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Scaring the Snus Out of Smokers: Testing Effects of Fear, Threat, and Efficacy on Smokers' Acceptance of Novel Smokeless Tobacco Products

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Abstract

Novel smokeless tobacco products (such as snus) are aggressively promoted to smokers by the tobacco companies. The Extended Parallel Process Model (EPPM; Witte, 1992) was used to evaluate the current perceptions of threat, efficacy, attitudes, and behavioral intentions regarding snus in a nationally representative sample of 1,836 smokers. Participants were then exposed to messages designed to discourage smokers from trying snus. On average, smokers perceived health threats of snus as somewhat serious, but believed they can effectively avert this threat. Support was found for the EPPM's proposition that when efficacy is high, greater perceived threat is associated with greater desired outcomes (less favorable attitudes towards snus and lower behavioral intentions to try snus in the future). No support was found for the proposition that when perceived efficacy is low, greater threat is associated with greater message rejection. Instead, message rejection was explained by fear felt while exposed to the anti-smokeless ads. This finding indicates the need to more clearly distinguish between cognitive (danger control) and affective (fear control) responses posited by the EPPM.

As public concern with exposure to secondhand smoke rises and the social acceptability of smoking continues to fall, the cigarette companies are turning to smokeless tobacco and novel smokeless tobacco products, such as snus, as a new way to retain their profits and to keep people from quitting tobacco (Carpenter, Connolly, Ayo-Yusuf, & Wayne, 2009). Snus is finely ground tobacco packaged in porous pouches resembling miniature tea bags that are placed between the gum and the lip to allow nicotine absorption (Figure 1). Snus originated in Sweden, where it has been in use since the early 19th century. Currently, snus is banned in the rest of the European Union and in Australia to protect public health (Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR), 2008). In the US, snus promotion increased in 2006, when the leading cigarette companies acquired smokeless tobacco manufacturers and began aggressively promoting snus products using cigarette brand names, such as Camel snus (Garten & Falkner, 2008; Mejia & Ling, 2010). Snus is marketed for use in smoke-free bars, offices, and airplanes as a temporary fix, thus encouraging dual-use (concurrent use of cigarettes and smokeless tobacco), discouraging smoking cessation, and normalizing tobacco use in smoke-free environments (Mejia, Ling, & Glantz, 2010). Use of smokeless tobacco has been linked to gingival recession,

periodontal bone loss (Offenbacher & Weathers, 1985), leukoplakia (precancerous oral lesions) (International Agency for Research on Cancer, 2007), oral cancer, esophageal cancer, and pancreatic cancer (Boffetta, Hecht, Gray, Gupta, & Straif, 2008). It is a risk factor in high blood pressure (Westman, 1995), and cardiovascular disease (Henley, Thun, Connell, & Calle, 2005). In addition, dual use of cigarettes and smokeless tobacco may make it more difficult to quit tobacco use (Hatsukami, Lemmonds, & Tomar, 2004) and dual use has been associated with higher cardiovascular risk than use of a single tobacco product (Teo, et al., 2006).

Because snus is a relatively new product on the US market, research on prevalence of its use, attitudes, beliefs, and perceptions about it is nascent. A consumer-based national survey of adults (Regan, Dube, & Arrazola, 2012) found that 44.2% heard of snus, 5.4% tried snus in their lifetime, and 1.8% used it in a past month. A survey of young adults in Minnesota reported that 64.8% of participants were aware of snus, 14.5% used snus in their lifetime, and 3.2% used snus in the past 30 days (Choi & Forster, 2012). Studies on attitudes towards snus were mainly qualitative focus groups investigations (Wackowski, Lewis, & Delnevo, 2011; Bahreinifar, Sheon, & Ling, 2013; Choi, Fabian, Mottey, Corbett, & Forster 2012; Liu et al., 2012). Across all four of these studies, participants expressed positive attitudes towards snus because it is convenient and can be used anywhere, including in smoke-free environments and in schools. The discreet nature of snus was perceived to lead to reduced stigma, because snus users would not be subject to stigma associated with traditional snuff or chew (Liu et al., 2012) or with second-hand smoke (Wackowski et al., 2011). Participants noted the different flavors of snus as its appealing characteristic, which could potentially entice youth (Liu et al., 2012) or encourage recreational use of snus (Choi et al., 2012). On the other hand, some participants found snus unappealing. Specifically, women did not like the idea of putting snus (i.e., tobacco) directly in their mouth (Choi et al., 2012) and users of traditional smokeless tobacco in rural Ohio perceived snus as a weak and non-manly product compared to traditional smokeless tobacco (Liu et al., 2012). In the US, one study found that 49.9% of adults thought snus was equally as harmful as cigarettes, and additional 37.3% were unsure about harmfulness of snus as compared to cigarettes (Regan et al., 2012).

Compared to cigarettes, far fewer efforts are focused on understanding factors leading to smokeless tobacco initiation (Helme, Cohen, & Parrish; 2012) and on smokeless tobacco prevention (United States Department of Health and Human Services, 2012). However, as smokeless tobacco is coming to the forefront of anti-tobacco research, there is a need for a closer look specifically at new smokeless tobacco products (Southwell et al., 2012). This study aims to begin filling this gap by assessing existing perceptions of smokers towards novel smokeless tobacco products like snus and by testing counter-marketing messages aimed at preventing initiation of novel smokeless tobacco products among smokers through the lens of the Extended Parallel Process Model.

The Extended Parallel Process Model (EPPM; Witte, 1992) is one of the latest theories to explain why fear appeals sometimes succeed and sometimes fail. It served as a theoretical foundation for dozens of health studies (Witte, Girma, & Girgre, 2003) and helped communication practitioners to develop and evaluate various interventions. It is particularly useful as a framework in assessing target audience before the intervention and in gauging

the effects of the campaign (Popova, 2012; Valente, 2002). The goal of the current study was to evaluate the possibility of using health fear appeals to deter smokers from starting to use snus. The EPPM was used as a theoretical framework to: a) evaluate the existing perceptions of snus and smokeless tobacco in the target audience in a nationally representative sample of smokers and b) to assess the effects of perceived threat, efficacy, and fear on various outcomes, such as attitudes, behavioral intentions, and message rejection.

The Extended Parallel Process Model

The Extended Parallel Process Model (EPPM; Witte, 1992) is built from the synthesis of earlier models (fear as-acquired drive model, Hovland, Janis, & Kelly, 1953; parallel process model, Leventhal, 1970; and protection motivation theory, Rogers, 1975), and it articulates the processing and outcomes of fear appeal messages. Fear appeals are designed to persuade by scaring people into changing behavior by showing a credible threat to their health or well-being. The EPPM posits that when people process fear appeals, they first evaluate the health threat in terms of its severity (how serious is this threat) and their susceptibility to it (how likely it is to happen to them). If the health threat is negligible or very unlikely to occur, the processing of the fear appeal stops. If the health threat is serious, people feel fear and that fear can actually make them believe that the threat is even more serious. Then they evaluate efficacy in terms of response efficacy (whether the recommended response is effective in averting the threat) and self-efficacy (whether they are capable of implementing the response). Depending on whether perceived threat or perceived efficacy outweigh each other, people engage in one of two responses. When efficacy is greater than threat, people do what the message recommends and change their attitudes, beliefs, and behavior in line with the message, engaging in so-called *danger control response*. When perceptions of threat outweigh perceptions of efficacy, people do the opposite of what the message recommends, engaging in *fear control response* by avoiding the message, derogating it, or ascribing manipulative intents to the message creators.

The EPPM is particularly useful to health communication practitioners because it can serve as a theoretical guide to evaluating target audience before the campaign and assessing the effects of campaign messages. For example, during the formative evaluation stage, researchers would measure perceptions of threat and efficacy, levels of fear, current attitudes, beliefs, behavioral intentions, and behavior of the audience. This evaluation allows researchers to assess the current state of the target audience – whether they are unaware of the threat, engaged in defensive proactive response, or scared and denying the threat. Based on the assessed state, the appropriate strategies for the intervention can be developed. Specifically, if the audience is not aware of the threat, messages focusing on raising the level of the threat can be used, but if the audience is already fearful, messages focusing on efficacy would be more appropriate (Muthusamy, Levine, & Weber, 2009). Because novel smokeless tobacco products, such as snus, are a new health threat in the US, the first goal of this study was to appraise the audience's current state in terms of the EPPM constructs.

The EPPM has generated a lot of research. Since its introduction in 1992 (Witte, 1992), by 2003, the EPPM has served as a theoretical foundation for over 50 empirical studies (Witte,

et al., 2003), and the more recent review counted at least 15 additional quantitative studies since then (Popova, 2012). However, the findings of these studies do not provide unequivocal support for any of the 12 propositions of the model (Popova, 2012). These mixed findings stem in part from different operationalizations of the EPPM's constructs, such as threat and efficacy. Within the EPPM framework, threat and efficacy are conceptualized as perceptions (situated within individuals), but in practice threat and efficacy are often treated as characteristics of the message. In order to conduct tests of EPPM's propositions that are more in line with how these propositions were originally conceived, it is necessary to evaluate perceived threat and perceived efficacy and treat them as continuous, rather than categorical, variables. This is what was done in this study, which tests two specific propositions of the EPPM that have received only mixed support previously – Proposition 2 and Proposition 4 (Popova, 2012). Proposition 2 posits, “As perceived threat increases when perceived efficacy is high, so will message acceptance,” while Proposition 4 states, “As perceived threat increases when perceived efficacy is low, people will do the opposite of what is advocated” (Witte, 1998). The next sections describe each of the propositions, summarize the evidence for and against them, and present specific hypotheses derived from these propositions.

High efficacy and high threat result in message acceptance

According to the EPPM's Proposition 2, when perceived efficacy is high, greater perceived threat leads to greater message acceptance (Witte, 1998). Several studies found evidence for this proposition (Basil, Basil, Deshpande, & Lavack, 2013; Roberto & Goodall, 2009; Smalec & Klinger, 2000; Terblanche-Smit & Terblanche, 2010; Witte & Allen, 2000; Witte, Berkowitz, Cameron, & McKeon, 1998). For example, in a survey, Roberto and Goodall (2009) used median split to divide respondents into four groups based on their levels of perceived threat and efficacy and found that the high threat/high efficacy group had the highest message acceptance (behavioral intentions and behavior at both the initial and follow-up survey). In an experiment pertaining to safe sexual behavior, Terblanche-Smit and Terblanche (2010) manipulated levels of threat (low, medium, and high) and although they did not manipulate efficacy, measured efficacy was relatively high (e.g., 3.9-4.0 on a 5-point scale). They found that attitude towards the message was more positive in higher threat groups.

In contrast, several studies found evidence against this proposition (Hubbell, 2006; Muthusamy, et al., 2009; Witte & Morrison, 1995; Witte, et al., 1993). For example, in a survey of rural Mexican American women, Hubbell (2006) reported that women in the low threat/high efficacy group had the highest enactment of protective behavior, followed by the low threat/low efficacy group. This is contrary to the EPPM's prediction that the highest level of protective behavior would be in the high threat/high efficacy group. In an experiment with youth where threat levels were manipulated but efficacy was kept consistently high, participants in the low threat group had attitudes that were more in line with the message (Witte & Morrison, 1995).

Why did the various survey and experimental studies failed to find consistent support for this proposition? One explanation stems from the way threat (and, to lesser extent, efficacy)

was operationalized. In most of these experimental studies, threat was an attribute of the message. Even when manipulation checks were performed, it was the message condition, not the actual perceived level of threat, that was used as a predictor variable for the outcomes. In survey studies, even though threat and efficacy were measured, the continuous measures were then dichotomized into low and high groups based on median splits. In contrast, when the original, continuous levels of threat and efficacy were used in a regression to predict message acceptance, support was found (Smalec & Klinge, 2000).

In this study, levels of threat and efficacy were measured on continuous scales and they were then used to predict the outcomes – attitudes and behavioral intentions to use novel smokeless tobacco products. In line with proposition 2 that stated that when efficacy is high, higher threat corresponds to greater message acceptance (attitudes and behavioral intentions in line with message recommendations), Hypothesis 1 predicted that:

H1: When perceived efficacy is high, perceived threat will negatively predict a) favorable attitudes towards snus and b) behavioral intentions to use snus.

Low efficacy and high threat result in message rejection

The EPPM's Proposition 4 posits that when people feel incapable of averting the threat (i.e., perceived efficacy is low), greater perceived threat leads to message rejection – people avoid the message, think that the message creators are trying to manipulate them, or believe the threat is exaggerated (Witte, 1998). Support for this proposition was found by Hubbell (2006) who used correlational analyses to assess relationships between perceptions of threat and efficacy and defensive avoidance of the message. As perceived threat increased, so did defensive avoidance.

On the other hand, several studies found evidence against this proposition (Rimal & Real, 2003; Roberto & Goodall, 2009; Witte, et al., 1993). In a survey, Witte et al. (1993) found that when efficacy was low, greater defensive avoidance, perceived manipulation, and issue derogation were exhibited in the low threat group. Furthermore, Smalec and Klinge (2000) found that at low levels of efficacy, threat was negatively correlated with message rejection.

The mixed findings on proposition 4 cannot be easily explained by the methodological differences in operationalization of variables, because studies found evidence against this proposition both when threat was treated as a continuous (Smalec & Klinge, 2000) and as a categorical (Roberto & Goodall, 2009) variable. Nonetheless, based on this proposition, pre-existing measures of threat and efficacy were used and perceived threat was treated as a continuous variable to test the following hypothesis:

H2: When perceived efficacy is low, perceived threat will positively predict a) message derogation and b) perceived manipulative intent.

Methods

Participants

A nationally representative probability-based sample of 1,836 adult current or recently former (quit within last two years) smokers participated in an online experiment in

November 2011. All participants were members of the Knowledge Networks panel. Knowledge Networks is a research company that recruits participants through probability-based sampling, using address-based sampling methods. Participants are rewarded either with incentive points redeemable for cash or with hardware and free access to the Internet.

This study was a part of a larger investigation focused on US smokers' use and attitudes towards novel smokeless tobacco products and on testing the effectiveness of countermarketing messages. Power analyses were performed for the primary inferential analyses of the main study (using NCSS 2008). Assuming a sample size of $N=1800$, which is consistent with previous tobacco advertisement research studies, $\alpha = .05$, and power = .80, for a continuous, approximately normally-distributed outcome variable minimum detectable effect size (R^2 increase) was calculated as less than 1%, which is a small standardized effect size (Cohen, 1987).

Procedure

The study was conducted online. Upon completing a screener (confirming that a participant was over the age of 18 and smoked over 100 cigarettes in his/her lifetime) and giving informed consent, all participants took a pretest. Then they were randomly assigned to one of the 8 groups: one of the six anti-smokeless message groups, a control/control group, or a control/smokeless ad group. Each group saw the first ad (treatment or control), completed a brief questionnaire about the first ad, saw the second ad (smokeless or control) and completed the second questionnaire. Then all groups completed a post-test.

Materials

The main goal of this study was to test messages that might be effective in deterring smokers from starting to use novel smokeless tobacco products. Six print anti-smokeless tobacco ads (Appendix A) were developed inductively, using a variety of message concepts based on the analyses of previously secret tobacco industry documents that detailed marketing strategies for smokeless tobacco products in the past, analysis of marketing materials for novel smokeless tobacco products, and building on past research on smoking prevention campaigns. The messages were first tested in online focus groups and further refined based on participants' reactions and evaluations. This approach to developing messages from the bottom up is similar to how many public health interventions are developed. As such, although it is based on relevant and timely empirical findings, message development is not explicitly guided by a specific theory, and the messages include a variety of approaches. Five out of six ads featured some information about negative health effects of novel smokeless tobacco products and one was a personal humorous testimony (Appendix A). However, this paper is not focusing on the effects of the individual ads. Using these messages as a springboard, it focuses on measuring the level of fear participants felt while looking at the ads and examining the relationships between the preexisting levels of threat and efficacy and outcome variables (message acceptance and rejection). For further description of the countermarketing ads used and the effects of individual ads on attitudes and behavioral intentions, see Popova, Neilands, and Ling (2013).

Measures

Perceived threat was a combination of perceived severity and perceived susceptibility. *Perceived severity* was measured by asking how harmful new smokeless tobacco products, such as snus, are for general health and to what extent new smokeless tobacco products cause heart attack, cancer, and oral cancer on a 1-9 Likert scale (pretest Cronbach's $\alpha=.90$, post-test $\alpha=.91$). *Perceived susceptibility* was measured by two items, "I am at risk of developing cancer from using snus" and "It is likely that my health will suffer from using snus" (pretest $\alpha=.95$, post-test $\alpha=.96$). Individual scales for severity and susceptibility were averaged to create an overall scale for perceived threat.

Similarly, *perceived efficacy* was a scale comprising individual items of response efficacy and self-efficacy. *Perceived response efficacy* was measured by two items, "Staying away from snus is effective in preventing cancer" and "If I do not use snus, I am less likely to develop health risks" (pretest $\alpha=.74$, post-test $\alpha=.87$). *Self-efficacy* was measured with one item, "It is easy for me to stay away from new smokeless tobacco products, such as snus." All these measures were on 1-9 Likert scale.

Overall *fear* was measured at pretest and post-test by one item, "I am scared of the health consequences of smokeless tobacco." In addition, to measure fear felt during the exposure to the ad, participants indicated to what extent they felt afraid while looking at the ad (1-9 Likert-type scale).

Danger control responses were attitudes and behavioral intentions to use snus. *Attitudes* towards using new smokeless tobacco products, such as snus, were assessed by 7-point semantic differentials: good/bad, intelligent/unintelligent, appropriate/not appropriate, pleasant/unpleasant (pretest $\alpha=.96$, post-test $\alpha=.97$). *Behavioral intentions* were measured by participants reporting how open they were to trying snus in the future on a 9-point Likert scale ranging from "Not at all open" to "Extremely open." In addition, they reported willingness to use or switch to a smokeless tobacco product: (a) in a situation when they could not smoke, (b) to reduce health risk, (c) to cut down on number of cigarettes smoked, and (d) to quit smoking on a 9-point Likert scale ranging from "Definitely would not" to "Definitely would." These four items were combined into one scale, openness to snus for health reasons (pretest $\alpha=.93$, post-test $\alpha=.91$).

Two types of *fear control responses* were measured: *message derogation* (e.g., "The anti-tobacco ad presented overblown information about health consequences or risks from smokeless tobacco," two items, post-test $\alpha=.91$) and perceived *manipulative intent* (e.g., "The anti-tobacco ad tried to manipulate my feelings," three items, post-test $\alpha=.86$).

Awareness of snus was measured by asking "How familiar are you with new smokeless tobacco products, such as snus?" with answers ranging from "Not at all familiar" to "Extremely familiar" on a 1-7 Likert scale.

Demographic variables included sex, age, race, education, annual income, region, and current and past smoking and smokeless behavior.

Missing data handling

Missing data were rare (on average, 1.82% of data for each of the main variables were missing, the highest being 4.36%). Rather than excluding responses with missing data, missing data were imputed using a hotdeck imputation procedure (Myers, 2011).

Respondents with missing data were matched with a “deck” of similar respondents, who had the same gender, age group, education group, lived in the same region of the US, and matched on being a past user or non-user of smokeless tobacco. The missing responses were replaced with data points drawn at random from this deck.

Results

Description of the Sample

The sample was 53% female, ages ranged between 18 and 84 with the mean age of 47, 73% of participants were non-Hispanic White, and the distribution of participants by income, education, and region of the US was diverse (see Table 1). The majority (62.7%) tried quitting smoking in the past, but went back to smoking; about a quarter of the sample were successful quitters (23.1%), and 14.2% had never tried quitting. The rates of trial of novel smokeless tobacco products in this sample were low: only 11.2% have ever tried snus and 2.1% were current snus users.

Table 2 presents means and standard deviations of the EPPM variables at pretest. In terms of the EPPM constructs, participants perceived threat of smokeless tobacco as somewhat serious (5.7 on a 9-point scale), but their perceptions of efficacy were higher (6.1 on a 9-point scale). They had moderate level of fear about the health consequences of using smokeless tobacco (5.4 on a 9-point scale). At pretest, participants had predominantly negative views of smokeless tobacco products with average attitudes of 2.4 on a 7-point scale and were not open to trying snus in the future. However, questions that listed specific health reasons for using or trying smokeless tobacco products elicited higher levels of interest (Table 2).

According to the EPPM, a simple comparison of perceptions of threat and efficacy allows to determine whether people are in a danger control or a fear control mode (Witte, Cameron, McKeon, & Berkowitz, 1996). Subtracting perceived threats scores from perceived efficacy score for each individual revealed that majority of participants (975 or 53.1%) were in danger control, 634 (34.5%) were in fear control, and 226 (12.3%) of participants were in neither mode.

Both the EPPM and the Risk Perception Attitude RPA Framework (RPA, (Rimal & Real, 2003) group people into four categories (EPPM uses “threat” while RPA uses “risk” to refer to essentially the same concept): high threat/high efficacy; low threat/high efficacy; high threat/low efficacy; and low threat/low efficacy. Different groups are believed to engage in different processing of fear appeal messages and different coping mechanisms. Participants were divided into groups based on their pretest measurements of threat and efficacy, using mid-point of the scale (5 on a 9-point scale). In past research, median splits were often used; however, while median split creates groups of equal size, if the median is high or low, it will assign people to improper categories. For example, median efficacy at pretest was 6, and

assigning someone at 5.9 efficacy to the low-efficacy group seems inherently wrong. Therefore, midpoint of each scale was used instead of a median split. The resultant groups and their levels on various measures are presented in Table 3.

Level of fear

At pretest, the four EPPM groups differed in their level of fear. The highest level of fear was in the high threat/high efficacy group and the lowest in the low threat/low efficacy group (Table 3). The EPPM groups also felt different levels of fear while looking at the anti-smokeless ads, with high threat/low efficacy group feeling the greatest level of fear.

Awareness of snus

On average, participants were not too familiar with the snus ($M = 2.55$, $SD = 1.84$). Awareness of snus was not related to perceived threat (at pretest $r = .04$, $p = .09$, at post-test $r = .03$, $p = .307$) or to perceived efficacy (at pretest $r = .002$, $p = .93$, at post-test $r = -.033$, $p = .16$). Familiarity was negatively related to the fear felt while looking at the ad ($r = -.09$, $p < .01$); people more familiar with snus felt less fear while looking at the anti-smokeless ad.

Hypotheses Testing

Hypothesis 1 posited: When perceived efficacy is high, perceived threat will negatively predict a) favorable attitudes towards snus and b) behavioral intentions to use snus. Because this hypothesis pertains to the condition of high efficacy, only people with high pre-test perceived efficacy (> 5 , the mid-point of the scale) who saw one of the anti-smokeless ads were used in these analyses ($N = 758$). Hierarchical regression models were conducted to isolate the R^2 change associated with each independent variable and covariate. For all analyses, the variables sex, age, and past use of snus were entered as covariates at the first step. At the next level, threat level at pre-test was entered. Separate regression analyses were run for post-test attitudes, openness to snus in general, and openness to snus for health reasons.

For post-test attitudes, the results of hierarchical linear regressions support the hypothesis that level of threat is predictive of post-test attitudes ($F(4, 871) = 37.60$, $p < .001$, $R^2 = .147$, R^2 change = .124). Pretest threat was a strong predictor of post-test attitudes ($\beta = -.355$, $t = -11.277$, $p < .001$). A negative relationship indicates that a greater level of threat was related to less positive attitudes towards snus. Likewise, the results support the hypothesis that level of threat is predictive of behavioral intentions. For openness to snus in general, the model was significant ($F(4, 861) = 35.321$, $p < .001$, $R^2 = .141$, R^2 change = .007) and threat was a significant predictor of post-test openness to snus in general ($\beta = -.084$, $t = -2.654$, $p < .01$). For openness to snus for health reasons, the model was significant ($F(4, 870) = 7.986$, $p < .001$, $R^2 = .035$, R^2 change = .014) and threat was a strong predictor of post-test openness to snus for health reasons ($\beta = -.188$, $t = -3.531$, $p < .001$). The greater threat smokers perceived, the less open they were to trying snus in the future.

Hypothesis 2 predicted that when perceived efficacy is low, perceived threat will positively predict a) message derogation and b) perceived manipulative intent. Only people with low perceived efficacy (≤ 5 , the mid-point of the scale) who saw one of the anti-smokeless ads

were used in these analyses ($n=644$). Hierarchical regression models were conducted in order to isolate the R^2 change associated with each independent variable and covariate. For all analyses, the variables sex, age, and past use of snus were entered as covariates at the first step. At the next step, threat level at pretest was entered. Separate regression analyses were run for message derogation and perceived manipulative intent.

For message derogation, hierarchical regression model was not significant ($F(4, 521)=.825, p=.510$). Threat and control variables (past use of snus, age, gender) were not significant predictors of message derogation. Similarly, for perceived manipulative intent, hierarchical regression model was not significant ($F(4, 521)=.652, p=.626$). Threat and control variables (past use of snus, age, gender) were not significant predictors of perceived manipulative intent.

Given that H2 was not supported, additional exploratory analyses were conducted in an attempt to determine what variables are associated with message rejection (message derogation and perceived manipulative intent). Using bivariate correlations between the predictor variables (threat, efficacy, fear at pretest, and fear while watching the ad) and outcome variables in the whole sample (Table 4), it was found that message derogation had a weak negative relationship with efficacy, and both message derogation and perceived manipulation intent had weak positive relationships with fear while looking at the ad.

So it was not pre-existing level of perceived threat, but fear while looking at the ad that was correlated with message rejection. Therefore, the hierarchical regression analyses using fear while looking at the ad as predictor variable entered in the second step were tested. Once again, only people with low efficacy (≤ 5) who saw anti-smokeless ads were used in these analyses.

For message derogation, hierarchical regression model was significant ($F(4, 519)=6.788, p<.001, R^2=.05$). Fear while looking at the ad was a significant predictor of message derogation ($\beta=.22, t=4.99, p<.001$). Similarly, for perceived manipulative intent, hierarchical regression model was significant ($F(4, 519)=3.429, p<.001, R^2=.026$). Fear while looking at the ad was a significant predictor of perceived manipulative intent ($\beta=.158, t=3.538, p<.001$).

Discussion

This study evaluated perceptions of novel smokeless tobacco products (such as snus) among US smokers using the framework of the Extended Parallel Process Model. In the past, fear appeals have been used effectively to target smoking (Wakefield et al., 2013), but comparative efforts are lacking in the area of smokeless tobacco and are nonexistent for the novel smokeless tobacco products.

In an online study with a nationally representative sample of US smokers it was found that smokers perceive novel smokeless tobacco as dangerous and harmful to health, but most of them also have high perceptions of efficacy, believing that not using snus is effective in averting threat and that they are able to stay away from snus. The relatively high levels of efficacy could be explained in part by the lack of appeal of these products - participants had very low favorable attitudes towards snus and were not at all open to trying snus in the

future. These findings corroborate results of the earlier qualitative studies that smokers find snus unappealing (Bahreinifar et al., 2013; Choi et al., 2012). However, smokers expressed more interest in snus when presented with specific reasons: situations when they cannot smoke, if these products are described as something to help them quit or cut down on smoking. These are exactly the messages used to promote novel smokeless products. For example, Camel Snus ads urge smokers to use snus in smoke-free environments to “Break Free” and “Boldly go anywhere,” and proclaim snus to be “bar-friendly,” “concert-friendly,” “endless meeting-friendly,” and even “date-friendly” (Trinkets & Trash Artifacts of the Tobacco Epidemic). Snus has also been promoted possibly as an alternative cessation in the Camel snus “Smoke-free resolution” campaign, which encouraged smokers to switch to Camel snus around the New Year, a time when many smokers make a resolution to quit smoking (Trinkets & Trash Artifacts of the Tobacco Epidemic).

The second goal of the paper was to test two central propositions of the EPPM. Proposition 2 posited that when efficacy is high, greater threat leads to greater message acceptance. This study found support for this proposition - for smokers who had high levels of perceived efficacy, greater levels of perceived threat predicted less favorable attitudes towards snus and less openness to using snus in the future, both in general and for specific health reasons. Past research found mixed support for this proposition, but this finding is in line with those past studies that treated threat and efficacy as continuous variables rather than dichotomizing them (Smalec & Klinger, 2000). Most of the studies that did not find support for this proposition either treated threat and efficacy as message characteristics and manipulated them or measured threat and efficacy and then divided people into groups based on median split. However, the practice of median splits has been heavily criticized in the literature because it leads to loss of information, power, and effect size (Cohen, 1983; Irwin & McClelland, 2003; MacCallum, Zhang, Preacher, & Rucker, 2002). A better way to test this proposition is to use full information available from measuring threat and efficacy as continuous variables, characteristics of the individuals, and use them as predictor variables.

Proposition 4 was not supported. When efficacy was low, perceptions of threat did not predict fear control responses such as message derogation and perceived manipulative intent. Although Hubbell (2006) found support for this proposition, the only fear control response examined in her study was defensive avoidance, which can be assessed in a survey, but would be difficult to evaluate in an experiment when participants are asked to look at the message. It is possible that perceived threat has different effects on different fear control responses. More naturalistic studies are needed to examine whether levels of threat consistently predict defensive avoidance of threatening information and have no effect on other fear control responses, such as message derogation and perceived manipulative intent of the message creators.

Although perceived threat did not predict message rejection outcomes, fear felt during exposure to the ad did. While this is evidence against proposition 4 of the EPPM, this finding is in line with EPPM's proposition 6: “Fear causes fear control responses.” Furthermore, in one of the earlier EPPM studies, Witte (1994) argued that cognitions of threat are not related to message rejection outcomes, but the emotion of fear directly predicts fear control responses, such as message rejection. The findings of current study indicate that

threat and fear are different constructs and should be treated as such. Threat is a cognitive assessment, while fear is an emotional response evoked by some stimulus (such as a fear appeal message). Each of these different constructs is related to different type of response. Danger control is a predominantly cognitive response. It comprises changes in attitudes, beliefs, behavioral intentions, and behavior in line with message recommendations. On the other hand, fear control response is mainly an affective reaction. When people are scared, they try to reduce fear (often without consciously thinking about it) by rejecting the threatening message. Therefore, in future studies using EPPM, greater distinction between predominantly cognitive (danger control) and affective (fear control) responses is needed. First, the distinction needs to be made at the level of predictor constructs – threat (cognition) and fear (emotion). Second, the propositions dealing with the fear control response side of the model should be reworded to distinguish between predictor variables. Thus, proposition 4: “As perceived threat increases when perceived efficacy is low, people will do the opposite of what is advocated” should be reworded. For example, it can read, “As fear increases when perceived efficacy is low, people will do the opposite of what is advocated” or “engage in emotional message rejection.”

It should be noted that participants reported consistently low levels of message derogation and perceived manipulative intent. This could be explained by the fact that these messages were carefully developed and pretested in focus groups to ensure they are effective and do not evoke negative emotional reactions and rejections. Low levels of fear control responses indicate that our team was successful in developing messages that did not evoke negative reactions from smokers.

Future research employing EPPM should further examine whether fear elicited by the fear appeal message is a better predictor than the cognitive threat participants report, how fear and threat interact, and under which conditions it is possible to elicit high perceived threat, but not high fear. For specific research on snus and other new tobacco products, future studies testing the effectiveness of messages to prevent initiation of new tobacco products should examine reactions of non-smokers, particularly focusing on young adults and adolescents, who might be more likely to experiment with novel products. In addition, the messages used in this study can be used in further studies with tighter theory-based manipulations. For example, there is a need to establish what message features (e.g., personal testimony, cartoon appearance, etc.) will increase the perceived efficacy of not starting to use smokeless tobacco. There is also an overall need for a more systematical investigation of specific message components and characteristics of individuals that account for success or failure of fear appeal messages (Yzer, Southwell, & Stephenson, 2012).

Limitations of this study include bottom up, public health intervention-type message development that was not explicitly guided by a specific theory. However, as mentioned earlier, this is the typical way to develop public health interventions. Even though we did not manipulate specific message features, the messages were effective in evoking some levels of fear and only a minimal level of message rejection. Another limitation was that because of the experimental design of the study, participants viewed only the ads (rather than at the ads embedded in a magazine, for example). This forced exposure lacks ecological validity because this is not how ads are usually viewed. However, this design maximizes internal

validity and facilitates participants' full attention to the target ad. Single exposure that was used in this study might be insufficient for some effects to emerge; it was enough for evoking at least some fear, which was found predictive of the message rejection outcomes. Because this research was part of a larger study, the number of items used to measure each of the EPPM constructs was limited to minimize the respondents' burden. This is a limitation, and future studies should employ more measures of each of the constructs. Finally, although most of the questions specifically focused on "new smokeless tobacco products, such as snus," several measures asked about "smokeless tobacco." It is unclear to what extent participants distinguished between the two categories. Future studies focusing on particular tobacco products should specifically ask about these products rather than asking about higher-order category of products, such as "smokeless tobacco."

In conclusion, as smoking rates continue to fall, tobacco industry is working hard on diversifying its products, on developing novel products, and on converting exclusive smokers to dual- or poly-users of various tobacco products. Snus is a new smokeless tobacco product in the US market and although levels of its trial and use are relatively low, they are growing. Snus contains nicotine and is addictive. Dual use of cigarettes and smokeless tobacco is associated with a variety of negative health effects (International Agency for Research on Cancer, 2007) and makes it harder to quit tobacco (Hatsukami et al., 2004). In response to the increased promotion of smokeless tobacco and novel smokeless tobacco products by the tobacco companies, efforts are needed to prevent smokers from becoming dual users of cigarettes and smokeless tobacco.

The results of this study show that when efficacy to carry out protective behavior is high, higher levels of threat lead to more message acceptance. The survey of the nationally representative sample of smokers revealed that, on average, smokers have high efficacy related to staying away from new smokeless tobacco products, such as snus. Therefore, campaigns on the national level using threatening messages (while also presenting the high level of efficacy) would be appropriate to further deter smokers from using smokeless tobacco products. However, for those smokers who have low perceptions efficacy – the group that had the most positive attitudes towards snus and was the most open to trying snus in the future – greater fear felt during exposure to the anti-smokeless ad was a significant predictor of message rejection. Smokers who do not believe staying away from snus is effective in averting the health threats or for whom it is not easy to abstain from snus resort to fear control responses when they feel fear and reject the anti-smokeless message. Therefore, messages targeting those smokers with low efficacy should first aim to raise their efficacy and not evoke too much fear.

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Appendix A

Description of Anti-Smokeless Ads used in the Study.

Ad	Message type	Headline	Body text	Endline	Fear elicited
Poison control <p>Do YOU or a family member use smokeless or "dissolvable" tobacco?</p> <p>Keep this Poison Control number in your phone: 1-800-222-1222.</p>	<ul style="list-style-type: none"> Health effects – danger to others 	<p>Do YOU or a family member use smokeless or "dissolvable" tobacco? ... Keep this Poison Control number in your phone: 1-800-222-1222.</p>	<p>Nicotine is poison. Toddlers who put a cigarette butt, snus or dissolvable smokeless product in their mouths need immediate medical attention. Snus look like candy in a wrapper. Dissolvables look like mints. Always keep these toxic products out of kids' reach. And be ready to call Poison Control.</p>	<p>SMOKELESS TOBACCO. Risky for you. Poison for them.</p>	4.71
Target <p>You might dodge one bullet. But can you dodge ten of them?</p>	<ul style="list-style-type: none"> Health effects 	<p>You might dodge one bullet. But can you dodge ten of them?</p>	<p>Tobacco in any form is a killer, causing cancer, stroke and heart attacks. It can also trigger health problems that last a lifetime. Using smokeless tobacco in situations when you can't smoke will not make you any safer. It only delays the day you take action to protect yourself. By becoming tobacco-free.</p>	<p>SMOKELESS TOBACCO. You know it's not the answer.</p>	4.36

Ad	Message type	Headline	Body text	Endline	Fear elicited
Industry cartoon	<ul style="list-style-type: none"> Health effects Anti-tobacco Industry 	From the industry that brought you lung cancer ...	Smokeless tobacco is just as addictive as smoking. But instead of causing lung cancer, snuff and chew cause mouth and throat cancer. And now a new smokeless gimmick, snus, is linked to pancreatic cancer. The more kinds of products the tobacco industry sells, the more kinds of cancer they cause.	SMOKELESS TOBACCO. Same tobacco, different cancers.	3.85
Experiment	<ul style="list-style-type: none"> Health effects Anti-tobacco industry 	Would you volunteer for a tobacco industry medical experiment?	Generations of user experience prove that traditional smokeless tobacco causes cancer and strokes. Now, the tobacco industry is test-marketing new smokeless products. Will these latest products prove to be just as risky? The tobacco industry won't pay you to be part of their experiment. You'll pay them.	SMOKELESS TOBACCO. It's what you don't see that kills you.	3.22

Ad	Message type	Headline	Body text	Endline	Fear elicited
<p>Keep smoking</p> <p>Smokeless tobacco. Now designed to keep you smoking.</p>	<ul style="list-style-type: none"> Health effects Addiction Anti-tobacco industry 	Smokeless tobacco. Now designed to keep you smoking.	Why does the tobacco industry push smokeless gimmicks at smokers? To keep smokers using nicotine more often. Some smokeless products force you to swallow instead of inhale. Others make you spit. All are designed to keep you addicted. More addiction, more sales. That's what the tobacco industry is all about.	SMOKELESS TOBACCO.It's all about addiction.	3.09
<p>Spit swallow</p> <p>"I don't spit and I won't swallow."</p>	<ul style="list-style-type: none"> Testimonial Humor 	"I don't spit and I won't swallow."	The tobacco industry pushes smokeless tobacco as something new. But it's as old as the hills. Chew, snuff, snus and dissolvables are all the same: chopped tobacco to put in your mouth. Whatever the smokeless product, you must either spit or swallow it. Of course, there's another choice. Just skip it.	SMOKELESS TOBACCO.Less satisfaction. More addiction.	2.12

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Figure 1.
A tin of Camel snus with some snus pouches.

Table 1
Participant Characteristics

Characteristic	N	%
Gender		
Male	859	46.8
Female	977	53.2
Age, years		
18-29	285	15.5
30-44	445	24.2
45-59	753	41.0
60+	353	19.2
Race		
White, Non-Hispanic	1343	73.1
Black, Non-Hispanic	185	10.1
Hispanic	189	10.3
American Indian or Alaska Native	16	0.9
Asian	11	0.6
Native Hawaiian/Pacific Islander	6	0.3
2+ Races, Non-Hispanic	70	3.8
Other, Non-Hispanic	16	0.9
Education		
Less than high school	174	9.5
High school	725	39.5
Some college	589	32.1
Bachelor's degree or higher	348	19.0
Annual Income (thousand USD)		
<15	349	19.0
15-24.9	222	12.1
25-39.9	369	20.1
40-59.9	310	16.9
>60	586	31.9
Region		
Northeast	275	15.0
Midwest	489	26.6
South	695	37.9
West	377	20.5

Characteristic	N	%
Current smoking status		
Did not smoke in the past 30 days	512	27.9
Smoked on less than 20 days in the past 30 days	128	7.0
Smoked on 20-29 days in the past 30 days	149	8.1
Smoked every day in the past 30 days	1047	57.0
Past use of snus		
Ever use of snus	206	11.2
Use of snus in the past 30 days	39	2.1

Table 2
Descriptive Statistics for the EPPM Constructs Measured at Pretest

EPPM Construct	Mean	SD
Threat	5.70	1.84
Perceived severity	6.06	1.84
Perceived susceptibility	5.33	2.42
Efficacy	6.13	2.02
Response efficacy	5.32	2.44
Self-efficacy	6.93	2.48
Fear	5.39	2.62
Attitudes towards snus	2.41	1.51
Openness to using snus	1.40	1.30
Openness to using snus for health reasons	4.00	2.69

Note. All constructs, except attitudes, were measured on 1 (lowest) to 9 (highest) Likert scale. Attitudes were measured on 1-7 semantic differential scale, with higher numbers indicating more positive attitudes towards snus.

Table 3
Distribution of Smokers across the Four EPPM Groups and Perceptions of Threat, Efficacy, Fear, Attitudes, and Openness to Using Snus for Each Group at Pretest

EPPM group	N	%	Threat	Efficacy	Fear (pretest)	Fear (during exposure)	Attitudes towards snus	Openness general	Openness for health reasons
Low threat, low efficacy	453	24.7	3.93a	3.80a	3.50a	3.48ab	3.09a	1.54a	4.43a
Low threat, high efficacy	312	17	4.07a	6.94b	4.69b	2.93a	2.66b	1.32a	3.91ab
High threat, low efficacy	231	12.6	6.40b	4.51c	4.89b	4.10c	2.26c	1.47a	4.41a
High threat, high efficacy	839	45.7	7.03c	7.54d	6.74c	3.67bc	1.94d	1.30a	3.91b

Note. Groups with different subscripts differ significantly at $p<.05$

Table 4
Intercorrelations of Threat, Efficacy, Fear, and Outcome Variables (n=1836)

	Threat	Efficacy	F-Pre	F-DE	A	OS-G	OS-HR	MD	MI
Threat (pretest)	1								
Efficacy (pretest)	.53**	1							
Fear (pretest)	.59**	.57**	1						
Fear (during exposure)	.12**	.01	.16**	1					
Attitudes towards snus (post-test)	-.36**	-.26**	-.30**	-.06**	1				
Openness to snus general (post-test)	-.10**	-.12**	-.08**	-.02	.37**	1			
Openness to snus for health reasons (post-test)	-.13**	-.15**	-.08**	.09**	.34**	.32**	1		
Message derogation (post-test)	-.03	-.05*	-.01	.08**	.07**	.03	.09**	1	
Manipulative intent (post-test)	-.01	-.02	0.02	.07**	.08**	.05*	.10**	.71**	1

Note. Threat, efficacy, and fear (pretest) were measured at pretest. Fear (during exposure) is the level of fear participants felt while looking at the ad. Outcome variables (attitudes, openness, message derogation, and manipulative intent) are reported as measured at post-test.

* $p < .05$.

** $p < .01$.

*** $p < .001$.