

Disordered eating, weight dissatisfaction, and dissatisfaction with physical appearance in adolescents
who use smokeless tobacco (Swedish snus)

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Abstract

Objective: While cigarette smoking has been linked to weight-related concerns and disordered eating, little is known about disordered eating behaviors and weight dissatisfaction among adolescents who utilize smokeless tobacco products (SLT). The use of Swedish moist snuff (snus) has increased dramatically over recent years, surpassing smoking among young people in several countries. This study investigated differences in disordered eating behaviors, weight dissatisfaction, and physical appearance dissatisfaction in male and female adolescents who never, occasionally, or regularly-used snus. **Method:** 23,622 adolescents aged 16-19 years from 40 high schools (11th, 12th, 13th grades) completed a cross-sectional, online national survey of adolescent health and well-being. Items assessed meal frequency, disordered eating pathology (e.g., desire for thinness, dieting, excessive exercise, vomiting, food preoccupation), and dissatisfaction with weight and physical appearance. Analyses were adjusted for cigarette smoking and socio-economic status. **Results:** Adolescents who used snus reported less regular breakfast, lunch, and dinner consumption. Among females, occasional and daily users reported higher levels of dissatisfaction with weight and physical appearance, and female occasional users reported greater eating disorder pathology. Among males, occasional and daily snus users reported greater weight dissatisfaction, which was characterized by perceived underweight (“I weigh too little”). **Discussion:** Unhealthy eating behaviors and weight dissatisfaction were significantly elevated among snus users 16-19 years of age, characterized differentially by gender. Increased awareness that occasional snus use may signal eating disorder pathology among adolescent females is important for detection and prevention. Parents, schools, and health professionals should be vigilant of snus use among weight-dissatisfied adolescents.

Keywords: Snus, Tobacco, Smokeless, Eating Disorders, Body Image, Physical Appearance, Prevention, Adolescence

Disordered eating, weight dissatisfaction, and dissatisfaction with physical appearance in adolescents who use smokeless tobacco (Swedish snus)

Snus, or Swedish-type moist snuff, is an oral smokeless and spitless tobacco product confectioned loose, or portion-packed in a small pouch positioned behind the upper lip. Snus has become increasingly marketed and sold in many countries, including North America, where the sales of pouched forms of moist snuff in the US increased by 333.8% between 2005 and 2011 (Delnevo et al., 2014). In Norway, the official sale of all tobacco products to minors (under 18 years) is illegal; however, snus remains widely available and is the most-commonly used tobacco product among youth 16 to 24 years of age (SSB, 2018). Over the past years, a shift in nicotine consumption has occurred among young people, marked by a dramatic reduction in cigarette smoking with parallel increases in smokeless forms of tobacco. The prevalence of daily cigarette smoking among 16- to 17-year-old Norwegians, for instance, fell from 23.6% to 6.8% between 2002 and 2010, whereas the prevalence of daily snus use nearly tripled from 4.3 to 11.9% (Pedersen & von Soest, 2014).

Tobacco harm reduction efforts have indicated a role for snus in aiding personal efforts at smoking cessation (Foulds, Ramstrom, Burke, & Fagerstrom, 2003), yet adopting a public health strategy that actively promotes a transition to snus, a highly addictive product containing several harmful substances including nitrosamines (TSNAs), remains debated (Berman et al., 2018; FHI, 2014; Gartner et al., 2007). Studies from Sweden have found that switching to snus is indeed a widely-used smoking cessation tool or harm reduction strategy cited by smokers, especially men (Ramstrom, Borland, & Wikmans, 2016). However, some studies have found that the majority of occasional users (Furberg et al., 2005) and younger female users (Kvaavik, Lund, Nygard, & Hansen, 2016) have *never* smoked. This indicates a strikingly different user profile and indicates that snus is not employed universally for the sole purpose of smoking cessation, but is associated with other factors.

Weight control has been identified as one expectancy factor related to snus use (Larsen, Rise, & Astrom, 2011). This is consistent with prior research on smoking, in which cigarette use has been cited as a “compensatory” method to control weight or suppress appetite by weight-concerned smokers (Fairweather-Schmidt & Wade, 2015; White, 2012). Weight-related concerns and a desire for thinness have been positively associated with the onset of cigarette smoking in children and adolescents (Field et al., 2002; Kendzor, Copeland, Stewart, Businelle, & Williamson, 2007). Studies have documented a high prevalence of weight concerns among participants enrolled in smoking cessation trials, and fears of post-cessation weight gain have been linked to attrition (Clark et al., 2006; Copeland, Martin, Geiselman, Rash, & Kendzor, 2006). Additionally, cigarette smoking is associated with binge eating and purging in community studies (Fairweather-Schmidt & Wade, 2015; White, 2012). Smoking is also a significant health problem in clinical samples of eating disorders (ED), particularly binge/purge presentations such as bulimia nervosa (Anzengruber et al., 2006; Krug et al., 2009; Solmi et al., 2016). E-cigarette use, or vaping, has also been linked to eating disorders. A recent study found that individuals with a current self-reported ED were nearly four times more likely to vape daily, and to vape for weight loss, relative to individuals without an ED (Morean & L'Insalata, 2018).

Whether smokeless tobacco users concomitantly engage more frequently in unhealthy eating and weight control behaviors, or show greater body dissatisfaction — a robust and reliable risk factor for the development of ED (Stice, Gau, Rohde, & Shaw, 2017) — is unknown. To our knowledge, only two existing studies have investigated the associations between SLT use, disordered eating, and weight concerns. Sutter et al. (2016) found that extreme dieting behaviors (e.g., fasting, vomiting, laxatives or diet pills, liquids, powders) were proportionally more frequent among 12- to 18-year-old smokeless tobacco users, yet the study investigated a heterogeneous and broader range of SLT products (e.g., dip, chewing tobacco), making it difficult to specify conclusions. Root et al. (2010)

investigated patterns of comorbidity of ED and substance use behaviors in the Swedish Twin Registry. No significant differences were found in the prevalence of occasional or regular snus use between individuals with versus without a history of an ED. However, the study was based upon a 2006 cohort of the Swedish Twin Registry comprised of twins born between 1959 and 1985, which may predate the steep increase in snus use among young people occurring in Scandinavia since 2000. The authors speculated that significant group differences may become detectable as snus use increases, or that perhaps snus is being used equivocally by all women as a weight control measure (p.6).

Given the changing landscape of tobacco use and increasing sales of SLT worldwide, which are often marketed to directly appeal to young persons (Lynch & Bonnie, 1994), research investigating eating behavior and body image among younger SLT users is warranted. Eating disorders commonly begin during adolescence or young adulthood and longitudinal studies have demonstrated increases or stability in the trajectory of behavioral and attitudinal symptoms of ED into adulthood (Neumark-Sztainer et al., 2018; Slane, Klump, McGue, & Iacono, 2014). Adolescence is also a critical risk period for snus onset, with initiation occurring most often before the age of 26 years (Lipari & Van Horn, 2016). The primary aim of this exploratory study was to examine whether unhealthy eating and weight control behaviors, weight dissatisfaction, and dissatisfaction with physical appearance differed between non-users, occasional users, and daily users of Swedish snus in a population-based sample of male and female high school students.

Method

Study Design

A national, cross-sectional online survey of health behaviors in adolescence (Ungdata) was conducted. The Norwegian Public Health Act mandates the monitoring of the psychosocial environment for young persons on the municipality (township) level and Ungdata has been conducted in 405 of 422 municipalities (Bakken, 2017). Annual data

collection and database management is performed by the Norwegian Institute of Social Research (NOVA) and Oslo Metropolitan University (OsloMet), with funding by the Norwegian Directorate of Health, the Ministry of Children, Equality and Social Inclusion, and the Ministry of Justice and the Public Security. Ungdata is regarded as the most comprehensive source of information on adolescent health and well-being in Norway, with 150 mandatory items related to relationships with family and friends, leisure activities, health, local environment, and school. Schools may opt to administer additional (non-mandatory) sets of questions pertaining to mental health, which include items related to disordered eating, weight dissatisfaction, and physical appearance dissatisfaction. The online questionnaire is administered anonymously at school, is cost-free, and participation is voluntary and based upon informed consent. Data collection received ethical approval by the Norwegian Centre for Research Data (NSD).

Participants

A total of 26,171 students from over 40 upper secondary (high) schools representing urban and rural municipalities in Norway participated in the online UngData survey in 2016. In Norway, upper secondary school comprises the 11th, 12th, and 13th grades and typically, students range from 16 to 19 years of age.

In the current study, respondents with missing data on gender ($n = 1428$) and snus use frequency ($n = 1239$) were excluded, because the analyses were stratified on these variables, leaving $N = 23,622$. The gender distribution was 49.2% ($n = 11,631$) male and 50.8% ($n = 11,991$) female. Approximately 58% were 11th grade students, 33.9% were 12th grade students, and 8.3% were 13th grade students. Forty-two percent reported that both parents had a college/university education, while 30% had one college-educated parent, and 28.2% reported neither parent had a college/university education. Mean family affluence was estimated based on a composite variable of family ownership of cars, computers, vacations, and having one's own bedroom (Currie, Elton, Todd, & Platt, 1997). Using the classification

method by Griesbach et al. (Griesbach, Amos, & Currie, 2003), 26.1% of the adolescents were classified as low, 48.7% middle, and 25.1% high affluence.

Measurement

Snus Use.

Snus use was measured by the following item “Do you use snus?” Response alternatives were “0 = never used snus”, “1 = have used in the past, but totally quit now”, “2 = less often than once per week”, “3 = every week, but not daily”, and “4 = daily”. A constructed variable was created to classify participants on current snus consumption: *non-users* (affirmative response to either “never” or “have tried in past, but do not use at all now”), *occasional users* (affirmative response to either “less often than once a week” or “every week but not daily”), and 3) *daily users* (affirmative response to “daily”).

Meal Pattern and Frequency.

Frequency of meal (breakfast, lunch, dinner) consumption was measured with the item “How often do you usually eat the following meals?” Response alternatives were “never or rarely”, “once a week”, “2-3 times per week”, “4-6 times per week”, or “daily.” Responses were aggregated to create a dichotomous variable of *daily* versus *non-daily* meals.

Eating Disorder Symptoms.

A short version of the Eating Attitude Test (EAT) (Garner, Olmsted, Bohr, & Garfinkel, 1982) was used to assess eating disorder pathology. The EAT is a well-established brief, self-report measure of disordered eating symptoms with good reliability and validity as a screening tool in non-clinical settings, including at-risk samples of high school students (Garfinkel & Newman, 2001). The EAT-8 items assessed desire for thinness, diet attempts, feeling uncomfortable after eating sweets, engaging in exercise to burn calories, vomiting after eating, difficulty controlling eating, preoccupation with food, and feeling that food controls one’s life. These items were derived from the 12-item version of the EAT, which has been used extensively in Norway for longitudinal population research minus four oral control

items (Engelsen & Hagtvet, 1999). Response alternatives range from “never” to “always” and higher scores indicate greater severity of ED pathology. Cronbach’s alpha for the EAT-8 in the present study was .88.

Satisfaction with Physical Appearance.

Items were based on the Physical Appearance scale of the Self-Perception Profile for Adolescents (SPPA) (Harter, Waters, & Whitesell, 1998). This subscale has previously been used in several longitudinal studies of Norwegian adolescents (Wichstrom, 1995). Items assessed general satisfaction with physical appearance (i.e., “I wish my body was different”, “I am not happy with my appearance, “I think I am attractive, “I wish I looked differently” and “I am very happy with how I look”) using a 4-point response scale ranging from “not true” to “very true.” Higher scores indicate higher levels of dissatisfaction. Cronbach’s alpha for the SPPA was .91.

Weight Satisfaction.

One item was used to assess satisfaction with self-perceived weight, i.e. “How satisfied are you with your weight?” Three forced-choice alternatives were response options were available reflecting perceived underweight, overall satisfaction, and perceived overweight: “I weigh too little,” “My weight is fine,” and “I weigh too much.”

Statistical Analyses

Analyses were conducted using IBM SPSS Statistics for Windows, version 23 (IBM Corp., Armonk, N.Y., USA). General linear univariate ANOVAs were performed to test the effect of gender and snus frequency on the EAT-8 and satisfaction with physical appearance (SPPA). Analyses were then run separately by gender using univariate general linear models with Bonferonni-adjusted post-hoc tests. Covariates included socio-economic status (parental education and family affluence) and smoking. Eta-squared (η^2) estimated effect sizes: small $\geq .01$, medium $\geq .06$ and large $\geq .14$ (Cohen, 1988). Chi-square analyses run separately by gender were used for categorical variables. Adjusted standardized residuals and Bonferonni-

corrected post-hoc tests examined significance differences between cells. Effect sizes for the chi-squares were determined by Phi or Cramer's V and were interpreted as small = .07, medium = .21, and large = .35.

Results

The majority of the participants (79.2%, $n = 18,704$) were classified as non-users, 8.1% ($n = 1907$) were occasional users, and 12.7% ($n=3011$) were daily users. A higher proportion of daily users were male versus female (15% versus 10.9%, respectively, $\chi^2(2) = 78.50, p < .001$, Cramer's V = .057). Nearly 83% of the sample had never smoked cigarettes, 14.9% smoked occasionally, and 2.3% were daily smokers. Approximately 1% of the sample engaged in dual use of snus and cigarettes on a daily basis (1.6% males and 0.6% females).

Meal Skipping

Tables 1 and 2 present findings for daily/non-daily consumption of breakfast, lunch, and dinner in female and male adolescents, respectively. Meal skipping was proportionally more frequent among occasional and daily snus users in both genders. In particular, breakfast was the most frequently skipped meal.

Eating Disorder Symptoms

A general linear univariate ANOVA was conducted to explore the effect of gender and snus frequency on disordered eating behaviors (EAT-8) covaried for smoking and adolescent SES. No significant interaction existed between gender and snus use, $F(2, 3338) = 1.76, p = .171$, partial eta-squared = .001. However, statistically significant main effects were found for gender and snus category. Higher EAT-8 scores were found among females versus males [$M_s = 16.1$ versus 12.5 , respectively, $F(1, 3338) = 188.4, p < .001$, partial eta-squared = .054] and higher EAT-8 scores existed for occasional versus non-users [$M_s = 15.3$ versus 14.3 , respectively), $F(2, 3338) = 5.11, p = .006$, partial eta-squared = .003].

Run separately by gender, post-hoc tests showed that among females, *occasional* users reported more severe ED pathology ($M = 17.51, SD = 5.80$) than *non*-users ($M = 15.84, SD =$

5.39), whereas daily users did not differ significantly from either group ($M = 16.93$, $SD = 6.00$) (Table 1). No significant differences in the severity of ED pathology existed for male snus groups (Table 2).

Satisfaction with Physical Appearance

A significant interaction was found between gender and snus on appearance satisfaction [$F(2, 6095) = 12.64$, $p < .001$, partial eta-squared = .004]. Main effects were found for gender [$F(2, 6095) = 637.6$, $p < .001$, partial eta-squared = .095], with higher levels of appearance dissatisfaction among females than males ($M = 13.4$, $SD = 3.6$ versus $M = 10.0$, $SD = 3.9$, respectively) and snus group [$F(2, 6095) = 6.26$, $p = .002$, partial eta-squared = .002], with higher levels of appearance dissatisfaction in daily and occasional users versus non-users. Split by gender, post-hoc tests revealed significantly higher levels of appearance dissatisfaction in female daily and occasional snus users compared to female non-users (Table 1). No significant differences in the level of physical appearance dissatisfaction existed for male snus groups (Table 2).

Weight Satisfaction

In females, significantly higher proportions of daily (51.5%) and occasional (46.6%) users perceived themselves as “overweight” compared to non-users (36.4%). A significantly higher proportion of female daily users (11.3%) felt they weighed *too little* in comparison to non-users (5.4%) (Table 1). In males, equal proportions of non-, occasional, and daily snus users perceived themselves as weighing “too much” (15.8%, 13.8%, and 16.9%), while a significantly higher proportion of occasional and daily snus users (approximately one-third) perceived themselves as weighing “too little” (Table 2).

Discussion

The present study offers novel evidence of a link between an increasingly popular smokeless tobacco product (Swedish snus) and unhealthy eating behaviors, weight dissatisfaction, and physical appearance dissatisfaction in adolescents aged 16-19 years old.

Several main conclusions can be drawn from the findings. First, meal skipping, particularly breakfast, was proportionally more frequent among snus users of both genders, with lower proportions of occasional and daily users consuming meals on a daily basis. Second, females who *occasionally* used snus reported higher levels of eating disorder pathology. This finding may reflect a differential user profile marked by effortfulness, or the propensity to use snus discriminately for weight and shape-related purposes, in contrast to daily users. Third, dissatisfaction with general physical appearance (e.g., “I am not happy with my appearance, “I wish I looked differently”) was significantly elevated among occasional and daily female users, but not among males. Fourth, weight dissatisfaction was evident —yet appeared to manifest differently— in male and female users. In males, weight dissatisfaction was marked by perceived underweight (“I weigh too little”), whereas weight dissatisfaction among female users was generally characterized by perceived overweight. Although ideal body composition was not assessed, the strikingly different gender pattern likely reflects the male-specific body image pressures afflicting boys and men, characterized by a drive for muscularity, in contrast to a predominant thin-ideal for females (Murray, Griffiths, & Mond, 2016).

This study is novel, and to our knowledge, contributes initial empirical evidence of unhealthy eating behavior and associated ED pathology among snus users in a large, population-based sample of male and female adolescents. Several strengths and limitations of the present study deserve discussion. Ungdata is a quality assured and standardized national online survey, representing a broad geographic area of urban and rural regions, and is regarded as the most comprehensive source of information on adolescent health and well-being in Norway (Bakken, 2017). However, the design is cross-sectional and data are self-reported. Longitudinal investigations are critically needed to infer causality and the developmental trajectory of disordered eating in relation to snus onset. Participation was voluntary, and although the overall participation rate for Ungdata is approximately 66%

(Bakken, 2017) and the majority (92.3%) of Norwegian youth are enrolled in upper secondary school, selection bias cannot be ruled out as a potential threat to representativeness. Replication and cross-cultural studies are necessary to determine the extent of generalizability of the findings. Selective administration by schools and non-mandatory responding was permissible for the mental health items, which considerably lowered the number of respondents for the items pertaining to disordered eating, appearance, and weight dissatisfaction, although these analyses remained adequately powered. Measures lacked cross-validation with standardized interviews or objective measures, and we lacked useful continuous variables such as age (years) or weight and height data. Single items or a selection of items from established instruments were administered due competing interests and time constraints involved in running a comprehensive national survey of health and well-being during school hours.

A more detailed and comprehensive assessment battery is warranted to shed light on intentions, beliefs and expectancies related to consumption of SLT products as a compensatory or weight control method. A study by White (2012), for example, directly assessed whether women utilized cigarette smoking to prevent or “undo” the effects of overeating or to control hunger. Items such as these would afford greater certainty related to intentions and expectancies regarding the potency of snus-delivered nicotine to effectively suppress appetite or weight, which may be overestimated or exaggerated, akin to weight-concerned smokers (White, McKee, & O'Malley S, 2007). Although some research has found that daily (but not occasional) snus consumption was associated with a lower likelihood of overweight ($BMI \geq 25 \text{ kg/m}^2$) in females, the association was weak (OR: 0.83, 95% CI: 0.68-1.00) (Lund, Kvaavik, Nygard, & Hansen, 2017). Psychoeducation and cognitive interventions may prove beneficial to address potentially distorted beliefs related to Swedish snus as an effective weight management tool.

Prior research has found that parental educational level and financial affluence is linked to youth health and well-being (Andersen & Bakken, 2015). Our findings held after controlling for adolescent socio-economic status and smoking. However, potential mediators and moderators, such as depression or anxiety, would be interesting to investigate in relation to snus use and eating behavior during adolescence. Additionally, future research is warranted to examine other aspects of snus use, including flavors (e.g., bergamot, citrus, mint), amount, and duration. Recent research has found that individuals with ED are motivated to vape (i.e., e-cigarettes) using e-liquids that mimicked food-and-beverage inspired flavors (e.g., candy, fruit, coffee) as a substitute to preferred binge foods, and/or to suppress cravings and appetite (Morean & L'Insalata, 2018).

In conclusion, adolescents aged 16-19 years old who utilized snus reported significantly more unhealthy eating behaviors and weight dissatisfaction. Akin to prior studies of cigarette smoking and vaping (Fairweather-Schmidt & Wade, 2015; Morean & L'Insalata, 2018; Solmi et al., 2016; White, 2012), the present study offers evidence of a link between snus and unhealthy eating behavior and associated ED pathology. Specifically, findings imply that occasional snus use may signal disordered eating pathology among teenage girls. Parents, schools, and health professionals should be vigilant of snus use by weight-dissatisfied adolescents. This knowledge provides a useful foundation and interpretive context for future research on smokeless tobacco products and associated health and mental health issues. As snus becomes increasingly marketed and sold worldwide, we feel these findings offer an important and novel contribution with implications for detection and prevention.

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Table 1. Meal frequency, eating disorder symptomology (EAT-8), satisfaction with physical appearance (SPAA), and weight satisfaction in non-, occasional, and daily snus users, females

	<i>Non-users</i> ^a (N = 9720)	<i>Occasional Users</i> ^{b,c} (N = 963)	<i>Daily Users</i> ^c (N = 1308)	<i>X²/F</i>	<i>p-value</i>	<i>Effect size</i>
<i>Females, %</i>						
Breakfast						
Non-daily, %	41.5 ^{b,c}	56.0 ^{a,c}	69.2 ^{a,b}	394.2	< .001	.183
Daily, %	58.5 ^{b,c}	44.0 ^{a,c}	30.8 ^{a,b}			
Lunch						
Non-daily, %	35.0 ^{b,c}	46.1 ^{a,c}	55.7 ^{a,b}	231.4	< .001	.140
Daily, %	65.0 ^{b,c}	53.9 ^{a,c}	44.3 ^{a,b}			
Dinner						
Non-daily, %	16.5 ^{b,c}	25.1 ^{a,c}	33.9 ^{a,b}	246.1	< .001	.144
Daily, %	83.5 ^{b,c}	74.9 ^{a,c}	66.1 ^{a,b}			
EAT-8, M(SD)	15.8 (5.4) ^b	17.5 (5.8) ^a	16.9 (6.0)	5.07	.006	.009
SPAA, M(SD)	13.2 (3.9) ^{b,c}	14.5 (3.4) ^a	14.7 (4.1) ^a	10.59	< .001	.026
Weight Satisfaction						
Satisfied, %	58.2 ^{b,c}	46.5 ^a	37.3 ^a	41.3	< .001	.097
Weigh too little, %	5.4 ^c	6.7	11.3 ^a			
Weigh too much, %	36.4 ^{b,c}	46.6 ^a	51.5 ^a			

Note: EAT = Eating Attitudes Test, Physical Appearance scale of the Self-Perception Profile for Adolescents (SPPA). Snus frequency categories were defined as: *non-users* (“never” or “have tried snus before, but do not use at all”), *occasional users* (“less often than once a week” or “every week but not daily”), and *daily users* (“every day”). For the GLM univariate analyses, sample sizes were EAT-8 (n = 1735) and SPAA (n = 3141) and for weight dissatisfaction (n = 2196) due to optional administration of these items by schools. Covariates in the models included smoking and SES indicators (parental education and family affluence). Subscript letters denote significant differences between groups. Post-hoc tests used a Bonferroni-adjustment to control for inflated Type I error due to multiple comparisons. * p < .05 ** p < .01 *** p < .001.

Table 2. Meal frequency, eating disorder symptomology (EAT-8), satisfaction with physical appearance (SPAA), and weight satisfaction in non-, occasional, and daily snus users, *males*

	<i>Non-users</i> ^a (<i>N</i> = 8984)	<i>Occasional Users</i> ^b (<i>N</i> = 944)	<i>Daily Users</i> ^c (<i>N</i> = 1703)	<i>F/X</i> ²	<i>p-value</i>	<i>Effect size</i>
<i>Males, %</i>						
Breakfast						
Non-daily, %	37.6 ^{b,c}	50.1 ^{a,c}	59.9 ^{a,b}	304.7	< .001	.164
Daily, %	62.4 ^{b,c}	49.9 ^{a,c}	40.1 ^{a,b}			
Lunch						
Non-Daily, %	34.5 ^{b,c}	40.4 ^a	43.9 ^a	59.3	< .001	.073
Daily, %	65.5 ^{b,c}	59.6 ^a	56.1 ^a			
Dinner						
Non-daily, %	10.5 ^{b,c}	16.2 ^{a,c}	20.4 ^{a,b}	135.1	< .001	.109
Daily, %	89.5 ^{b,c}	83.8 ^{a,c}	79.6 ^{a,b}			
EAT-8	12.4 (4.9)	13.0 (5.2)	12.7 (4.8)	0.604	.547	--
SPAA	9.9 (3.6)	10.4 (3.9)	10.0 (3.8)	0.463	.629	--
Weight Satisfaction						
Satisfied, %	64.7 ^{b,c}	58.0 ^a	53.5 ^a	21.66	<.001	.074
Weigh too little, %	19.5 ^{b,c}	28.2 ^a	29.6 ^a			
Weigh too much, %	15.8	13.8	16.9			

Note: EAT = Eating Attitudes Test, Physical Appearance scale of the Self-Perception Profile for Adolescents (SPPA). Snus frequency categories were defined as: *non-users* (“never” or “have tried snus before, but do not use *at all*”), *occasional users* (“less often than once a week” or “every week but not daily”), and *daily users* (“every day”). For the GLM univariate analyses, sample sizes were EAT-8 (*n* = 1604) and SPAA (*n* = 2954) and for weight satisfaction (*n* = 1999) due to optional administration of these items by schools. Covariates in the models included smoking and SES indicators (parental education and family affluence). Subscript letters denote significant differences between groups. Post-hoc tests used a Bonferroni-adjustment to control for inflated Type I error due to multiple comparisons. * *p* < .05 ** *p* < .01 *** *p* < .001.