defares, 1986). This subscale describes how people attempt to control their food intake. Eight self-report items were adapted to assess an individual's weight concern and eating habits. Items include: "Do you deliberately eat less in order to not become heavier?", "How often do you refuse food or drink offered because you are concerned about weight?" Response options ranged from: 1 = "Never" to 5 = "Very Often". Scores from these eight questions were aggregated to form a scale of weight concern. The variable was then dichotomized into categories of "low or moderate level of weight concern" and "high level of weight concern". Individuals with a mean (over the eight items) score that corresponded to "often" or "very often" on a 5-point Likert scale were considered to have a high level of weight concern. The obtained Cronbach's alpha for the 8 items we used was 0.92.

2.3. Data analysis

Chi-square tests of association were conducted to assess differences in the prevalence of ever-tried smoking by demographic characteristics and by subgroups. To determine possible interaction effects between demographic variables and weight concern, a univariate general linear model factor analysis was performed. Bivariate and multivariate logistic regression models were used to evaluate associations between weight concern and lifetime smoking. Unadjusted and adjusted odds ratios were calculated for lifetime smoking; no smoking was used as the referent. Odds ratios greater than 1 indicate increased risks for smoking. To control for confounding, the demographic variables of age, gender, socio-economic status, and generation status were treated as covariates. All statistical analyses were performed with SPSS version 13.0.

3. Results

Table 2 shows the prevalence of lifetime smoking by grade, gender and ethnicity. Chi-square analyses were run to test for group differences in smoking behavior. The proportions for lifetime smoking varied

Table 1
Demographic characteristics of the sample by subgroups

	Asian–American	African– American	White, non-Hispanic	Hispanic
	N (%)	*N* (%)	*N* (%)	*N* (%)
	1250 (35.6)	159 (4.5)	508 (14.5)	1598 (45.5)
Age: mean (±SD)	14.1 (1.2)	14.0 (1.4)	13.6 (1.2)	14.1 (1.7)
Gender:				
Male	653 (52.4%)	72 (46.2%)	252 (51.1%)	753 (48.4%)
Female	593 (47.6%)	84 (53.8%)	241 (48.9%)	804 (51.6%)
Grade level:				
8th graders	379 (30.4%)	56 (35.2%)	258 (51.5%)	434 (27.4%)
9th graders	866 (69.6%)	103 (64.8%)	243 (48.5%)	1151 (72.6%)
Parental education:				
Low (≤12 years)	326 (30.6%)	28 (19.6%)	70 (14.9%)	781 (56.9%)
High (>12 years)	738 (69.4%)	115 (80.4%)	399 (85.1%)	592 (43.1%)
Own home:				
Yes	598 (48.4%)	58 (37.4%)	309 (61.9%)	607 (38.8%)
No	638 (51.6%)	97 (62.6%)	190 (38.1%)	956 (61.2%)
Immigrant status:				
1st generation	436 (35.4%)	11 (7.1%)	62 (12.5%)	323 (21.2%)
2nd generation	678 (55.0%)	10 (6.5%)	54 (10.9%)	782 (51.2%)
3rd generation (or greater)	118 (9.6%)	133 (86.4%)	380 (76.6%)	421 (27.6%)
Marital status of parents:				
Married	968 (77.8%)	52 (33.8%)	303 (62.2%)	930 (60.2%)
Divorced	161 (12.9%)	42 (27.3%)	128 (26.3%)	230 (14.9%)
Separated	54 (4.3%)	40 (26.0%)	37 (7.6%)	263 (17.0%)
Widowed/widower	36 (2.9%)	10 (6.5%)	12 (2.5%)	54 (3.5%)
Both parents deceased	12 (1.0%)	3 (1.9%)	4 (0.8%)	8 (0.5%)
Other	14 (1.1%)	7 (4.5%)	3 (0.6%)	60 (3.9%)

Table 2
Smoking prevalence by grade, gender, and ethnicity

Variable	*n*	Ever smoking %	χ^2	*p* value	30-day smoking %	χ^2	*p* value
Grade level			76.216	<0.001		26.544	<0.001
8th graders	1127	20.5			2.8		
9th graders	2358	35.0			7.3		
Sex			3.979	0.046 *		3.346	0.067
Male	1720	32.0			6.5		
Female	1727	28.8			5.0		
Race			68.924	<0.001		15.408	<0.01
Asian–American	1250	23.4			7.9		
African–American	157	22.9			4.7		
White, non-Hispanic	508	28.5			4.6		
Hispanic	1595	37.2			4.7		
Total	3510	30.4			5.9		

Note: Percentage decompositions do not add to 100% because of missing responses.
* $p<.05$.

significantly across ethnic groups. Hispanic adolescents reported the highest lifetime smoking rates, followed by the White, Asian–American, and African–American groups.

Weight concern according to grade, gender, and ethnicity is summarized in Table 3. There were significant differences between ethnic groups when mean weight concern scores were compared, with Hispanics having the highest mean and Asian–Americans the lowest ($p<.001$). When gender differences were compared, the females' mean weight concern score was significantly higher than that of male respondents ($p<.001$). There were no significant pairwise interactions among grade level, sex, and race, nor was there a significant three-way interaction ($p>.05$).

Table 3
Weight concern by grade, gender, and ethnicity

	Mean (±SD)	*df*	Mean squares	*F*	*p* value
Grade level:		1	155.72	2.63	.105
8th graders	16.59(7.92)				
9th graders	17.31(8.01)				
Sex:		1	5205.39	87.74	<.001 *
Female	18.93(8.30)				
Male	15.27(7.20)				
Race:		3	421.65	7.11	<.001 *
Asian–American	16.21(7.38)				
African–American	17.08(8.28)				
White, non-Hispanic	16.45(8.29)				
Hispanic	18.02(8.24)				
Grade level × sex		1	53.25	0.90	.344
Grade level × race		3	32.20	0.54	.653
Race × sex		3	139.26	2.347	.071
Grade level × race × sex		3	80.03	1.349	.257

* $p<.01$.

Table 4
Associations between weight concern and lifetime smoking

	Unadjusted multivariate			Adjusted multivariate		
	OR	95% CI	*p* value	OR	95% CI	*p* value
Weight concern						
Low to medium level	Reference			Reference		
High level	1.42	1.20, 1.68	.000**	1.33	1.10, 1.62	.004**
Race						
White, non-Hispanic	Reference			Reference		
Asian–American	0.76	0.61, 0.96	.023*	0.66	0.50, 0.85	.002**
African–American	0.75	0.49, 1.13	.168	0.51	0.31, 0.83	.006**
Hispanic	1.48	1.19, 1.84	.000**	1.16	0.89, 1.50	.275

Note: Adjusted by grade level, sex, race, education of parents, and marital status of parents. *$p<.05$, **$p<.01$.

Univariate and multivariate logistic regression models were performed to evaluate the association between lifetime smoking and weight concern (see Table 4). The results of the univariate analysis revealed a significant association between a higher level of weight concern and increased risk of lifetime smoking for the whole sample. A high level of weight concern was significantly associated with a decreased risk for lifetime smoking among Asian–Americans compared to Whites (OR=0.76, 95%, CI=0.61, 0.96, $p<.05$). In contrast, a high level of weight concern was significantly associated with an increased risk for lifetime smoking among Hispanics when compared to Whites (OR=1.48, 95%, CI=1.19, 1.84, $p<.01$). African–Americans were not significantly different from Whites with regard to the association between weight concern and lifetime smoking. After controlling for potentially confounding effects of covariates, a high level of weight concern was significantly associated with a decreased risk of lifetime smoking for Asian–Americans (OR=0.66, 95%, CI=0.50, 0.85) and for African–Americans compared to Whites (OR=0.51, 95%, CI=0.31, 0.83).

4. Discussion

In this study, we examined the association between smoking initiation and weight concern. Our respondents were young adolescents from four ethnic groups. We found inter-group differences in lifetime smoking rates, in weight concern, and in the association between weight concern and lifetime smoking rates among the groups.

We found that a higher level of weight concern was a risk factor for smoking initiation for the sample as a whole. Participants who reported having more weight concern were more likely to report having tried smoking. Our results are consistent with previous research on the relationship between weight concern and smoking among adolescents (Delnevo, Hrywna, Abatemarco, & Lewis, 2003; French & Jeffery, 1995).

In our sample, in contrast to Wiecha's (1996) findings, Hispanics had the highest smoking prevalence rates in lifetime smoking compared to the three other ethnic groups. Hispanics also had the highest level of weight concern. In addition, within the Hispanic group, those with high weight concern were more likely to smoke. For the other ethnic groups, the picture was not quite as clear. African–Americans had the lowest smoking prevalence, but their level of weight concern was the second highest among the ethnic groups. Asian–Americans had the lowest level of weight concern, and their smoking prevalence was also low (but not quite as low as that of the African–Americans).

The intragroup connection between weight concern and smoking did not apply to one of the ethnic groups. Among Asian–Americans, those with greater weight concern were less likely to smoke. A possible explanation for the anomaly may be that Asian–American youth are slim in general; accordingly, there is little reason for them to take up smoking to control their weight.

A possible methodological limitation to this study is that the results are cross-sectional. We cannot determine definitively whether weight concern induces smoking or whether one of the consequences of smoking initiation is a decreased concern with weight. If we are willing to assume causality despite this loophole in the logic, the study highlights the need to identify alternative means to control weight rather than via the unhealthy behavior of smoking. The different influences of weight concern on smoking among ethnic groups also point to the importance of cultural targeting when designing and implementing prevention programs.

Acknowledgement

Preparation of this manuscript was supported by the California Tobacco Related Disease Research Program (TRDRP Grant # 9DT-0090).

References

Cachelin, F., Weiss, J. W., & Garbanati, J. A. (2003). Dieting and its relationship to smoking, acculturation, and family environment in Asian and Hispanic adolescents. *Eating Disorders*, *11*, 51−61.

Chen, X., & Unger, J. B. (1999). Hazards of smoking initiation among Asian–American and non-Asian adolescents in California: A survival model analysis. *Preventive Medicine*, *28*, 589−599.

Crocker, P., Kowalski, N., Kowalski, K., Chad, K., Humbert, L., & Forrester, S. (2001). Smoking behavior and dietary restraint in young adolescent women: The role of physical self-perceptions. *Canadian Journal of Public Health*, *92*, 428−432.

Delnevo, C. D., Hrywna, M., Abatemarco, D. J., & Lewis, M. J. (2003). Relationships between cigarette smoking and weight control in young women. *Family and Community Health*, *26*, 140−146.

Epstein, J. A., Botvin, G. J., & Diaz, T. (1998). Ethnic and gender differences in smoking prevalence among a longitudinal sample of inner-city adolescents. *Journal of Adolescent Health*, *23*, 160−166.

French, S. A., & Jeffery, R. W. (1995). Weight concerns and smoking: A literature review. *Annals of Behavioral Medicine*, *17*, 234−244.

Gritz, E. R., Klesges, R. C., & Meyers, A. W. (1989). The implications of the smoking and body weight relationship for programmatic smoking intervention and controlling postcessation weight gain. *Annals of Behavioral Medicine*, *11*, 144−153.

Neumark-Sztainer, D., Story, M., Falkner, N. H., Beuhring, T., & Resnick, M. D. (1999). Sociodemographic and personal characteristics of adolescents engaged in weight loss and weight/muscle gain behaviors: Who is doing what? *Preventive Medicine*, *28*, 40−50.

Potter, B. K., Pederson, L. L., Chan, S. S. H. C., Aubut, J. A. L., & Koval, J. J. (2004). 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*, *6*, 397−425.

United States Department of Health and Human Services. (USDHHS). (1998). *Tobacco use among U.S. racial/ethnic minority groups: A report of the Surgeon General.* Atlanta: U.S. 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.

van Strien, T., Frijters, J. E. R., Bergers, G. P. A., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders*, *5*, 295−315.

Weiss, J. W., & Garbanati, J. A. (2006). Effects of acculturation and social norms on adolescent smoking among Asian–Americans. *Journal of Ethnicity in Substance Abuse*, *5*, 75−90.

Wiecha, J. M. (1996). Differences in patterns of tobacco use in Vietnamese, African–American, Hispanic, and Caucasian adolescents in Worcester, Massachusetts. *American Journal of Preventive Medicine*, *12*, 29−37.