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BODY MASS INDEX AND REGULAR SMOKING IN YOUNG ADULT WOMEN

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Abstract

Little is known about the relationship between relative body weight and transition from experimentation to regular smoking in young adult women. In the current study, data from 2494 participants in wave 4 of the Missouri Adolescent Female Twin Study (aged 18-29 years) who reported ever smoking a cigarette were analyzed using logistic regression. Body mass index (BMI) at time of interview was categorized according to CDC adult guidelines, and regular smoking was defined as having ever smoked 100 or more cigarettes and having smoked at least once a week for two months in a row. Since the OR's for the overweight and obese groups did not differ significantly from one another in any model tested, these groups were combined. Forty-five percent of women who had ever smoked had become regular smokers. Testing of interactions between potential covariates and levels of the categorical BMI variable revealed a significant interaction between overweight/obesity and childhood sexual abuse (CSA; $p < 0.001$) associated with regular smoking. Among women reporting CSA, the association between overweight/obesity and having become a regular smoker was negative ($n = 374$; OR = 0.48, 95% CI: 0.28-0.81). Both underweight and overweight/obesity were positively associated with transition to regular smoking among women who did not report CSA ($n = 2076$; OR = 1.57, 95% CI: 1.05-2.35 and OR = 1.73, 95% CI: 1.35-2.20, respectively). These results suggest that experiencing CSA alters the association between BMI and regular smoking in women who have experimented with cigarettes.

Keywords

Smoking; body mass index; childhood sexual abuse; twins; MOAFTS

1. INTRODUCTION

Smoking and obesity are the leading preventable causes of disease and have been identified by Healthy People 2010 as leading health indicators (U.S. Department of Health and Human

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DISCLOSURE Pamela A.F. Madden was formerly on the scientific advisory board for deCODE Genetics. The other authors have no competing interests.

Services, 2000). Both smoking and obesity are independent risk factors for cardiovascular disease morbidity and mortality in women (Wilson, D-Agostino, Sullivan, Parise, and Kannel, 2002; Freedman et al., 2006; Eckel and Krauss, 1998), and the combination of current smoking and obesity has been found to have a synergistic effect on the risk of mortality from circulatory disease in women under age 65 (Freedman and others, 2006). It has been estimated that 4.2% of women in the U.S. are simultaneously current smokers and obese (Healton, Vallone, McCausland, Xiao, and Green, 2006).

The relationship between smoking behaviors and relative body weight is complex and appears to vary depending upon which smoking behavior is explored within the context of body weight. The bulk of studies on the association between current smoking and obesity in adult women have reported that current smokers are less likely to be obese and/or have lower body mass index (BMI) than never smokers (Molarius, Seidell, Kuulasmaa, Dobson, and Sans, 1997), although other studies have reported positive relationships between smoking and overweight. For example, Park (2009) observed that underweight and overweight women were more likely to be current smokers than normal weight women participating in the Minnesota Survey on Adult Substance Use, and Saarni et al (2009) found that women who had smoked more than 10 cigarettes a day in adolescence were more likely to be become overweight in young adulthood, even after adjusting for adolescent BMI (Saarni, Pietilainen, Kantonen, Rissanen, and Kaprio, 2009).

The majority of smokers smoke their first cigarette before age 18 (Substance Abuse and Mental Health Services Administration, 2008). The belief that smoking will reduce weight and/or prevent weight gain is common among female adolescents (Klesges, Elliot, and Robinson, 1997), and studies of smoking initiation in female adolescents have reported a positive association between smoking initiation and dieting, weight concern and being overweight (Cawley, Markowitz, and Tauras, 2003). Approximately 30% of individuals who experiment with smoking cigarettes go on to become regular smokers (Hu, Davies, and Kandel, 2006; Dierker et al., 2008). Although many studies have addressed the risk factors for, and correlates of, the transition to regular smoking in women, few have included body weight in their investigations. An exception is Kaufman and Augustson (2008), who examined the role of factors associated with body image, including BMI, in the transition to regular smoking in female participants in the National Longitudinal Study of Adolescent Health (Kaufman and Augustson, 2008). They did not find BMI to be significantly associated with regular smoking among adolescent women; however, the odds ratio for overweight, as compared to normal weight was protective (<1.00) and the 95% confidence interval did not include 1.00. Given the young age of the sample (grades 7-12 at baseline with follow-up 1 year later), and the somewhat low proportion of women who had transitioned to regular smoking some of the young women participating in the study may still be within their age of greatest risk for transition to regular smoking, and these results may instead reflect the relationship between BMI and early transition to regular smoking. It is possible that a different relationship may exist when women who transitioned later in adolescence and in young adulthood are included in the analysis. Furthermore, the analyses included women who had never smoked a cigarette among those who had not become regular smokers, and thus it is not possible to separate the relationship between BMI and smoking initiation from that of BMI and transition to regular smoking.

There are many potential confounders and moderators of the relationship between relative body weight and transition to regular smoking in women. For example, women who become regular smokers are more likely to suffer from psychiatric disorders and to have experienced childhood trauma such as sexual abuse (Nelson et al., 2006; Agrawal et al., 2005; Sartor et al., 2008), and psychopathology and childhood trauma have also been shown to be associated with relative body weight (Kasen, Cohen, Chen, and Must, 2007; Noll, Zeller,

Trickett, and Putnam, 2007; Pickering, Grant, Chou, and Compton, 2007; Scott et al., 2008). Despite these associations, few studies have examined these variables as potential confounders or effect modifiers. The objective of the current study was to characterize the association between BMI and the transition from smoking experimentation to regular smoking in young adult women and to identify mediators and moderators of this relationship. Since previous studies had found obesity to be related to smoking initiation, we hypothesized that female ever-smokers who had gone on to become regular smokers would be more likely to be obese at the time of interview than those who had not progressed from smoking experimentation. Given the exploratory nature of this study, we did not have a priori hypotheses regarding specific mediators and moderators of the relationship between transition to smoking and obesity.

2. METHODS AND PROCEDURES

The Missouri Adolescent Female Twin Study (MOAFTS) is a study of female twin pairs born between 1975 and 1985 to parents residing in the state of Missouri. Parents of twins were identified and traced through birth records and contacted regarding participation (target $n = 1,999$ European-American [EA] and $n = 370$ African-American [AA] pairs representing all live-born pairs of Missouri resident parents; 95.9% of families located, $n = 2,279$). Participants reflect statewide demographics and include individuals of non-Hispanic AA and EA ancestry coming from rural and urban areas. Data collection from the twins began with the baseline interview in 1995-1999, when twins were of median age 15 (mean [SD] = 15.52 [2.42]; range: 12-23 years). Unless otherwise noted, data for the current study come from the Wave 4 data collection, which was conducted between 2000 and 2005, on average 5 years after the baseline assessment, when the twins were median age 22 (mean = 21.69 [2.76]; range: 18-29 years). Cross-sectional data from Wave 4 was used rather than using longitudinal data from all waves of data collection for two reasons. First, at Wave 4 all women originally targeted at baseline were recontacted unless they had previously been withdrawn from the study, because minors for whom parental consent was denied at baseline were of legal age of consent at Wave 4; this resulted in 925 new participants at Wave 4. Of women successfully recruited for Wave 4, those reporting a history of childhood sexual abuse were less likely to have participated at baseline (OR=0.51, 95% CI: 0.71-0.62), as were women who were obese at wave 4 (OR=0.75, 95% CI: 0.60-0.91). Second, over a third (36%) of the women who reported ever smoking cigarettes at Wave 4 had already progressed to regular smoking by the time of the Wave 1 interview.

In the current study, 28% ($n=1070$) of the total 3,785 Wave 4 participants were excluded because they had never smoked a cigarette or had missing data on smoking variables. An additional 214 women were excluded because of known pregnancy/postpartum status at time of interview and 7 women were excluded because of missing data for height and/or weight. Analyses were conducted on the remaining sample of 2,494 women. Additional details regarding the sample are available elsewhere (Heath et al., 1999; Heath et al., 2002).

Study participants were interviewed with a telephone adaptation of the Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA), a comprehensive structured psychiatric diagnostic instrument (Bucholz et al., 1994). Individual diagnoses of the original SSAGA, including alcohol dependence, other drug dependence, and depression have indicated good to excellent reliability, with κ exceeding 0.60 for most diagnoses studied (Bucholz and others, 1994; Hesselbrock, MESA, Bucholz, Schuckit, and Hesselbrock, 1999). Self-reported height and weight, used to compute BMI, were included as part of the zygosity section of the interview. Respondents' BMI based on self-reported height and weight was highly correlated with that calculated based on their co-twins' reports (follow-up $r = .90$). BMI was categorized using standard adult BMI cutoffs: underweight ($<18.5 \text{ kg/m}^2$), normal

weight (18.5-24.9 kg/m²), overweight (25.0-29.9 kg/m²), and obese (≥ 30 kg/m²). Very few women in the sample met criteria for a strict *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition lifetime diagnosis of eating disorder (15 with bulimia nervosa, 13 with anorexia nervosa, 1 with both disorders, and 4 with binge eating disorder) (Duncan et al., 2007). Since recency data for anorexia nervosa symptoms were not collected, it was not possible to determine the prevalence of eating disorders at the time of interview. However, one woman with a lifetime diagnosis of binge eating disorder and 12 women with bulimia nervosa reported binge eating in the past year at the time of interview.

The smoking section of the interview, based on the World Health Organization's Composite International Diagnostic Interview (World Health Organization, 1997) included detailed questions on current and past smoking behavior. Women were classified as ever smokers if they endorsed the question "Have you ever tried a cigarette?" Women who had ever smoked were considered to have transitioned to regular smoking if they (a) indicated that they had smoked ≥ 100 cigarettes in response to the question "How many cigarettes have you smoked in your life?" and (b) reported ever having smoked at least once a week for at least two months in a row.

Variables identified from the literature as being related to both BMI and smoking and available in the MOAFTS datasets were selected as potential covariates. Being currently enrolled in school, current employment status, living with a parent or guardian for the majority of the past 12 months, DSM-IV lifetime major depression and conduct disorder, lifetime alcohol use (ever vs. never), intoxication (ever vs. never), marital status, having many friends, having a majority of friends who smoke cigarettes, early menarche (<12 years) were obtained from the twin interview. Binge eating and weight shape concern, assessed as part of the eating disorders diagnostic section (Duncan and others, 2007), were also included as covariates. In addition, parental education (maternal and paternal education $\leq$ high school) was obtained from the parental (usually maternal) interview conducted at baseline in which the parent completing the interview reported his or her own education achievement as well as that of the other parent. Parental report data were not available for 524 women eligible for the study. Therefore maternal and paternal education variables were each included in multivariable models as a set of design variables (parental education $\leq$ high school or parental data missing, with parental education $>$ high school as the referent). Maternal and paternal education $\leq$ high school were moderately correlated (tetrachoric correlation = .67).

Retrospective self-report of child abuse was assessed in several interview sections. In addition to the traumatic events section, which was adapted from that used in the National Comorbidity Study (Kessler, Sonnega, Evelyn, Hughes, and Nelson, 1995) and contained questions on physical abuse, rape or sexual molestation at any time in childhood, including age onset, the parental discipline and early childhood experiences section of the interview included questions on physical discipline between ages 6 and 13 and forced sexual contact before age 16. Respondents were also asked about forced sex (including age onset) in the sexual maturation section. A woman was coded positive for childhood physical or sexual abuse if she reported onset before age 16. This age cutoff has been used in numerous other studies (e.g., (Fergusson, Lynskey, and Horwood, 1996; Sartor et al., 2007).

Statistical analyses were conducted using Stata Version 9 (StataCorp LP, College Station, TX), and standard errors were adjusted for the nonindependence of observations inherent in twin data using Huber-White robust variance estimation (StataCorp, 2005). Given the existence of a strong relationship between age and the outcome and many of the covariates, all analyses adjusted for age using logistic regression. Since age was positively skewed in this sample, it was modeled as a set of dummy variables representing age quartiles with the

lowest quartile serving as the referent. First, interactions between the potential confounders and the BMI categories were assessed by entering an interaction term between the covariate and each level of the BMI variable into a logistic regression model along with the main effects for BMI and the covariate. The interactions with each level of BMI were tested separately. Since three interactions were tested per covariate (one for each BMI category other than the referent), a Bonferroni adjusted p-value of 0.017 was used to indicate statistical significance. When a statistically significant interaction was identified, separate models stratified on that variable were built. Potential confounders of the relationship between BMI category and regular smoking were assessed in each stratum by adding the variables into the base model for that stratum one at a time. If the addition of the covariate caused the odds ratio (OR) for any of the levels of the BMI category design variable to change by more than 10%, the variable was judged to be a confounder and was retained in the model. A change of less than 10% resulted in the variable being dropped from the model (Greenland, 1989).

3. RESULTS

Forty-five percent of women in the sample who had ever smoked a cigarette went on to become regular smokers. The majority of the sample (62.67%) had BMI's in the normal weight category, followed by overweight (17.20%), obese (13.95%), and underweight (6.17%). Forty-seven percent of women in the overweight and obese categories had transitioned to regular smoking compared to 43% of normal weight women and 56% of underweight women (omnibus p-value=0.010). The prevalences of BMI categories and potential covariates by smoking status are presented in Table 1. With the exception of missing parental education data, living with a parent or guardian in the past year, and having many friends, there were significant differences between regular smokers and experimenters in the prevalence of all covariates. Compared to experimenters, women who had transitioned to regular smoking were less likely to be African-American and to be currently enrolled in school and more likely to be positive on all other covariates (e.g., CSA).

Since ORs for obesity and overweight were of similar magnitude and post hoc tests indicated that they could be equated in all models tested, the overweight and obese groups were combined into one. Testing of interactions between potential covariates and levels of the categorical BMI variable revealed a significant interaction between overweight/obesity and having a history of childhood sexual abuse (CSA; $p \leq 0.001$ in models with and without additional covariates). Therefore, further analyses were stratified by CSA. The prevalence of regular smoking by BMI category, stratified by CSA status, is presented in Table 2, which shows that underweight and normal weight women higher rates of transitioning to regular smoking if they had been sexually abused, but that rates of transition to regular smoking for overweight/obese women were similar regardless of CSA status. Results from the logistic regression analyses are presented in Table 3. Among women who did not report CSA ($n=2076$), underweight and overweight/obesity were positively associated with transition to regular smoking when compared to the normal weight group (OR=1.57, 95% CI: 1.06-2.35 and OR=1.73, 95% CI: 1.35-2.20, respectively) after adjusting for age and additional relevant confounders. Among women reporting CSA ($n=332$), however, overweight/obesity was negatively associated with transition to regular smoking in the adjusted model (OR=0.47, 95% CI: 0.28-0.81), and there was no significant association between underweight and transition to regular smoking.

4. DISCUSSION

In this population-based sample of young adult female twins the relationship between transition to regular smoking and BMI in ever smokers differed by whether or not a woman

had experienced childhood sexual abuse. Specifically, there were positive associations between underweight and overweight/obesity and transition to regular smoking among women who had never experienced childhood sexual abuse and a negative association between overweight/obesity and transition to regular smoking among those that did experience childhood sexual abuse. While we did not specifically hypothesize an interaction between CSA and overweight/obesity, evidence for this interaction was not wholly unexpected, given that child maltreatment, including CSA, is a potent environmental risk factor for many adverse outcomes that may alter biological processes (Heim et al., 2000; Weiss, Longhurse, and Mazure, 1999; Carpenter et al., 2007).

The results among women who had not experienced sexual abuse (the majority of our sample) differed from the results of most previous studies of the relationship between body weight and current smoking, which have found that female current smokers weighed less than non-smokers or that there were no significant differences in BMI between smokers and non-smokers (Chiriboga et al., 2008; Molarius and others, 1997; Duvigneaud et al., 2007). The group of women who had transitioned from smoking experimentation to regular smoking in our study included women who were not current smokers; however, the majority of those who had transitioned to regular smoking were current smokers at the time of interview (85%). While current smoking has been associated with lower BMI in many studies (Duvigneaud and others, 2007; Chiriboga and others, 2008; Klesges and others, 1997), some studies have found that former smokers are heavier than never smokers (Lahti-Koski, Pietinen, Heliovaara, and Vartiainen, 2002; Park, 2009), and others have found no significant differences in weight between former and never smokers (Duvigneaud and others, 2007; Mizoue, Ueda, Tokui, Hino, and Yoshimura, 1998). Overweight and obesity, along with dieting and weight concern, have been found to be positively related to smoking initiation (Cawley and others, 2003; Klesges and others, 1997). It is thus not surprising that these factors are also related to transitioning to regular smoking. It is also important to note that, although some previous studies have found that the relationship between smoking and BMI differs by educational level (Molarius and Seidell, 1997), we did not find any evidence in our data that the relationship between BMI and transition to regular smoking was moderated by either parental education or being currently in school (many study participants were still of college age at the time of assessment, and as such we did not feel that highest educational level attained was a useful variable).

Previous findings are more similar to our findings in women who reported CSA, for whom transition to regular smoking was associated with decreased odds of being overweight or obese. Overall, women who had experienced CSA had significantly higher rates of transition to regular smoking as well as overweight and obesity, which is consistent with the literature (e.g., Nelson et al., 2002; Noll and others, 2007); however, among overweight and obese women, those who had experienced CSA actually had lower rates of transition to regular smoking than overweight and obese women who had not experienced CSA, although this difference was not statistically significant. Compared to overweight and obese women who had not experienced CSA, those who had been abused were more likely to endorse weight/shape concern and binge eating and to have lifetime diagnoses of major depression and conduct disorder, an unanticipated finding given that these constructs and diagnoses are positively associated with smoking both in the total MOAFTS sample (see Table 4) and in the literature (Fergusson, Boden, and Horwood, 2008; Rayworth, Wise, and Harlow, 2004; Weiss and others, 1999). Overweight and obese women who had experienced CSA were also less likely to be employed, to have lived with a parent or guardian in the past year and have ever been intoxicated. None of these variables, however, confounded the relationship between overweight/obesity and transition to regular smoking women who did or did not experience CSA. Therefore it is likely that the explanation for the interaction between overweight/obesity and CSA involves variables unmeasured in the MOAFTS study.

Knowledge of the temporal sequence of onset of overweight/obesity, CSA, and regular smoking might also provide insight into the relationships between these three variables. Although the MOAFTS study assesses the age of onset of CSA and regular smoking retrospectively, information on participants' height and weight before the study's baseline assessment (median age 15, age range 12-23), when many participants had already experienced CSA and/or transitioned to regular smoking.

In this study we have treated MOAFTS as a general population sample, ignoring the twin structure of the data, with the exception of using robust standard errors to account for the relatedness of our twin pairs. Four percent of the women in the total MOAFTS Wave 4 sample were both obese and current smokers, identical to the prevalence in the National Health Interview Survey reported by Heaton et al (Heaton and others, 2006). A substantial amount of literature has documented a strong genetic contribution to variation in BMI, including BMI assessed during young adulthood (Duncan et al., 2009; Maes, Neale, and Eaves, 1997). Given the evidence for the heritability of regular smoking (Broms, Silventoinen, Madden, Heath, and Kaprio, 2006; Heath, Martin, Lynskey, Todorov, and Madden, 2002), as well as for a relationship between smoking behavior and BMI (Duvigneaud and others, 2007; Chiriboga and others, 2008), it is possible that regular smoking and BMI share common genetic and/or environmental liability. However, in preliminary analyses we found little evidence for common genetic liability to BMI and transition to regular smoking, implying that genetic analysis would not be useful.

This study had several limitations. First, BMI was computed using self-reported height and weight. Self-reported height and weight have been found to correspond highly with actual height and weight in young women (Brunner Huber, 2007; Goodman, Hinden, and Khandelwal, 2000), although a bias toward underreporting weight has been observed in adolescents (Elgar, Roberts, Tudor-Smith, and Moore, 2005; Goodman and others, 2000). We do not have measured height and weight for MOAFTS participants; however, respondents were asked their co-twins' heights and weights in the zygosity section of the interview, and BMI based on self-reported height and weight was highly correlated with that calculated based on their co-twins' reports ($r=.90$).

A second limitation is that data on physical activity and diet were not collected from MOAFTS participants. Since poor diet and lack of physical activity are the most important risk factors for overweight/obesity and these variables have also been found to be positively associated with smoking (Huot, Paradis, and Ledoux, 2004; Huot, Paradis, Receveur, and Ledoux, 2004; Pitsavos, Panagiotakos, Lentzas, and Stefanadis, 2005), it is possible that inclusion of these variables in the models would have altered the results. These variables are, however, also associated with socioeconomic status (Brennan, Henry, Nicholson, Kotowicz, and Pasco, 2009; Pan et al., 2009; Thompson, Rafiroiu, and Sargent, 2003), and the relationship between overweight/obesity and transition to regular smoking was still statistically significant after the inclusion of paternal and individual educational status as a proxy for socioeconomic status.

Finally, it is not possible to make causal inferences given that the analyses were cross-sectional. Although longitudinal data were available, we chose to conduct our analyses using cross-sectional data because we felt that results of analyses on Wave 4 of MOAFTS were likely more generalizable than those from women who participated at both time points since the entire sample, including women whose parents had refused participation for them at baseline when they were minors, was retargeted at Wave 4, resulting in 925 new study participants. Women entering the study at Wave 4 were more likely than those recruited at baseline to report CSA and to be obese. Furthermore, 36% of the women who had ever smoked cigarettes had already progressed to regular smoking by the time of the Wave 1

interview. Thus, results from a longitudinal analysis could not be generalized to all women who had ever tried a cigarette because early onset smokers would be excluded from the analyses. We did, however, conduct analyses in women who had tried cigarettes but were not regular smokers at Wave 1 and who had data at Wave 4 and found a statistically significant interaction between obesity and CSA in the same direction as that in the cross-sectional analyses.

This study provides evidence that relative body weight may be a factor in the transition from smoking experimentation to regular use in women. It suggests, however, that there is important heterogeneity within the group of overweight/obese women such that the role played by relative body weight may differ according to the experience of adverse events in childhood. Future research should focus on elucidating the mechanisms by which young women become regular smokers and how these might differ according to weight and CSA status.

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Table 1

Prevalence of demographic and behavioral characteristics of female ever smokers by regular smoking status.

	Regular smokers (n=1119)	Experimenters (n=1375)	p-value**
BMI category			0.010
Underweight	7.69	4.95	
Normal weight	59.79	65.02	
Overweight	16.51	18.05	
Obese	13.53	14.48	
African-American	6.43	17.82	<0.001
Mean years since first cigarette (SE)	8.52 (0.13)	6.77 (0.12)	<0.001
Currently enrolled in school	32.35	55.13	<0.001
Employed full or part time	71.17	75.05	0.004
Married or cohabiting	40.93	27.42	<0.001
Lives with parent/guardian*	29.85	36.36	0.451
Maternal education			
> high school	35.75	42.98	--
≤ high school	43.07	36.15	0.001
missing	21.18	20.87	0.119
Paternal education			
> high school	31.28	39.05	--
≤ high school	47.54	40.07	<0.001
missing	21.18	20.87	0.504
Has many friends	48.17	51.35	0.94
Majority of friends smoke cigarettes	62.18	24.74	<0.001
Ever drank alcohol	97.32	93.60	0.001
Ever been intoxicated	88.91	72.29	<0.001
Experienced CSA	19.49	11.97	<0.001
Menarche <12 years old	20.93	17.06	0.026
Weight/shape concern	31.81	28.11	0.046
Binge eating	10.43	7.74	0.017
Major depression – lifetime	30.21	18.11	<0.001
Conduct disorder – lifetime	11.12	2.98	<0.001

NOTE: All numbers are percentages unless otherwise indicated.

Table 2

The prevalence of regular smoking by BMI category among women who have and have not experienced sexual abuse.

	CSA % (n)	No CSA % (n)
Underweight	81.48 (22)	49.59 (61)
Normal weight	66.86 (117)	39.71 (546)
Overweight or obese	43.50 (77)	48.06 (285)

Table 3

Stratified logistic regression models for transition to regular smoking in 2450 women who have ever smoked a cigarette[^]

	Did not experience CSA[*] (n=2076)	Experienced CSA^{**} (n=374)
BMI category		
Underweight	1.57 (1.05-2.35)	1.22 (0.42-3.54)
Normal weight	1.00 (referent)	1.00 (referent)
Overweight/obese	1.73 (1.35-2.20)	0.48 (0.28-0.81)

[^] the number of participants for these analyses differs from that in table 1 due to missing data on childhood sexual abuse (n=24) and other covariates (n=20).

^{*} adjusted for African-American race, age, ever intoxicated, majority of friends smoke and enrolled in school

^{**} adjusted for African-American race, age, marital status, majority of friends smoke, and paternal education

Table 4

Characteristics of overweight/obese women who have ever smoked a cigarette by CSA status.

	CSA (n=177)	No CSA (n=593)	p-value**
Regular smoking	43.50	48.06	0.313
Mean years since first cigarette (SE)	9.60 (0.35)	7.75 (0.18)	<0.001
Currently enrolled in school	32.20	36.09	0.352
Employed full or part time	61.58	71.16	0.015
Married or cohabiting	35.59	37.10	0.722
Lives with parents*	18.08	34.57	<0.001
Maternal education			0.015
> high school	32.77	36.09	
≤ high school	35.59	43.51	
missing	31.64	20.04	
Paternal education			0.017
> high school	21.47	26.64	
≤ high school	46.89	52.95	
missing	31.64	20.40	
Has many friends	32.77	41.99	0.037
Majority of friends smoke cigarettes	44.00	37.03	0.110
Ever drank alcohol	91.53	93.25	0.438
Ever been intoxicated	66.10	74.03	0.048
Menarche <12 years old	38.07	25.30	0.001
Weight/shape concern	56.82	33.45	<0.001
Binge eating	20.45	8.09	<0.001
Major depression – lifetime	49.72	22.43	<0.001
Conduct disorder – lifetime	13.07	7.76	0.037

NOTE: All numbers are percentages unless otherwise indicated.