Published in final edited form as:

Psychol Addict Behav. 2016 December ; 30(8): 895–903. doi:10.1037/adb0000230.

Perceptions of Harm and Addiction of Snus: An Exploratory Study

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Abstract

Tobacco companies in the United States are prohibited from making reduced harm claims without filing a modified risk tobacco product application with the Food and Drug Administration and obtaining an order to market as such. However, it is possible that product marketing may suggest reduced risk to individuals. This study examines perceptions, in particular those related to harm and addiction, of snus print advertisements using a combination of eye-tracking, survey, and semistructured interviews. Participants were 22 male smokers ages 19–29 ($M = 26.64$, $SD = 2.92$). Five snus advertisements were each displayed for 20 s and eye movements were tracked. Participants responded to questions about harm and addiction after each advertisement and interviews were conducted after seeing all advertisements. For each advertisement, descriptive statistics were calculated and regression analyses predicted harm and addiction perceptions from eye tracking areas of interest (e.g., warning label). Qualitative data were analyzed using inductive/deductive thematic analysis. For certain advertisements, areas of interest were significantly associated with harm and/or addiction perceptions. For example, higher total fixation duration on

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The results from this study were presented as part of a symposium, “Social Psychological Perspectives on the Prevention of Substance Use Behaviors,” at the Society for Prevention Research 23rd Annual Meeting (2015) in Washington, DC. A poster of these results was presented at the World Conference on Tobacco or Health (2015) in Abu Dhabi, United Arab Emirates.

Supplemental materials: <http://dx.doi.org/10.1037/adb0000230.supp>

the graphic in the *Smokeless for Smokers* advertisement was associated with decreased perceptions of addiction ($B = -.360, p = .048$). Qualitative themes emerged and in many instances corroborated quantitative results. This study indicates that for some advertisements, attention on certain areas (measured through eye tracking) is associated with perceptions among young male smokers. Understanding how smokers perceive and understand products after viewing advertisements may inform regulations regarding claims about product harm and addiction and may guide public health efforts to educate smokers on the risks of emerging products.

Keywords

snus; harm; addiction; eye-tracking; qualitative

Attitudes toward cigarette smoking have shifted over the years and have contributed, in part, to a decline in cigarette consumption in the U.S. (Chassin et al., 2003; Robert Wood Johnson Foundation, 2011). Tobacco companies have diversified their products and expanded smokeless options, including snus, a pouch of moist tobacco that is typically placed under the lip and is generally not accompanied by spitting. Snus originated in Sweden and was introduced to the U.S. market in 2006 (Rogers et al., 2010). Smokeless tobacco products pose many risks, including cancer (International Agency for Research on Cancer, 2012; National Cancer Institute [NCI], 2001; U.S. Department of Health & Human Services, 2014). Despite these risks, sales and consumption of smokeless tobacco products, including snus, have increased in the U.S. (Maher et al., 2012; Mitka, 2014; Popova & Ling, 2013).

Increased use of snus is likely due in part to heightened marketing. The Family Smoking Prevention and Tobacco Control Act of 2009 states “A tobacco product shall be deemed to be misbranded... if its advertising is false or misleading in any particular manner” (FDA, 2009, Section 903). Tobacco companies have a history of making risk reduction claims regardless of accuracy (NCI, 2001). These unsubstantiated advertising claims influence public perceptions about tobacco products (NCI, 2008). In light of this history, it is important to assess whether snus advertisements may implicitly make risk reduction claims and to monitor how the public perceives and engages with advertisements.

While research exploring perceptions about snus is increasing (Bahreinifar et al., 2013; Choi et al., 2012; Choi & Forster, 2013; Lund & Scheffels, 2014; Sami et al., 2012; Wackowski et al., 2015; Wray et al., 2012; Zhu et al., 2013), no studies to date have explicitly examined the influence of snus advertisements on perceptions of snus. Eye-tracking is an unobtrusive way to gather objective measurement of attention and information processing (Rayner, 1998; Wedel & Pieters, 1999). The current study utilizes a combination of eye-tracking methodology to examine advertisement viewing patterns, survey, and semistructured interviews to measure perceptions (i.e., harm and addiction), related to snus print advertisements among a sample of young-adult male smokers.

Method

Participants

A community convenience sample ($N = 22$) of young adult male daily cigarette smokers ages 18–29 was recruited by newspaper advertisements, online postings, local flyers, and social media in the Washington, DC area between August, 2013 and September, 2013. Eighty-two potential participants were screened (participants were excluded based on preset criteria such as being female, outside the age range specified, some day smoking) to achieve a mix of ages, education statuses, and race/ethnicities, and to screen out participants who could not be calibrated for the Tobii Eye Tracker (e.g., those with trifocal contact lenses) or did not speak fluent English.

Procedure

Participants completed a consent form and baseline questionnaire. Tobii Studio TX300 was used to display five snus print advertisements and track eye movements. The snus print advertisements were selected to represent a variety of brands, although brand names and symbols were removed, with diverse messaging and imagery. The warning label was standardized across all advertisements and the advertisements were randomized to account for order effects. The eye-tracker had a sampling rate of 300 Hz, and was equipped with infrared iris reading sensory optics and a remote camera that tracked eye movement while participants were seated naturally. Participants were seated with their faces approximately 65 cm away from the 23-inch monitor. Participants' eye movements were calibrated and gaze was tracked and time-locked as they viewed each advertisement for 20 s. Fixations were defined as 60 ms or more. After each advertisement, participants responded to questions.

Participants then engaged in a one-on-one semistructured interview. The interview protocol underwent pilot testing ($n = 9$) to ensure that questions were clear and understandable. The moderator guide can be found in the supplemental material. The protocol consisted of open-ended questions designed to elicit participants' awareness of snus, general perceptions of snus, health consequences of using snus, intentions to use snus, advertisement features, and warning labels. A trained research assistant conducted the interviews according to standardized qualitative methodology (Denzin & Lincoln, 2005). Interviews were conducted in English in a private room and were audio-recorded and transcribed verbatim by a professional transcription company.

At the end of the session, participants were debriefed about the study purpose and provided information about the risks of tobacco and cessation resources. Participants received \$50 for participation. This study was considered exempt from Institutional Review Board review by the Office of Human Subjects Research Protections at the National Institutes of Health.

Measures

Supplemental material shows baseline measures for this study. Self-reported sociodemographic variables assessed included age, education, race/ethnicity, marital status, and employment status. Age of first cigarette, age first started daily smoking, number of cigarettes per day, past quit attempts, having heard of snus and prior snus use, and intentions

to use snus were also assessed. Prior to advertisement exposure, harm and addiction perceptions of snus were assessed.

After viewing each advertisement, participants were asked “Do you believe that the snus product in THIS advertisement is less or more {harmful to one’s health/addictive} than ordinary cigarettes? Would you say the snus product in this advertisement is...” For both items, participants evaluated relative harm using a 5-point scale (*much less harmful/addictive, less harmful/addictive, about the same, more harmful/addictive, much more harmful/addictive*). To operationalize these constructs, participants were categorized as endorsing each snus product as less harmful/addictive (much less/less) and harmful/addictive (about the same/more/and much more; Kaufman et al., 2014).

A priori “areas of interest” (AOI) on each advertisement were designated as graphics, warning, text, headers, and packs (see Figure 1; Strasser, 2012.). Time to first fixation (TTFF) measured time in seconds before a participant fixates on an AOI for the first time. The time measurement started when the image was displayed and stopped when the participant fixated on the AOI. If a participant did not fixate on a particular AOI, the TTFF was recorded as missing. Total fixation duration (TFD) measured, in seconds, the sum of the duration for all fixations within an AOI. If a participant returned to the same AOI then the new fixations on the AOI were included in the metric. If a participant did not fixate on a particular AOI, the TFD was 0.

Data Analyses

Quantitative analysis—Statistical analyses were performed using SPSS 21. To test whether AOI TTFF and TFD predicted harm and addiction perceptions, two multiple linear regression analyses were conducted for each advertisement. The predictors of harm for each advertisement included all areas of interest and baseline harm perception. The predictors of addiction perception for each advertisement included all areas of interest and baseline addiction perception. Participants were excluded from an analysis if they had missing data (e.g., they never fixated on a specific area) on key measures in the analysis.

Qualitative analysis—Interview transcripts and field notes were systematically analyzed using a hybrid process of inductive/deductive thematic analysis (Fereday & Muir-Cochrane, 2006; Glaser & Strauss, 2009). Line-by-line coding was conducted using QSR International NVivo10 Software, 2011. Thematic analysis focused on identifying, examining, and recording patterns within the data, as well as the general agreement among participants (Shontz, 1985).

Results

Table 1 shows sample descriptive statistics. More than half (54.5%) had heard of snus prior to the study: Only one participant reported using snus more than once, three reported using once, and 18 reported never using snus (data not shown). At baseline, the majority believed that snus posed about the same harm and addiction as ordinary cigarettes; four participants reported believing that snus was less harmful whereas six participants reported that snus was much less ($n = 3$) or less ($n = 3$) addictive than ordinary cigarettes (data not shown).

Eye Tracking

Figure 1 shows the five advertisements, highlighted AOI, and heat maps from eye tracking results. Table 2 shows eye tracking descriptive statistics by advertisement. As depicted in the heat maps and by the mean TFD, generally participants spent the most time looking at the text portion of each advertisement. On average, participants' TFD on the warning labels across all five advertisements was 1.60 s ($SD = 0.86$) and TTFF was 6.14 s ($SD = 2.56$; data not shown).

Harm Perceptions

The top of Table 3 shows the results of the multiple linear regression. For TTFF, there was a marginally significant association for the smokeless for smokers advertisement such that the faster someone looked at header 1, the less harmful they perceived this product ($B = -.205$, $p = .052$); however, the overall model did not reach significance. The overall model predicting harm perception from TFD was significant in the "smokeless for smokers" advertisement, $R^2 = .64$, $F(6, 18) = 3.50$, $p = .03$. Longer fixation on the warning label was associated with greater perceived harm of the product ($B = .139$, $p = .009$). Finally, longer fixation on the graphic in the "emissions" advertisement was significantly associated with increased harm perceptions; however, the overall model did not reach significance.

Addiction Perceptions

The bottom of Table 3 shows the results of the multiple linear regression. TFD on AOI's for the "smokeless for smokers" advertisement were significantly associated with perceived addiction of the product, $R^2 = .682$, $F(6, 19) = 4.643$, $p = .010$. Longer fixation on the graphic ($B = -.360$, $p = .048$) and Header 2 ($B = -.277$, $p = .003$) were associated with lower perceived addiction of the product, whereas longer fixation on Header 1 ($B = .107$, $p = .046$), text ($B = .079$, $p = .018$), and the warning label ($B = .090$, $p = .041$) were associated with greater perceived addiction of the product. TTFF on the AOI's for the "Swedish" advertisement indicated that the faster people looked at the header, the less addictive they perceived the product ($B = -1.012$, $p = .015$), but the more quickly people looked at the packs ($B = .054$, $p = .034$), and text ($B = .170$, $p = .013$), the greater perceived addiction, $R^2 = .773$, $F(6, 13) = 3.984$, $p = .047$. The overall regression models for both TTFF, $R^2 = .786$, $F(5, 14) = 6.624$, $p = .007$; and TFD, $R^2 = .650$, $F(5, 18) = 4.837$, $p = .010$, on AOI's for the "without matches" advertisement were significant; however, baseline addiction perceptions were the only significant associations. Finally, for the "resolution" advertisement, longer fixation on the packs was associated with greater perceived addiction of the product ($B = .404$, $p = .007$); however, the overall model did not reach significance.

Qualitative Themes

Table 4 shows themes and examples of associated quotes that emerged in the semistructured interviews. Themes associated with perceived harm and addiction were mentioned frequently, and sometimes together; suggesting that participants were not differentiating these concepts. Participants noted that convenience may increase addiction to tobacco products and this increase in frequency could lead to harmful consequences in the future. However, many participants perceived the snus products in the advertisements to be less

harmful than cigarettes. The absence of smoke and comparisons made with cigarettes gave some participants the impression that using snus was not worse than using cigarettes and might be less harmful. All reported awareness of cigarette smoking health consequences and many mentioned the harms of inhaling cigarette smoke and/or chemicals into their lungs. Unlike with cigarettes, many participants thought that snus might not have widespread physical effects on health beyond the mouth. Other themes that emerged related to harm perceptions included frequency of use, flavors, worry about health outcomes, and increased opportunities for use. Many perceived that snus use may lead to greater addiction. Unprompted, half of the participants reported that snus could be used as a means to help with smoking cessation.

While there was some variation in responses by advertisement, in general participants found the ads appealing. They said snus looked like “little pillows” making it seem less harmful or “scary.” About half of the participants thought that the advertising text and imagery made a smoke-free product like snus appear healthier or mentioned that the advertisement made the product look less harmful or addictive. Several participants thought the advertisements were being directed to young people. The colorfulness of the packs (implying flavors) and overall feel of the ads were cited as being enticing to younger audiences. Most participants said that the warning label was believable. However, some were skeptical about the warning label and pointed out the incongruence with the advertisement design with appealing product messaging.

Behavioral Intentions

At baseline, 64% of participants stated that it was extremely unlikely that they would switch to snus completely and give up cigarettes. However, about 23% of participants reported that they would be *likely/extremely likely* to try a free package of snus, while about 36% reported they would be either *likely/extremely likely* to use snus instead of cigarettes in situations where they could not smoke. At the end of the interview sessions, about half of participants maintained their curiosity about trying snus (“I like to try new things so I would just see what the fuss is about”) although they were not interested in long-term use or use in combination with cigarettes. Participants described the enjoyment of smoking and did not believe snus would be as pleasurable. They expressed concern that using snus in combination with cigarettes or in places they otherwise do not use tobacco would increase their tobacco exposure and nicotine addiction.

Discussion

This study revealed that attention to particular areas of snus product advertisements, as measured by eye tracking, was associated with perceptions about the product. This is the first study to use a combination of eye tracking, survey, and interview methods to understand how current cigarette smokers perceive a novel alternative tobacco product and how advertisements may contribute to their beliefs about these products. Tobacco companies are prohibited from making reduced harm claims without review and approval (FDA, 2009, Section 911). However, our findings suggest that marketing for snus may implicitly contribute to young male smokers’ perceptions about snus. The quantitative findings from

our study show that addiction perceptions were driven strongly by components of the advertisements, whereas harm perceptions were not. Our qualitative findings suggest that half of the participants, unprompted, viewed snus as a smoking cessation aid. Prior research has shown that snus marketing reflects an attempt to prevent smokers from quitting (Richardson et al., 2014). There is no evidence that snus is associated with cessation among U.S. smokers and manufacturers have not submitted snus to the FDA for consideration as a cessation aid.

Our findings also suggest that individuals may not look at warning labels on some advertisements in real life viewing situations. Individuals typically spend about 4 s on a given magazine page (Kanakubo et al., n.d.; Süßenbach, Niemeier, & Glock, 2013), and in the current study, participants did not look at the warning label until about 6 s after exposure. The amount of time it takes a viewer to see a warning label may depend on features of the advertisement. For example, the advertisement (“without matches”), where participants fixated faster on the warning label, had less text and more color contrast than the other advertisements. The Family Smoking Prevention and Tobacco Control Act of 2009 has provisions around contrasting colors for smokeless tobacco warnings on tobacco products’ packages and advertisements: “The text of the label statement shall be black on a white background or white on a black background...” (FDA, 2009, Section 3). Warnings on packages must be “... in a manner that contrasts, by typography, layout, or color, with all other printed material on the package...” and on advertisements must be “conspicuous and legible.” Future research should explore in what context (e.g., predominant color on advertisements, other advertisement features) these warning label contrasts are most effective on advertisements.

There are several limitations to consider. This is a small, exploratory study aimed at examining how snus advertisements are perceived by young male smokers. Multiple comparisons were made (increasing likelihood of Type I error). Due to the small convenience sample and laboratory setting, the findings have limited generalizability. Future studies should explore potential differences in eye tracking and perceptions by sociodemographics. There may be differences in how consumers view and interpret advertisements in real life. Participants were aware that they were engaging in a research study and as a result may have changed their behavior or responses. Survey measures of harm and addiction perceptions of snus compared it with cigarettes (Kaufman et al., 2016) and future studies may change the comparator or use absolute perceptions. Unfortunately, we did not assess if participants had seen these particular advertisements prior to the study and were unable to determine if this influenced their responses.

These limitations are offset by strengths. Studies examining snus have focused mainly on non-Hispanic White samples (e.g., Bahreinifar et al., 2013; Wray et al., 2012) and our study utilized a more diverse sample of predominately African American male smokers. The role of race and socioeconomic status (SES) in the advent of emerging tobacco products is important and future research may consider studying more diverse samples. To our knowledge, this is the first study to directly link eye-tracking data with self-reported perceptions. Showing each advertisement for 20 s gave participants an opportunity to explore the entire advertisement; however, future studies may want to use a more naturalistic

viewing period to better understand how dwell time on the advertisement influences attention.

Tobacco companies have a history of making risk reduction claims, often implicitly, regardless of accuracy. This study is the first to explore consumer perceptions about an emerging market of tobacco products applying innovative methods including eye tracking methodology to understand basic attentional processes in viewing snus advertisements. Understanding consumer perceptions of products is crucial to informing tobacco control efforts. Regulation of tobacco product marketing is needed, particularly the marketing of emerging products for which individuals are forming beliefs and attitudes based on this messaging.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1. Advertisement, advertisement’s areas of interest, and heat maps. The top row are the advertisements as they appeared for participants. The second row shows a priori areas of interest (AOI) designated as graphic, headers, packs, text, and warning label. The bottom row shows heat maps, which show where participants spend time looking. Red indicates the longest time and green the least, with varying levels in between. No color indicates participants did not look in the area. See the online article for the color version of this figure.

Table 1

Sample Descriptive Characteristics (N = 22)

	<i>N</i>	%
Age ($M = 24.63$, $SD = 2.92$)		
19–24	10	45.5
25–29	12	54.6
Education		
High school diploma	8	36.4
Post high school training (not college)	3	13.6
Some college	9	40.9
College degree or more	2	9.1
Race/ethnicity		
Non-Hispanic White	5	22.7
Non-Hispanic Black	14	63.6
Latino/Hispanic	3	13.6
Marital status		
Married	1	4.6
Single	20	90.9
Divorced	1	4.6
Employment status		
Employed	12	54.6
Unemployed	5	22.7
Student	3	13.6
Disabled	1	4.6
Missing/don't know	1	4.6
Age at first cigarette ($M = 15.77$, $SD = 2.35$)		
Range = 9–21		
Age when starting smoking daily ($M = 18.18$, $SD = 2.59$)		
Range = 12–25		
Number of cigarettes smoked per day ($M = 9.82$, $SD = 5.58$)		
Range = 3–22		
Ever prior quit attempt		
Yes	19	86.36
If yes: In the past 12 months?	13	59.09
No	3	13.64

Table 2

Descriptive Eye Tracking Statistics for Each Advertisement

	Emissions			Resolution			Without matches			Smokeless for smokers			Swedish		
	N	TTF	TFD	N	TTF	TFD	N	TTF	TFD	N	TTF	TFD	N	TTF	TFD
		<i>M(SD)</i>	<i>M(SD)</i>		<i>M(SD)</i>	<i>M(SD)</i>		<i>M(SD)</i>	<i>M(SD)</i>		<i>M(SD)</i>	<i>M(SD)</i>		<i>M(SD)</i>	<i>M(SD)</i>
Graphic	21	2.45 (4.92)	2.55 (1.74)	21	.50 (.37)	3.29 (2.14)	22	.91 (2.10)	4.24 (2.33)	12	9.71 (6.65)	.86 (.72)	20	.63 (.79)	3.95 (2.68)
Header1	20	2.78 (5.21)	1.25 (.91)	22	1.29 (2.26)	3.09 (2.86)	21	2.52 (4.38)	1.83 (2.77)	21	1.51 (3.55)	4.43 (2.21)	19	.79 (.59)	1.42 (.67)
Header2	—	n/a	n/a	—	n/a	n/a	—	n/a	n/a	18	3.18 (3.14)	1.22 (1.10)	—	n/a	n/a
Packs	16	8.81 (5.70)	.70 (.74)	18	10.91 (5.08)	.76 (.68)	—	n/a	n/a	—	n/a	n/a	16	9.22 (5.98)	.51 (.41)
Text	21	1.78 (1.48)	9.01 (4.11)	22	3.64 (3.31)	7.16 (3.81)	21	2.71 (4.28)	3.62 (2.50)	21	3.43 (1.49)	5.06 (3.02)	20	3.89 (2.62)	7.23 (3.44)
Warning label	19	6.78 (6.13)	1.97 (2.11)	21	7.89 (6.0)	.95 (.76)	20	3.35 (3.48)	2.22 (2.42)	20	7.05 (3.85)	2.48 (2.03)	20	5.75 (6.65)	1.13 (1.67)

Note. *M* = mean; *SD* = standard deviation; TTF = time to first fixation; The time from the start of the ad display until the participant fixates on an AOI for the first time (seconds); TFD = total fixation duration; Duration of all fixations within an AOI (seconds). Participants were excluded from an analysis if they had missing data (e.g. they never fixated on a specific area) on key measures in the analysis. Header2 and Packs were not present in all advertisements and in such cases is shown as n/a.

Table 3

Multiple Linear Regression Results of Eye Tracking Areas of Interest Predicting Harm and Addiction for Each Advertisement

	Emissions	Resolution	Without matches	Smokeless for smokers	Swedish

Harm B (<i>p</i> -value)					
Time to first fixation (TTFF)					
1 Graphic	-.017 (<i>p</i> = .676)	.266 (<i>p</i> = .602)	-.156 (<i>p</i> = .372)	.014 (<i>p</i> = .626)	-.150 (<i>p</i> = .503)
2 Header 1	.042 (<i>p</i> = .496)	-.292 (<i>p</i> = .195)	.026 (<i>p</i> = .355)	-.205 (<i>p</i> = .052)	-.362 (<i>p</i> = .419)
3 Header 2	n/a	n/a	n/a	.184 (<i>p</i> = .153)	n/a
4 Packs	-.071 (<i>p</i> = .327)	.002 (<i>p</i> = .960)	n/a	n/a	.065 (<i>p</i> = .085)
5 Text	-.134 (<i>p</i> = .356)	.045 (<i>p</i> = .617)	.105 (<i>p</i> = .235)	-.068 (<i>p</i> = .668)	.137 (<i>p</i> = .128)
6 Warning label	.013 (<i>p</i> = .783)	-.001 (<i>p</i> = .974)	-.052 (<i>p</i> = .169)	-.001 (<i>p</i> = .990)	-.018 (<i>p</i> = .511)
Baseline harm	-.152 (<i>p</i> = .837)	.115 (<i>p</i> = .779)	.193 (<i>p</i> = .549)	-.449 (<i>p</i> = .366)	-.330 (<i>p</i> = .432)
Total fixation duration (TFD)					
1 Graphic	.193 (<i>p</i> = .018)	-.043 (<i>p</i> = .397)	.059 (<i>p</i> = .207)	-.234 (<i>p</i> = .329)	.023 (<i>p</i> = .631)
2 Header 1	-.170 (<i>p</i> = .195)	-.039 (<i>p</i> = .332)	-.006 (<i>p</i> = .866)	.120 (<i>p</i> = .084)	.058 (<i>p</i> = .758)
3 Header 2	n/a	n/a	n/a	-.142 (<i>p</i> = .100)	n/a
4 Packs	-.073 (<i>p</i> = .649)	.005 (<i>p</i> = .981)	n/a	n/a	.222 (<i>p</i> = .451)
5 Text	-.036 (<i>p</i> = .212)	-.011 (<i>p</i> = .729)	.011 (<i>p</i> = .769)	.039 (<i>p</i> = .272)	-.071 (<i>p</i> = .108)
6 Warning label	-.086 (<i>p</i> = .158)	.258 (<i>p</i> = .134)	.093 (<i>p</i> = .113)	.139 (<i>p</i> = .009)	.028 (<i>p</i> = .745)
Baseline harm	-.120 (<i>p</i> = .693)	.132 (<i>p</i> = .673)	.505 (<i>p</i> = .168)	.259 (<i>p</i> = .346)	.089 (<i>p</i> = .746)
Addiction B (<i>p</i> -value)					
Time to first fixation (TTFF)					
1 Graphic	-.027 (<i>p</i> = .502)	-.060 (<i>p</i> = .916)	.086 (<i>p</i> = .463)	-.011 (<i>p</i> = .786)	.207 (<i>p</i> = .210)
2 Header 1	.035 (<i>p</i> = .544)	-.254 (<i>p</i> = .301)	.011 (<i>p</i> = .557)	-.015 (<i>p</i> = .898)	-1.012 (<i>p</i> = .015)

	Emissions	Resolution	Without matches	Smokeless for smokers	Swedish
③ Header 2	n/a	n/a	n/a	-.062 ($p = .702$)	n/a
④ Packs	-.056 ($p = .396$)	-.009 ($p = .827$)	n/a	n/a	.054 ($p = .034$)
⑤ Text	-.026 ($p = .872$)	.045 ($p = .645$)	-.029 ($p = .615$)	-.039 ($p = .855$)	.170 ($p = .013$)
⑥ Warning label	.026 ($p = .486$)	.008 ($p = .774$)	-.017 ($p = .486$)	-.009 ($p = .873$)	-.025 ($p = .170$)
Baseline addition	.602 ($p = .196$)	.268 ($p = .517$)	.802 ($p = .002$)	.972 ($p = .111$)	.898 ($p = .010$)
Total fixation duration (TFD)					
① Graphic	.043 ($p = .642$)	-.048 ($p = .286$)	.039 ($p = .373$)	-.360 ($p = .048$)	-.003 ($p = .937$)
② Header 1	-.095 ($p = .557$)	-.011 ($p = .763$)	.002 ($p = .942$)	.107 ($p = .046$)	.102 ($p = .544$)
③ Header 2	n/a	n/a	n/a	-.277 ($p = .003$)	n/a
④ Packs	-.076 ($p = .702$)	.505 ($p = .007$)	n/a	n/a	.206 ($p = .427$)
⑤ Text	-.002 ($p = .967$)	-.006 ($p = .829$)	-.022 ($p = .526$)	.079 ($p = .018$)	-.053 ($p = .183$)
⑥ Warning label	-.058 ($p = .467$)	-.109 ($p = .464$)	.021 ($p = .589$)	.090 ($p = .041$)	.007 ($p = .930$)
Baseline addition	.145 ($p = .641$)	.461 ($p = .079$)	.796 ($p = .002$)	.224 ($p = .251$)	.481 ($p = .089$)

Note. Bold values indicate statistical significance $p = .05$. TTF = time to first fixation; The time from the start of the ad display until the participant fixates on an AOI for the first time (seconds); TFD = total fixation duration; Duration of all fixations within an AOI (seconds)

Participants were excluded from an analysis if they had missing data (e.g. they never fixated on a specific area) on key measures in the analysis. Header2 and Packs were not present in all advertisements and in such cases is shown as n/a.

Table 4

Qualitative Themes on Harm and Addictiveness From Semistructured Interviews

Themes	Examples
Harm and addiction	<p><i>They were trying to say that it was better and less addictive, but I mean it's got nicotine and stuff in it, so of course it's addictive and of course it's harmful to your health.</i></p> <p><i>It seems like in some ways it's more harmful, and in other ways it's less harmful. It seems less harmful because it is not a cigarette, and it seems as though any alternative to cigarettes is probably less harmful in some form. It also seems more harmful in a sense, because we all start smoking cigarettes because there is something about it that we enjoy—we either enjoy the experience of it, the way it feels, long before we are actually addicted to the nicotine and getting anything chemically from it.... But with this stuff, I mean, what is there to enjoy in this other than getting a dose of nicotine? So in that sense, it seems more harmful because it's just kind of reinforcing this addictive behavior.</i></p>
Harm	
A “safer” alternative	<p><i>... if you can make a product like Nicorette gum, I would think you could make a relatively healthy like product like snus relatively safe.</i></p> <p><i>It makes it sound like it's something not as harmful as like inhaling smoke in your lungs.</i></p> <p><i>Well, after I saw the number zero I read the emissions, and I am thinking okay, smoke-free. It's kind of like thinking of a soda product that says zero calories or whatever, and so I was, like, okay, zero calorie cigarette, or a zero calorie product, tobacco product. I'm like, okay, that could be a safer alternative towards smoking.</i></p>
Frequency of use	<p><i>First off, because I don't really know that it causes mouth cancer, and I don't think I would do it enough to make it cause mouth cancer.</i></p> <p><i>If you use it frequently, like they smoke cigarettes, you might go through a pack of cigarettes a day, maybe two packs a day. If they use snus on the regular—I feel like it causes mouth cancer.</i></p>
Smoke exposure	<p><i>But at least we're not harming the people who don't smoke, or at least we're caring about the people who don't smoke by trying to make a product that won't harm them with the secondhand smoke kind of stuff.</i></p> <p><i>Before I looked at the warning and I saw “smokeless for smokers,” I was, like, well, maybe this might be something that you could try that won't really have an effect on your lungs—you know, an effect on your health.</i></p>
Flavors	<p><i>... it's saying... we have a variety of different flavors for you. So it was, like, that was the catch... first catch was it's smokeless, that people that normally smoke so people are, like... may be this might be a little bit healthier than a regular cigarette. And then they're kind of like pulling you in, saying they got several tastes.</i></p>
Worry	<p><i>This is mouth cancer. Mouth cancer is kind of more scary to me just because it's more visible. You can't really see what a person's lungs look like until after you are already performed the autopsy</i></p> <p><i>I would be less worried with the snus because there's no direct, you know, danger... but the snus, I just sit it there and it does everything by itself. It just practically disappears. So, I would feel less concerned with the snus as opposed to a cigarette.</i></p>
Believability of warning label	<p><i>The negative things it just says it causes. The product can cause mouth cancer. It's saying “can.” They don't know. It's not saying that you will catch it. It's just saying it <u>may</u> cause that.</i></p> <p><i>Okay, if I believe that this will cause mouth cancer, then that's what will happen in my life. If I see this and I'm, like, “I control my life and my reality,” then I wouldn't believe that this would cause mouth cancer for me—no matter how much I may use the product or not. I do believe that it causes mouth cancer. I don't believe it will cause mouth cancer for myself. I believe I have the power to make my reality what it is.</i></p> <p><i>Yes, I actually do believe it, because tobacco is not going to stop being tobacco.</i></p>
Juxtaposition of warning and advertisement	<p><i>It's an alternative to smoking cigarettes. The way they have it, it's a lot better than smoking cigarettes. The way they have it is snus is a good product and everything, but the warning sign is bigger than day right there. So you know it's not really good for you, but the way they have the advertisement, it looks like a good product to take.</i></p> <p><i>It doesn't really show that it's going to harm you, it shows you—if the warning wasn't at the bottom, you wouldn't really be, like, “This is something that could potentially kill you.”</i></p>
Addiction	
Greater addiction	<p><i>But with this stuff, there's no way you can deny that you're an addict. I mean, so that is one negative thing that would affect one's self-image... if you are now experimenting with different ways of getting a chemical into your body, it probably would make you more willing to try other ways as well.</i></p> <p><i>You know, it's just another tobacco product to get people or to keep people addicted while they're working or something. I've heard that it has more nicotine, which is the stuff that actually gets you addicted. I think</i></p>

Themes	Examples
Increased use opportunities	<i>it's more addictive [than regular cigarettes]. I feel like if I tried it and enjoyed it then I would start wanting to buy it. It would be so readily available that I could get addicted to it really quick.</i>
Cessation	<p><i>Because [with] cigarettes you have to step outside. My job doesn't always allow me to go outside, but with this you can use it while you're inside, so you can use it all the time. I think it's more dangerous. It's more available and more convenient.</i></p> <p><i>Maybe sometime in the future, yeah I would switch [to snus] because lately I've been worrying about my health from smoking.</i></p> <p><i>If I get to that point where I know that I'm going to stop smoking or I want to try something different it would be this... an electronic cigarette or snus.</i></p> <p><i>Well, they say Nicorette gum can help you quit smoking so why couldn't this?</i></p> <p><i>I just wouldn't use it because if I somehow found a way to quit cigarettes then I'm just going to stay away from tobacco products altogether. I wouldn't want to risk getting addicted to anything else.</i></p>
Other	
Appeal to youth	<p><i>And what it seems like is that generally ads like these, when tobacco's advertised, it's being targeted at young people because those are the people who are thinking about starting to smoke. I don't think anybody starts smoking when they're 45, you know. They start targeting young people, and they make it sound sexy, they make it sound appealing, they make it sound like it's not that dangerous.... And then people get addicted ... they can't quit, and then they either end up spending tons of money on it, it has social consequences, health consequences. I mean, you know, ultimately it's a really, really horrible thing...</i></p> <p><i>A little kid would probably look at it—they see the can, and they assume it's candy. They see you're not blowing smoke or anything, now you say you just keep it in there. So you know, it pretty much gives them an idea of, like, hey, let me try that.</i></p>