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Awareness, perceptions, and use of snus among young adults from the upper Midwest region of the U.S

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Abstract

Background—Since its introduction in 2006, snus has been aggressively marketed by tobacco companies. However, little is known about the awareness, perceptions, and use of snus among young adults after Camel and Marlboro snus were sold nationwide in 2010.

Methods—Data were collected from 2,607 young adults (ages 20–28) who participated in the Minnesota Adolescent Community Cohort Study in 2010–2011. Data include awareness of snus, ever and past-30 day use, perceived potential of snus as a quit aid, and perceived harmfulness and addictiveness of snus relative to cigarettes. We assessed the association between these outcome variables and socio-demographic characteristics.

Results—Overall, 64.8% of participants were aware of snus, 14.5% ever used snus, and 3.2% used snus in the past 30 days. Men and participants who smoked >100 cigarettes in their lifetime were associated with these three outcomes ($p<0.05$). Among those who were aware of snus, 16.3% agreed snus can help people quit smoking, 17.3% agreed snus is less harmful than cigarettes, and 11.3% agreed snus is less addictive than cigarettes. These perceptions were associated with ever use and past 30-day use of snus ($p<0.05$).

Conclusions—In this regional sample of U.S. young adults, the majority of young adults were aware of snus, and over 1 in 10 had used snus. More young adults in our sample than the overall U.S. adult population believed that snus is less harmful than cigarettes. Perceptions of snus are associated with snus use. Strategic health communication interventions targeting young adults to confront the positive perceptions associated with snus may be needed to curb the interest in snus.

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Keywords

young adults; smokeless tobacco; perceptions; use

INTRODUCTION

Snus is a smokeless tobacco product that wraps moist tobacco in a porous packet designed to be placed between the gum and cheek. Snus originated in Sweden and was recently introduced to the United States. Limited studies comparing the content of snus found that snus available in the United States is not the same as the Swedish products (e.g., Marlboro snus has a lower nicotine content than Swedish snus [1]), and therefore it is unknown if the harm reduction effect of Swedish snus applies to the snus manufactured in the United State. In 2006, RJ Reynolds Tobacco Company (owned by Reynolds American Inc.) test marketed Camel snus in Portland, Oregon, and Austin, Texas, while Philip Morris (owned by Altria) test marketed Marlboro snus in Dallas and Fort Worth, Texas, and Indianapolis, Indiana [2]. Between 2007 and 2009, RJ Reynolds Tobacco Company expanded the test marketing to 19 additional U.S. cities and launched the product nationwide in 2009 [3]. Philip Morris started selling Marlboro snus nationally in 2010 [4]. Along with market testing, tobacco companies launched marketing campaigns to promote snus through mailed promotions to cigarette smokers, promotions in bars and clubs, and magazine advertising [5, 6].

Research has demonstrated that young adults in the U.S. are interested in snus. A survey conducted shortly after snus was sold nationwide found that 44.2% of U.S. adults had heard of snus, and 5.4% had tried snus [7]. The study also showed that young adults (ages 18–24) were most likely to have heard of snus. Two studies, both conducted before snus was sold nationally, found that young adults were more likely than older adults to have tried snus [5, 8]. However, little is known about the prevalence and characteristics associated with young adults' awareness and use of snus, particular after Marlboro snus was released nationally in 2010 [4]. Furthermore, little is known about young adults' perceptions of snus, and their association with snus use. Two focus group studies with young adults found that some young adults (ages 18–26) perceived snus to be safer than cigarettes and to help people quit smoking [9, 10]. A survey with U.S. adults also found that 4.5% perceived that snus is less harmful than cigarettes, and another 37.3% were undecided [7]. However, investigators of the study did not determine the prevalence of and characteristics associated with this perception in young adults, and did not assess the association between this perception and snus use in young adults.

In light of the limitations of the current literature, we assessed the prevalence of awareness and use of snus among young adults, and investigated the characteristics associated with awareness and use after snus became available nationwide. We also assessed the prevalence of selected perceptions of snus (addictive potential and harmfulness relative to cigarettes, usefulness as an aid for quitting smoking), the characteristics associated with these perceptions, and whether these perceptions were associated with snus use.

METHODS

Study population

Data are from the Minnesota Adolescent Community Cohort (MACC), a community-based prospective cohort study designed to deepen the understanding of the transitional process from non-smoking to smoking in adolescence, and to examine the effect of state- and local-level tobacco prevention and control programs on youth and young adults in Minnesota. The design of the study has been detailed elsewhere [11]. Briefly, participants in the MACC study were selected in 2000–2001 and 2001–2002 through modified random digit dialing using cluster random sampling of household phone numbers. Sixty geopolitical units (GPUs) in Minnesota (out of 126) were randomly selected and five GPUs from four comparison states (North and South Dakota, Michigan, and Kansas) were chosen because of their similarity to Minnesota. Clearwater Research, Inc. used modified random digit dialing and a combination of probability and quota sampling methods to obtain an even distribution of youth from ages 12 to 16.

Of the eligible households, 3636 participants in Minnesota and 605 participants in comparison states were recruited (recruitment rates of 58.5% and 58.3% respectively). An additional cohort of 585 twelve year-olds in Minnesota from the 60 Minnesota GPUs was recruited using the same random digit dialing method during 2001–2002 (a recruitment rate of 63.6%), resulting in an overall sample of 4826. Participants were surveyed every six months through 2007–2008 (except in 2003–2004 due to a gap in funding), and then annually between 2008 and 2011 through computer-assisted telephone interviews using phone numbers provided by the participants (including mobile phone numbers). Participants who completed the round 21 survey (data collected between October 2010 and March 2011, $n=2607$) were included in this cross-sectional analysis (68.9% of those eligible for the round 21 survey). We compared the demographic characteristics and smoking outcomes between those who remained in the study and those who dropped out, and found that who dropped out were more likely to be male, from racial minority groups, and have initiated smoking ($p<0.05$). The University of Minnesota Institutional Review Board approved this study.

Measures

We measured three main outcome variables pertaining to snus awareness and use. We first asked participants if they were aware of snus, “a tobacco product that is chewing tobacco in little white pouches to be put between your gum and cheek”. For participants who were aware of snus, we asked if they had ever used snus, and number of days in the past 30 days they used snus (dichotomized to whether used snus in the past 30 days; yes/no). Variables pertaining to perceptions of snus (perceived potential of snus as a quit aid, perceived harmfulness and addictiveness of snus relative to cigarettes) were used as both independent and outcome variables. Participants who had heard of snus were asked their level of agreement with the following statement (5-point Likert scales from strongly agree to strongly disagree): (1) snus can help people quit smoking, (2) snus is less harmful than cigarettes, and (3) snus is less addictive than cigarettes. When used as independent variables, responses were collapsed to agree, undecided, and disagree. These variables were further collapsed to agree vs. other when perceptions were used as outcome variables.

Other independent variables included demographics (age, gender, race/ethnicity, education level), smoking status, and peer smoking. Race/ethnicity was measured as non-Hispanic White versus “other” (collapsed from original categories of non-Hispanic White, African American or Black, American Indian, Asian, Hispanic, and other due to the small numbers of participants in categories other than non-Hispanic White). Participants who were currently enrolled in post-secondary school were asked the type of school (two-year vs. four-year college), while participants who were not in school were asked about their highest level of education. Responses to these items were used to categorize participants into three education levels: completed high school or less (due to the small number of participants not completing high school), enrolled in or graduated from a two-year college, and enrolled in or graduated from a four-year college. Smoking status was measured based on two survey items: whether smoked >100 cigarettes in lifetime (yes/no) and number of days smoked in the past 30 days. Based on the responses to these items, participants were classified into three smoking levels: (1) have not smoked >100 cigarettes, (2) smoked >100 cigarettes but did not smoke in the past 30 days, and (3) smoked >100 cigarettes and smoked in the past 30 days. Participants were asked the number of close friends who smoked (dichotomized into none vs. at least one). We also assessed participants’ exposure to snus marketing at bars/clubs by asking if they have seen tobacco promoters swiping IDs, giving out free snus sample and/or coupons for snus, or selling snus in the past six months (yes/no) because previous research showed that tobacco companies have promoted snus in these venues [6].

Statistical analysis

Following descriptive frequencies for each variable, we assessed the multivariate associations between awareness/use of snus and the independent variables (demographic characteristics, smoking status, peer smoking and exposure to snus marketing at bars/clubs). We also assessed the associations between snus use (ever use and past 30-day use) and each perception variable while adjusting for demographic characteristics, smoking status, and exposure to snus marketing at bars/clubs. We then treated the perception variables as outcomes and assessed the associations between each perception and the independent variables (demographic characteristics, smoking status, peer smoking, and exposure to snus marketing at bars/clubs). Generalized linear models were used to estimate all the associations, accounting for the clustering by GPU by including GPU as a random effect, and $p < 0.05$ was used as level of significance. Odds ratios were obtained through exponentiation of the regression coefficients. All analyses were conducted with SAS® v9.2 using PROC GLIMMIX [12].

RESULTS

Overall, 64.8% of participants were aware of snus. Participants who were male, those who smoked >100 cigarettes in their lifetime (regardless whether they smoked in the past 30 days), and those who had at least one close friend who smoked were more likely to be aware of snus ($p < 0.05$; Table 1). Participants who were exposed to snus marketing at bars/clubs in the past six months were also more likely than those who were unexposed to be aware of snus (adjusted odds ratio [AOR]=1.38, 95% confidence interval [CI]=1.04, 1.83). Compared

to non-Hispanic Whites, participants of other race/ethnicities were less likely to have heard of snus (AOR=0.56, 95% CI=0.42, 0.74).

Of all participants, 14.5% reported ever using snus, and 3.2% reported using snus in the past 30 days (22.4% and 4.9% among those who were aware of snus, respectively; Table 1). Among those who had tried snus (n=379) and those who had used snus in the past 30 days (n=83), 44.6% and 39.8% smoked in the past 30 days, respectively. Male participants were more likely than female participants to have ever used snus (AOR=9.59, 95% CI=6.80, 13.53) and used snus in the past 30 days (AOR=34.17, 95% CI=8.35, 139.82.00). Participants who smoked >100 cigarettes in their lifetime (regardless of whether they smoked in the past 30 days) were more likely to have ever used snus and used snus in the past 30 days ($p<0.05$). The positive association between exposure to snus marketing at bars/clubs and ever using snus was marginally non-significant (AOR=1.32, 95% CI=0.94, 1.86).

Among those who were aware of snus, 16.3% agreed that snus can help people quit smoking, 17.3% agreed that snus is less harmful than cigarettes, and 11.3% agreed that snus is less addictive than cigarettes (Table 2). Male participants were more likely to endorse all three perception statements ($p<0.05$). Participants who smoked >100 cigarettes in their lifetime (regardless if they smoked in the past 30 days) were more than those who never smoked >100 cigarettes to agree that snus can help people quit smoking ($p<0.05$). Participants who were exposed to snus marketing at bars/clubs in the past six months were more likely to agree that snus is less harmful than cigarettes (AOR=1.40, 95% CI=1.00, 1.96). In contrast, younger participants (ages 20–24) were less likely than older participants (ages 25–28) to agree that snus can help people quit smoking (AOR=0.72, 95% CI=0.55, 0.95). Participants who agreed that snus can help people quit smoking, is less harmful than cigarettes, and is less addictive than cigarettes were more likely than those who disagreed to have ever used snus and to have used snus in the past 30 days ($p<0.05$; Table 1). In contrast, participants who were undecided whether snus is less addictive than cigarettes were less likely than those who disagreed to have ever used snus (AOR=0.62, 95% CI=0.40, 0.95).

DISCUSSION

While young adulthood represents the final stage of tobacco use initiation, and the prevalence of tobacco is the highest of all age groups [13], little is known about the awareness, perceptions, and use of snus in this population in the U.S. since both Camel and Marlboro snus became available nationwide in 2010. A previous study conducted after Camel snus (but not Marlboro snus) was nationally available found that 61.9% of U.S. young adults (ages 18–24) had heard of snus, and 5.4% of the U.S. adults had tried snus [7]. Another study conducted in the test markets found that 12.3% of young adult smokers (ages 18–24) had tried snus [8]. We found more young adults (64.8%) in our U.S. regional sample were aware of snus, and a dramatic increase in ever use of snus over time among young adult smokers (38.1%) compared to the study conducted in test markets.

The high awareness and prevalent use of snus in young adults may be attributed to tobacco companies' promotion strategies for the product, including giving out free samples, providing coupons (either through points of sales or direct mail), advertising in magazines,

and also promoting the products in bars and clubs where many young adults congregate [6, 14]. This hypothesis is partially supported by our finding that exposure to snus marketing at bars/clubs was associated with awareness of snus, and its association with ever using snus was marginally non-significant. Marketing snus to young adults at bars/clubs is particularly effective not only because of the direct exposure to the marketing activities (e.g., free snus samples or coupons for snus), but also the indirect exposure to these activities through having conversations with people who use snus and possibly obtaining snus from friends.

As expected, men and those who smoked in the past 30 days (compared to those who never smoked >100 cigarettes) were more likely to have heard of, tried, and used snus in the past 30 days, similar to previous reports [5, 8]. This is probably because companies encourage smokers to use snus alongside cigarettes [14]. However, this dual-use behavior implies that young adult smokers use snus to sustain their nicotine addiction when they cannot smoke (e.g., because of clean indoor air policies), and therefore use reduces their likelihood of smoking cessation. An interesting finding is that participants who had smoked >100 cigarettes but did not smoke in the past 30 days were also more likely than those who had not smoked >100 cigarettes to be aware of, have tried, and have used snus in the past 30 days. Previous research found that smokers who tried snus were less likely than smokers who did not try snus to plan to quit smoking in the next 30 days [8]. Furthermore, a large military cohort study found that among smokers who subsequently started using smokeless tobacco products, only 13% completely switched to smokeless tobacco products [15]. Therefore, it is unlikely that the reason for these participants not smoking cigarettes in last 30 days was because they completely switched to snus. In contrast, it is possible that snus leads those who have quit cigarette smoking to begin using smokeless tobacco. Given the cross-sectional nature of the study, we could not test this hypothesis. Future longitudinal analysis is needed to determine if snus influences tobacco use behaviors among those who quit cigarette smoking. It is noteworthy that 14.8% of young adults in our sample who never smoked >100 cigarettes in their lifetime also reported ever using snus. This finding indicates that snus can potentially introduce non-smoking young adults to tobacco use. These young adults may develop nicotine addiction, and subsequently switch to smoking cigarettes [16, 17].

Among participants in our regional sample who have heard of snus, a higher proportion of them perceived that snus is less harmful than cigarettes than in a national sample of young adults (17.3% vs. 4.5%, respectively) [7]. Similar proportions in our sample believed that snus is less addictive than cigarettes (11.3%) and can help people quit smoking (16.3%). Although some scholars have discussed promoting snus as a harm reduction approach to cigarette smoking [18], there are three reasons that snus should not be promoted as a harm reduction approach in young adults. First, since the snus available in the U.S. is different from Swedish snus, there is no guarantee that the U.S. snus is associated with lower overall health risk as Swedish snus [19]. There is also no evidence to demonstrate that snus available in the U.S. is less addictive than cigarettes or can help people quit smoking. Second, young adults are still in the stage of initiating tobacco use. Therefore, promoting snus as a harm reduction product may increase the proportion of non-smoking young adults who have these positive perceptions of snus, and may subsequently lead them to try snus. Third, the success of a harm reduction approach relies on the smokers to completely switch

from cigarettes to the less harmful products. However, given that a significant proportion of snus users are using both snus and cigarettes in our sample, promoting snus as a harm reduction product may inevitable increase dual-use behavior, and may also hinder smokers from using proven-effective cessation treatments when attempting to quit smoking.

We found that male participants are more likely to agree that snus can help people quit smoking, is less harmful and less addictive than cigarettes, and those who smoked >100 cigarettes in their lifetime were more likely than those who did not to agree that snus can help people quit smoking. We also found that those who were exposed to snus marketing at bars/clubs were also more likely than those who did not to agree that snus is less harmful than cigarettes. To our knowledge, this is the first report showing an association between snus marketing and perception of snus in young adults. Given that participants who held these perceptions were more likely to try snus and use snus in the past 30 days, health communication interventions targeting young men to promote correct information about U.S. snus, particularly at bars/clubs where snus marketing activities take place, may be an important strategy to prevent snus use. An interesting finding is that those who were undecided about the addictiveness of snus relative to cigarettes were less likely than those who disagreed that snus is less addictive than cigarettes to use snus. This group of young adults may include those who are skeptical in general, and those who are uninterested in tobacco products overall, and therefore less likely to have used snus. Further study is needed test these hypotheses.

One limitation of the study is its cross-sectional design, which hinders determining whether perceptions of snus are antecedents or consequences of snus use. The cross-sectional design also prevents establishing causal associations between snus use and cigarette consumption. The use of modified random digit dialing of household phone numbers as a sampling frame may be viewed as a limitation for a study of young adults because it would exclude households that did not have landlines and reduce the representativeness of the sample. However, since the cohort was established when the participants were young teenagers and living with their parents in 2000, using household phone numbers to assemble the cohort was appropriate at the time. Furthermore, in each round of data collection, participants were asked to provide the best phone numbers (including mobile phone numbers) to contact them for follow up to minimize attrition because of relocation and discontinuation of household phone number. Another limitation is that attrition over time in this cohort study may introduce bias to our estimates. Because smokers are more likely to drop out from our study, our estimates on the awareness, perceptions and use of snus may be more conservative than the true population estimates. However, our estimate of past-30-day snus use is almost identical to that of the Minnesota Adult Tobacco Survey 2010 (3.7%), which is a population-based random-sampling study [20]. This provides some evidence on the representativeness of our sample. An additional limitation is the regional sample of the study participants, and also that most of the participants were non-Hispanic White (reflective of Minnesota demographic composition), and therefore our findings may not be generalizable to the entire U.S. young adult population.

In conclusion, the majority of our sample of U.S. young adults from the upper Midwest were aware of snus, and more than 1 out of 10 had tried snus in 2010. Some young adults

perceived snus positively, for example perceiving that snus can help people quit smoking. Having these perceptions was also associated with use of snus. Given that tobacco companies are promoting snus alongside cigarette smoking, snus use may prolong and intensify nicotine addiction among young adults, and therefore may hinder the decline in the prevalence of tobacco use in this population. Public health interventions such as strategic health communication interventions targeting groups that are most likely to hold these perceptions of and to use snus may be effective to curb snus use in young adults.

WHAT THIS PAPER ADDS

Since its introduction to the U.S. in 2006, snus has been heavily marketed by tobacco companies. Young adults are more likely to have heard of snus, and have tried snus. However, little is known about the characteristics associated with awareness, perceptions and use of snus in this high risk group after both Camel and Marlboro snus were sold nationwide.

We found that the majority of young adults in a regional U.S. sample were aware of snus, 14.5% ever used snus, and 3.2% used snus in the past month. Additionally, among young adults in the sample who were aware of snus, about 11–17% possessed positive perceptions of snus (potential as smoking cessation aid, and relatively less harmful and addictive than cigarettes). Possessing these perceptions was also associated with use of snus. Strategic health communication interventions targeting young adults to provide correct information about snus may be needed to curb the interest in snus.

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Table 1

Multivariate analysis on awareness and use of snus.¹

Independent variables	Aware of snus			Ever used snus			Used snus in past 30 days		
	N	% aware	AOR (95% CI)	N	% used	AOR (95% CI)	N	% used	AOR (95% CI)
Total	2607	64.8%	--	1689	22.4%	--	1689	4.9%	--
Age: 20-24	1701	65.2%	1.11 (0.92, 1.33)	1109	23.0%	1.24 (0.94, 1.63)	1109	5.3%	1.40 (0.84, 2.32)
Age: 25-28	906	64.0%	Reference	580	21.4%	Reference	580	4.1%	Reference
Ethnicity: Non-Hispanic white	2330	66.2%	Reference	1543	22.9%	Reference	1543	5.1%	Reference
Ethnicity: Other	277	52.7%	0.56 (0.42, 0.74)	146	17.1%	0.66 (0.40, 1.08)	146	2.7%	0.52 (0.18, 1.46)
Gender: Male	1235	76.9%	2.79 (2.33, 3.34)	950	35.3%	9.59 (6.80, 13.53)	950	8.5%	34.17 (8.35, 139.82)
Gender: Female	1372	53.9%	Reference	739	6.0%	Reference	739	0.3%	Reference
Education									
Enrolled in/graduated from a 4-year college or more	1549	59.7%	1.02 (0.77, 1.35)	925	20.3%	1.03 (0.73, 1.47)	925	4.7%	1.16 (0.63, 2.13)
Enrolled in/graduated from a 2-year college	651	71.7%	1.27 (0.94, 1.71)	467	21.8%	0.89 (0.61, 1.29)	467	4.7%	1.02 (0.52, 1.97)
High school graduate or less	407	73.0%	Reference	297	30.0%	Reference	297	6.1%	Reference
Smoking status									
>100 cigarettes and in past 30 days	531	83.6%	2.54 (1.92, 3.38)	444	38.1%	4.60 (3.32, 6.37)	444	7.4%	2.05 (1.18, 3.57)
>100 cigarettes and not in past 30 days	316	72.2%	1.70 (1.28, 2.27)	228	26.3%	2.68 (1.82, 3.94)	228	6.1%	2.02 (1.03, 3.97)
Never smoked >100 cigarettes	1760	57.8%	Reference	1017	14.8%	Reference	1017	3.5%	Reference
one close friend smoke: Yes	1379	74.6%	1.83 (1.51, 2.21)	1028	25.1%	0.88 (0.65, 1.19)	1028	5.8%	1.34 (0.77, 2.32)
one close friend smoke: No	1228	53.8%	Reference	661	18.3%	Reference	661	3.5%	Reference
Exposure to snus marketing at bars/clubs									
Yes	334	75.1%	1.38 (1.04, 1.83)	251	29.9%	1.32 (0.94, 1.86)	251	6.8%	1.20 (0.67, 2.12)
No	2273	63.3%	Reference	1438	21.1%	Reference	1438	4.6%	Reference
Snus can help people quit									
Strongly agree/agree				275	40.4%	2.05 (1.50, 2.81)	275	10.6%	1.99 (1.21, 3.27)
Undecided				120	17.5%	0.82 (0.48, 1.40)	120	2.5%	0.54 (0.16, 1.80)
Disagree/strongly disagree				1294	19.1%	Reference	1294	3.9%	Reference
Snus is less harmful than cigarettes									
Strongly agree/agree				292	33.9%	1.67 (1.22, 2.29)	292	9.6%	2.13 (1.29, 3.53)

Independent variables	Aware of snus			Ever used snus			Used snus in past 30 days		
	N	% aware	AOR (95% CI)	N	% used	AOR (95% CI)	N	% used	AOR (95% CI)
Undecided	124	19.4%		124	19.4%	0.84 (0.50, 1.41)	124	5.7%	1.42 (0.61, 3.32)
Disagree/strongly disagree	1273	20.1%		1273	20.1%	Reference	1273	3.8%	Reference
Snus is less addictive than cigarettes									
Strongly agree/agree	191	41.4%		191	41.4%	2.06 (1.44, 2.91)	191	11.5%	1.94 (1.13, 3.32)
Undecided	211	15.6%		211	15.6%	0.62 (0.40, 0.95)	211	1.9%	0.37 (0.13, 1.04)
Disagree/strongly disagree	1287	20.8%		1287	20.8%	Reference	1287	4.4%	Reference

/ Estimates for demographic variables, smoking status and exposure to snus marketing at bars/clubs are adjusted for each other. Each perception of snus is adjusted for demographic variables, smoking status and exposure to snus marketing at bars/clubs. Bolded estimates are statistically significant ($p < .05$). Analyses for the use outcomes only include those who have heard of snus.

Table 2

Multivariate analysis on perceptions of snus.¹

Independent variables	N	Agreed that snus can help people quit smoking		Agreed that snus is less harmful than cigarettes		Agreed that snus is less addictive than cigarettes	
		% agree	AOR (95% CI)	% agree	AOR (95% CI)	% agree	AOR (95% CI)
Total	1689	16.3%	--	17.3%	--	11.3%	--
Age: 20–24	1109	14.5%	0.72 (0.55, 0.95)	18.3%	1.21 (0.91, 1.60)	12.2%	1.31 (0.93, 1.84)
Age: 25–28	580	19.7%	Reference	15.3%	Reference	9.7%	Reference
Ethnicity: Non-Hispanic white	1543	16.6%	Reference	17.1%	Reference	11.2%	Reference
Ethnicity: Other	146	13.0%	0.76 (0.45, 1.26)	19.2%	1.19 (0.76, 1.85)	12.3%	1.15 (0.67, 1.95)
Gender: Male	950	21.2%	2.44 (1.82, 3.25)	21.1%	1.83 (1.40, 2.40)	15.2%	2.55 (1.80, 3.61)
Gender: Female	739	10.0%	Reference	12.5%	Reference	6.4%	Reference
Education							
Enrolled in/graduated from a 4-year college or more	925	14.9%	1.07 (0.73, 1.55)	19.2%	1.34 (0.93, 1.93)	12.0%	1.08 (0.71, 1.64)
Enrolled in/graduated from a 2-year college	467	18.0%	1.18 (0.80, 1.74)	13.1%	0.79 (0.52, 1.18)	8.4%	0.66 (0.41, 1.07)
High school graduate or less	297	17.9%	Reference	17.9%	Reference	13.8%	Reference
Smoking status							
>100 cigarettes and in past 30 days	444	20.7%	1.65 (1.18, 2.31)	19.4%	1.30 (0.94, 1.81)	13.1%	1.29 (0.87, 1.90)
>100 cigarettes and not in past 30 days	228	21.9%	1.78 (1.22, 2.63)	16.2%	1.12 (0.75, 1.68)	12.3%	1.36 (0.85, 2.17)
Never smoked >100 cigarettes	133	13.1%	Reference	16.6%	Reference	10.3%	Reference
one close friend smoke: Yes	1028	17.6%	1.05 (0.77, 1.43)	17.9%	1.09 (0.81, 1.46)	12.3%	1.21 (0.85, 1.72)
one close friend smoke: No	661	14.2%	Reference	16.3%	Reference	9.8%	Reference
Exposure to snus marketing at bars/clubs							
Yes	251	19.5%	1.24 (0.87, 1.77)	22.7%	1.40 (1.00, 1.96)	14.3%	1.24 (0.83, 1.85)
No	1438	15.7%	Reference	16.3%	Reference	10.8%	Reference

¹ Only included those who have heard of snus. Adjusted for all variables in the table. Bolded estimates are statistically significant (p<.05).