

DEPARTMENT of PSYCHOLOGY

Predicting Tobacco-Free Nicotine Pouch Intention Among Swedish Young Adults: Gender and the Proximal Predictors of the Theory of Triadic Influence

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Abstract

Nicotine pouches are popular products marketed in Sweden as tobacco-free alternatives to tobacco-containing snus. The purpose of the present study was to investigate the underlying factors influencing use of nicotine pouches among Swedish young adults using the theory of triadic influence (TTI; Flay et al., 1995), a model used to predict health-related behaviors. A questionnaire measuring self-efficacy/perceived behavioral control, social normative beliefs, and affective attitudes toward nicotine pouches and snus was administered to nicotine-using and nonusing Swedish adults ages 18-29 (N = 493). Ordinal logistic regressions were conducted to assess the predictive power of the three TTI predictors and gender on nicotine pouch use intention with nicotine-use status and age as controls. Additional tests were conducted to measure betweengender differences in intention and within-subject differences in nicotine pouch and snus affective attitudes. Participants with higher self-efficacy/perceived behavioral control had .460, 95% CI [.389, .544] the odds of expressing higher intention, and participants with more positive affective attitudes toward nicotine pouches had 1.144, 95% CI [1.054, 1.243] the odds of expressing higher intention than those that scored lower. No significant differences were found in intention between genders, U = 25746, z = -1.386, p = .166. Nicotine pouches elicited a mean increase in affective attitudes when compared to snus, t(476) = 14.474, p < .001, d = .66. Results indicated that self-efficacy/perceived behavioral control and affective attitudes toward nicotine pouches were significant predictors for nicotine pouch use intention, and participants held more positive affective attitudes toward nicotine pouches than snus.

Keywords: nicotine pouches, snus, theory of triadic influence, gender

Predicting Tobacco-Free Nicotine Pouch Use Intention Among Swedish Young Adults: Gender and the Proximal Predictors of the Theory of Triadic Influence

The evolution of nicotine use is influenced by innovative new nicotine-containing products, effective advertising strategies aimed at current and new users, and adaptation to the consumer's knowledge and perception surrounding the health effects of nicotine products. Smoking rates have trended downward since the year 2000 (World Health Organization [WHO], 2019), while snus, or moist snuff, has remained a staple among Swedish young adults and adolescents (Public Health Agency of Sweden, 2019). According to statistics from WHO (2019), snus has become more popular than traditional smoking in Sweden with 17-29 year olds making up the highest percentage of users (Zetterqvist & Ramstedt, 2019). Swedish men are using snus to a greater extent than Swedish women (WHO, 2019), but there has been a notable increase in Swedish female snus users from barely 1% using snus on a daily basis in 1988 (Statistics Sweden, 2018) to 4% in 2019 (WHO, 2019).

Over the past three years, snus manufacturers have launched "tobacco-free" snus alternatives, also known as nicotine pouches, and are marketing them as potentially reduced-risk products (British American Tobacco, n.d.). A few of the most prominent brands sold in Sweden are *LYFT* by British American Tobacco, *ZYN* by Swedish Match, *On!* by Råå S AB, and *Nordic Spirit* by Nordic Snus (see Appendix A; Robichaud et al., 2019). Nicotine pouches differ from tobacco-containing snus by ingredients, manufacturing, and packaging. The nicotine found in nicotine pouches is either (a) extracted from tobacco leaves and infused into cellulose powders (British American Tobacco Science, n.d.; Robichaud et al., 2019), or (b) transformed into nicotine salts (OnNicotine, n.d.). These powders and salts are substituted for the tobacco leaf in most brands of nicotine pouches (OnNicotine, n.d.; Robichaud et al., 2019). Nicotine pouches are marketed as "tobacco-free" reduced-risk products and come in an assortment of flavors with light colored packaging designs. Manufacturers often present the amount of nicotine on their packaging using different scales between brands and sometimes completely omit the amount of nicotine pouch from the container (see Appendix A).

Traditional tobacco-containing snus is regulated by the Swedish tobacco law and Swedish Food Act (Lag om tobak och liknande produkter [Act on tobacco and similar products], SFS 2018:2088; Livsmedelsverkets föreskrifter om snus och tuggtobak [The Swedish Food Agency's regulations on snuff and chewing tobacco], LIVSFS 2012:6), which prohibits the sale of snus to minors under the age of 18 and regulates the handling, hygiene, and marketing of snus. However, there are no existing laws in Sweden governing nicotine pouches (Livsmedelsverket, 2019; Lag om tobak och liknande produkter, SFS 2018:2088), making it legal for manufacturers to advertise nicotine pouches on social media and at social events (A Non-Smoking Generation, 2020). The Swedish government is conducting a review on the manufacturing and advertising of nicotine pouches that is expected to conclude in 2021 (Kommitédirektiv [Committee Directive] 2020:9).

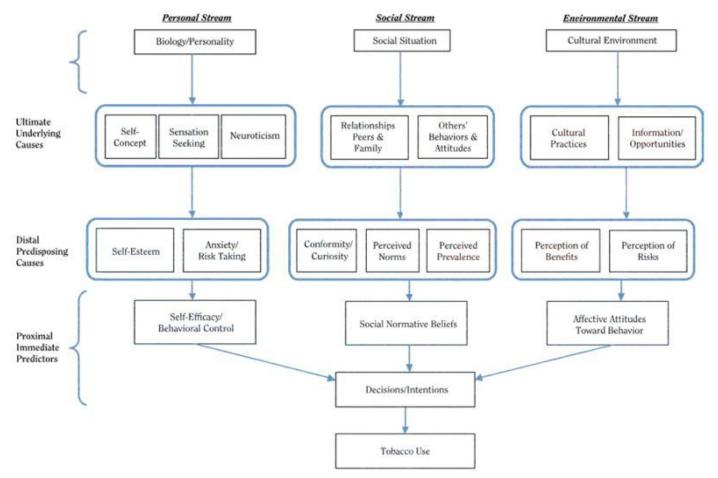
There is a great deal of research that attempts to model the factors underlying the uptake of risky behaviors and substances. With the introduction of new products like nicotine pouches, it is important to evaluate how well extant theoretical frameworks can account for the uptake of these new products. Using a theoretical model, the present study evaluated the underlying factors associated with nicotine pouch use among Swedish young adults.

Theoretical Framework and Previous Research

Theory of Triadic Influence and Intention

The processes that underpin risk behavior and intention among people are both dynamic and complex, but can be conceptualized according to existing theories of health behavior. The most pertinent contemporary theory to understand risk behaviors is the theory of triadic influence (TTI; Flay et al., 1995). The TTI, which is based on over 20 years of research, builds upon the strengths of earlier theories including the social cognitive theory (Bandura, 1977, 1986), protection motivation theory (Rogers, 1975), theory of reasoned action (Fishbein & Ajzen, 1975), and theory of planned behavior (Ajzen, 1985, 1988). The TTI organizes them into a coherent framework relevant to the study of risk behaviors, such as tobacco use (Flay et al., 1999; Petraitis et al., 1995), and has been consistently used to predict tobacco-use intention among young adults (Bricker et al., 2009; Chun, 2015; Egbe et al., 2017; Gupte et al., 2020; Holman et al., 2013; Sussman et al., 2000).

Figure 1



Theory of Triadic Influence (TTI; adapted from Flay et al., 2009)

The factors that deter or promote tobacco use are organized into three streams according to the TTI: interpersonal, social-contextual, and cultural-environmental (Figure 1). The interpersonal stream involves personality-related and biological factors that undermine the ability to resist pressure to use tobacco. Such interpersonal influences include, among others, selfesteem, self-concept, and propensity for risk-taking. The social-contextual stream represents peoples' more immediate social situations and intimate support systems that contribute to the social pressure people might feel to experiment with tobacco products. Such normative influences include parenting style, tobacco use by family and peers, the strength of bonds between family and the individual, and the strength of bonds between peers and the individual. The cultural-environmental stream includes macro level factors and general social values that contribute to people's personal attitudes concerning tobacco use. Such factors and values include cultural conventions, societal practices, public policies, and media depictions (Flay et al., 1995).

Ultimate Underlying and Distal Predisposing Causes. In addition to the three streams, there are also three levels of influence according to the TTI: ultimate, distal, and proximal (Figure 1; Flay et al., 1995). The level furthest from intention represents the ultimate underlying causes of tobacco use. Unlike proximal and distal influences, ultimate influences are broad in scope and more deeply rooted in peoples' environment, personality, and biological make-up. Ultimate influences consist of self-concept, others' attitudes and behaviors, and cultural practices. Influences at the distal level are derived from the ultimate underlying causes and contribute indirectly to tobacco-specific attitudes, normative beliefs, and self-efficacy. Distal influences include self-esteem, risk taking, conformity, risk and benefit perception, perceived norms, and perceived prevalence. Distal predisposing causes can be further broken down into proximal immediate predictors.

Proximal Predictors. Influences at the proximal level immediately precede intention and subsequent tobacco use (Flay et al., 1995; Flay, 1999). The three proximal predictors proposed by the TTI are self-efficacy/perceived behavioral control, social normative beliefs, and attitudes toward the behavior. Not all influences from the ultimate or distal levels have their effects on behavior directly through the proximal variable in the same stream. Some effects occur through interactions and cross-over paths. In addition, any experience with a behavior feeds back and influences the original causes of that particular behavior. In such, influences on a behavior form a dynamic system that changes as people develop and have experiences with the behavior (Flay, 1999).

Self-Efficacy/Perceived Behavioral Control. Self-efficacy/perceived behavioral control is the proximal predictor for tobacco use along the interpersonal stream of the TTI and is defined as the relative ease for one to perform a desired behavior and the perceived level of control over their capabilities to perform said behavior (Ajzen, 2002). These are derived from an individual's sense of self and social competence (Flay et al., 1999).

Self-efficacy is described as a person's belief in their ability to perform a certain task and attain a desired outcome (Bandura, 1977). The concept was a key component in self-efficacy theory and social cognitive theory (Bandura, 1977, 1991). It was later added to the theory of planned behavior (Ajzen, 1991, 2002) to complement perceived behavioral control. Similar to

self-efficacy, perceived behavioral control was first adopted into the theory of planned behavior to account for situations when individuals lacked complete volitional control (Ajzen, 1991, 2002), such is the case when a person develops dependence upon a substance. In practice, a lower sense of control strengthens the intentions for one to perform risky behaviors like cigarette smoking (Topa & Moriano, 2010), while a greater sense of control strengthens the intentions and increases the likelihood to perform healthy behaviors successfully, such as quitting smoking (Schnoll et al., 2011). Similarly, greater resistance self-efficacy, or the ability to resist pressure to perform a behavior, has been found to inhibit intentions for undesirable and risky behaviors such as smoking, marijuana use, and alcohol consumption (Ellickson & Hays, 1990). Cheung and Chan (2000) conducted a meta-analysis to evaluate the applicability of the theory of planned behavior to various risk behaviors. They found that only self-efficacy measures could stand alone to predict increases in intention and behavior, while perceived behavioral control items were only significantly associated with increased intentions when paired with self-efficacy items.

Social Normative Beliefs. Social normative beliefs are the proximal predictors for tobacco use along the social-contextual stream of the TTI. They are derived from the perceptions of a socially expected behavior and one's motivation to comply with others, which in turn is influenced by social bonding and others' behaviors and attitudes (Flay et al., 1999).

Social normative beliefs originate from the characteristics of one's immediate surroundings, especially the tobacco/alcohol-related behaviors and attitudes among family members and close peers. The TTI asserts that these characteristics affect people's subjective perception about tobacco-use norms and the social pressure people might feel to experiment with tobacco (Flay, 1999). In a 16-year longitudinal study by Holman et al. (2013), peer influence was found to predict smokeless tobacco initiation among male youths in the United States. Higher levels of friend compliance at baseline assessment doubled the likelihood that they would be daily smokeless tobacco users six years later. Flay and colleagues (1994) found that parental and peer smoking indirectly affected adolescents' smoking initiation and escalation by first affecting their perceived approval of smoking, refusal skills, self-efficacy, and outcome expectancies regarding smoking. Page and colleagues (2011) investigated social normative beliefs among Hungarian youths using a logistic regression analysis. They found that perceived peer and family approval of tobacco use were significantly associated with higher risk of current tobacco use, ever trying tobacco, and susceptibility to tobacco use. In a correlational study by Adkinson and colleagues (2016a), they found a significant association between social normative beliefs and snus interest among adolescents in the United States. Participants who perceived snus use to be acceptable among their significant others, and who believed that elite members of the society use smokeless tobacco, were significantly more likely to show interest in trying snus (Adkinson et al., 2016a).

Affective Attitudes. Affective attitudes are the proximal predictors for tobacco use along the cultural-environmental stream of the TTI and are defined as the expected outcome of a behavior with the value placed on those outcomes. These expected outcomes and the value placed on them are influenced by access to information, opportunity to engage in behavior, and cultural beliefs and practices (Flay et al., 1999; Flay et al., 2009).

Several studies during the past decade have aimed to assess the health effects of Swedish snus using pooled analyses. Findings are mixed, with some studies finding no association between snus use and negative health outcomes like pancreatic cancer (Araghi et al., 2017), stroke (Hansson et al., 2014), atrial fibrillation (Hergens et al., 2014), myocardial infarction (Hansson et al., 2012), cardiovascular disease (Hansson et al., 2009), and dental caries (Hugoson et al., 2012), while similarly robust studies find significant associations for other diseases and conditions like increased blood pressure (Antoniewics et al., 2018), heart failure from a nonischemic origin (Arefalk et al., 2018), type 2 diabetes (Carlsson et al., 2017), Parkinson's disease (Yang et al., 2017), and obesity (Hansson et al., 2011). A study by Lund & Vedoy (2019) compared the risk perceptions of snus with various nicotine and tobacco products in Norway. Using regression models, they found that the risk scores for snus were lower than cigarettes, but higher than e-cigarettes and nicotine replacement products. In contrast to affective attitudes related to snus, affective attitudes toward nicotine pouches have not been definitively measured in any cultural context, but one way to infer the affective attitudes of consumers toward a product is to ask current users for their reasoning behind why they started using the product. A recent study by Plurphanswat and colleagues (2020) using consumer panel data from SwedishMatch asked ZYN nicotine pouch users this exact question. Their data revealed that 61.8% of customers began using ZYN because of their belief that the product was less harmful to their health than other tobacco products. This finding suggests that a high percentage of ZYN's users perceive nicotine pouches as a reduced-risk product when compared to other nicotine delivery products (Plurphanswat et al., 2020).

The e-cigarette literature can offer insight into the perceptions of new nicotine products among adolescents and young adults. A correlational study by Morean and colleagues (2016) found that, among a sample of American middle and high school e-cigarette users, 34.1% did not know the concentration of nicotine in their own e-liquid, the substance that enables the ecigarette to function. This raised the concern that e-cigarette users were potentially unaware of the higher amounts of nicotine, or even the presence of nicotine, in their e-liquids. JUUL, another electronic nicotine delivery system (ENDS) product, was introduced into the United States market in 2015 (Tiku, 2015). A correlational study by Willett and colleagues (2019) on an American sample of adolescents and young adults found that 25% of individuals that recognized the product and 37% of those that reported using the product in the last 30 days were unaware that the device contained any form of nicotine. Although the majority of e-cigarette product packaging has the amount of nicotine printed on the product, Morean and colleagues (2016) found that non-smoking and occasional users are largely unaware of how much nicotine is in ecigarettes despite the label being present. The packaging on nicotine products should generally give the consumer an idea of how much nicotine they are consuming. However, a study by Goniewicz and colleagues (2013) found that young e-cigarette users in the United States were being misled as to how much nicotine was present in their e-cigarettes as the amount of nicotine printed on the packaging did not reflect the amount of nicotine that was actually being consumed.

Advertising and Marketing. Advertisements often influence people at all levels of the TTI by appealing to people's needs and desires. For instance, tobacco advertising sells the idea that tobacco can make you feel good physically (attitudes), psychologically (sense of self), and socially (social normative beliefs; Flay, 1999). Pricing, advertising, access policies, and other supply-side variables are located at the top of the broad cultural-environmental stream of the TTI, leading to broad consequences since they can influence several other variables. For example, the pricing of tobacco will influence people's tobacco use via the direct path of altering their attitudes toward tobacco, but also via indirect paths such as making tobacco appear less socially acceptable, reducing self-efficacy to obtain tobacco, or reducing family/peer tobacco use (Flay, 1999).

According to the TTI, behavioral intentions are one of the strongest predictors of future behavior (Flay et al., 1995). Research demonstrates that advertising and promotion affects

behavioral intentions toward tobacco use, which leads to increased susceptibility to initiate tobacco use, especially among adolescents and young adults (Jackson et al., 2018). In a correlational study by Mantey and colleagues (2016), they found a significant association between exposure to e-cigarette marketing across multiple channels (internet, print, retail, TV/movies) and subsequent use among adolescents and young adults. In an experimental study by Farrelly and colleagues (2015), they found that the exposure of e-cigarette television advertisements to participants who had never used the product before resulted in more favorable attitudes and higher intention to try e-cigarettes compared to a control group. In a systematic review of existing literature on tobacco industry marketing and tobacco use by adolescents, DiFranza and colleagues (2006) presented substantial evidence that the marketing practices of the tobacco industry led to increased tobacco use. Across a wide variety of promotion types, research designs and populations, they found clear evidence for a causal relationship between promotion of tobacco products and subsequent adolescent tobacco use.

Marketing of Nicotine Products

Packaging and Flavor Additives. Packaging can serve as a critical pathway for tobacco marketing, both by reinforcing brand imagery communicated through other media and by serving as a communication vehicle at the point of sale. Packaging has become a more central marketing tool to tobacco companies as the use of other common communication vehicles like billboards, magazines, and mass media have been restricted or outlawed (Henriksen, 2012). In a review of internal research at tobacco companies, Lempert and Glantz (2017) revealed that tobacco companies realized the effect of cigarette package color and design on consumers' perception of the relative strength and flavor of cigarettes. Consumers perceived the flavor of cigarettes in darker or red colored packages to be stronger, while cigarettes in packages with white and lighter colors were perceived to be less harmful and to have less intense taste (Lempert & Glantz, 2017).

Flavored smokeless tobacco has been found to have a broad appeal to adolescents and young adults (Corey et al., 2015), and are commonly associated with non-tobacco products such as chewing gum and candy (Couch et al., 2017). Flavor additives entice individuals to initiate smokeless tobacco use by reducing the strong tobacco taste and unpleasant mouth feel associated with tobacco-containing products (Kostygina & Ling, 2016).

Influencer Marketing. The role of marketing and media in the development of adolescent and young adults' tobacco behavior have become especially salient in recent years

with the pervasiveness of social media (Hébert et al., 2017). Influencer marketing, referring to a form of marketing where brands invest in selected influencers to promote their branded content to both the influencer's own followers and to the brands' target consumers, has been growing exponentially (Lou & Yuan, 2019). Influencer-produced branded content is considered to have more organic, authentic and direct contact with potential consumers than brand-generated ads (Lou & Yuan, 2019).

Social media can be a powerful tool for communicating social norms and influencing tobacco use. According to a correlational study by Depue and colleagues (2015), exposure to depictions of tobacco use on social media was associated with later cigarette smoking among young adults. Overall, social media had a stronger influence on later smoking behavior than did movie or television depiction (Depue et al., 2015). In a correlational study by Hébert and colleagues (2017), they found a significant relationship between susceptibility to use tobacco and exposure to tobacco-related social media among adolescents, with 52.5 % of the participants reporting exposure to tobacco-related social media in the past month (Hébert et al., 2017).

Reduced-Risk Products. There is an ongoing scientific debate about the possibilities of harm reduction within the field of tobacco control. In principle, smokeless forms of tobacco are less harmful than cigarettes, since they result in exposure to fewer toxins than cigarettes (Damphousse et al., 2015; Gao et al., 2014; Weitkunat et al., 2007). Swedish snus has been estimated to be 90-95% less harmful than cigarettes when used long term (Levy et al., 2004) and the relative reduced tobacco-related mortality and morbidity rate in Sweden among males has been attributed to greater snus use as opposed to cigarette smoking (Ramström & Wikmans, 2014). However, concerns have been raised regarding marketing smokeless tobacco products as "reduced-risk products" in reference to cigarettes. It is unclear whether marketing smokeless tobacco as less risky than cigarettes leads to reduced total tobacco use (Ramström & Foulds, 2006) or not (Zeller & Hatsukami, 2009). In Parker and colleagues' (2018) correlational study, they found an association between participants' perceived harm of tobacco products and future use. Tobacco products with lower perceived harm were associated with greater use among youth participants a year later. The use of reduced harm products, such as smokeless tobacco and ecigarettes, may also be a gateway to smoking. Whereas few smokers switch to smokeless tobacco or e-cigarettes, a greater number of smokeless tobacco and e-cigarette users switch to cigarettes (Berry et al., 2019; Chaffee et al., 2018; Chang et al., 2018).

Gender and Snus. In Sweden, snus use is traditionally considered a "manly" behavior and is tied to ideas of heteronormative Swedish masculinity (Edvardsson et al, 2012; Levy, 2017). Edvardsson and colleagues (2012) found in their qualitative study that male respondents viewed female snus users as unwomanly and less attractive than women who did not use snus. Studies of tobacco industry strategies from the United States have shown how smokeless tobacco manufacturers have invested in research, product development, and marketing for decades in an effort to attract new customer groups (Amos, 2012; Mejla & Ling, 2011). Given the low tobacco use prevalence among women and girls, this population has represented a vast "untapped market" and a prime target of the tobacco industry (Amos, 2012). While the main target groups were initially low-income males (portrayed in advertising as "hard working"), tobacco companies started to target more urban and female smokeless tobacco users with their marketing strategies after 1990 by introducing products with different flavors, lower nicotine levels, slimmer pouches, and more sophisticated packaging designs (Mejla & Ling, 2011). Numerous studies have shown that global advertising to women seeks to link tobacco use to desirable female attributes such as independence, modernity, glamour, stress relief, and weight control (Amos, 2000; Amos et al., 2012; Brown-Johnson et al., 2014; Toll & Ling, 2005). In a qualitative study by Scheffels and Lund (2017), they found that lighter colored packages were perceived as more feminine, but also less harmful, than darker packages. Flavored products in candy-like boxes were perceived positively, especially among non-users and women, and flavor additives (e.g., mint or fruit) contributed to ideas about the product being less strong and harmful (Scheffels & Lund, 2017). This is in line with similar studies of combustible tobacco, where flavor additives have been shown to influence cigarette appeal and make the initial experience of smoking less aversive and more appealing to youth and women (Kostygina et al., 2016; Lewis & Wackowski, 2006). Experimental studies of cigarette packaging have shown how standardizing colors can reduce false beliefs about some cigarette products being less harmful than others (White et al., 2012), and that removing flavor descriptions from cigarette packages can make them less appealing to young women (Hoek & Robertson, 2015).

Research Gaps

Since nicotine pouches are relatively new on the market, there is a significant gap in the literature that needs to be addressed regarding the determinants of its uptake and the differences in perception between nicotine pouches and snus. Primarily, it is unclear whether or not the TTI

can be used as a valid model to predict nicotine pouch use intention. To the best of our knowledge, self-efficacy/perceived behavioral control, social normative beliefs, and affective attitudes have not been investigated individually or in tandem to predict nicotine pouch use intention. Secondly, the role of gender in nicotine pouch use is not understood. Earlier findings suggest that people associate color packaging and flavor additives to be more appealing to women than men, but these studies are not specific to nicotine pouches. Lastly, there are no empirical studies evaluating the perceived risks of nicotine pouches and how they compare to tobacco-containing snus products.

Aims

The purpose of the present study was to investigate the underlying factors associated with nicotine pouch use among Swedish young adults. We aimed (a) to investigate the role of self-efficacy/perceived behavioral control, social normative beliefs, and affective attitudes toward nicotine pouch use intention as theorized by the theory of triadic influence (TTI); (b) to compare nicotine pouch use intention among men and women; and (c) to compare the perceptions and attitudes toward nicotine pouches and tobacco-containing snus.

Hypotheses

There were three overarching hypotheses to evaluate in this study:

- 1. Self-efficacy/perceived behavioral control, social normative beliefs, and affective attitudes toward nicotine pouches will be significant predictors of intention to use nicotine pouches across models as reasoned by the TTI.
- Gender will be a significant predictor of nicotine pouch use intention across models, as nicotine pouch marketing and product design appeal more to women.
- 3. There will be a difference in affective attitudes toward nicotine pouches and tobacco-containing snus, as labeling nicotine pouches as a tobacco-free and reduced-risk product may positively influence participants' attitudes toward nicotine pouches.

Method

Participants

A sample of 493 participants was recruited using a convenience sampling method to complete an online questionnaire about the perception of risks and attitudes toward snus and nicotine pouch products. Participants were stratified into four groups on the basis of tobacco use

status and gender. Tobacco use status was evenly represented and defined as participants that had used a tobacco product/nicotine pouches in the last 30 days versus those that had not. Gender was defined as men and women. The target population was Swedish young adults between the ages of 18 and 29. A preliminary power analysis was conducted with an expected medium effect size based on our pilot study and four predictors as parameters, yielding a required sample size of 85 participants per group in order to achieve 80% power. Prior to data analysis, participants that failed a control item, did not identify as a man or woman, and whose responses were significant outliers on more than one occasion were removed from further analysis (n = 15, 3.0%), yielding a final sample of 478 participants (Table 1).

Table 1

Characteristic	Women		Men		Full sample		
	Users	Non-users	Users	Non-users	Users	Non-users	N
n	138	141	103	96	241	237	478
Age $(M \pm SD)$	24.0 ± 2.7	23.4 ± 2.8	24.1 ± 3.2	23.7 ± 3.2	24.0 ± 2.9	23.5 ± 2.9	23.8 ± 2.9
Education (% with at least Bachelor degree)	47.8	40.4	35.9	39.5	42.7	40.1	41.3
Awareness of nicotine pouch existence (%)	95.7	87.2	94.2	80.2	95.0**	84.4	89.6
Current nicotine pouch use (%)	53.6**		31.1		44.0		22.1
Snus/nicotine pouch frequency (%)							
Daily/Less than daily	81.9		83.5		82.6		
Tried at least once	15.9		13.6		14.9		
Never used snus	2.2		2.9		2.5		
Cigarette/e-cig frequency (%)							
Daily/Less than daily	15.2		20.4		17.4		
Tried at least once	71.0		63.1		67.6		
Never smoked	13.8		16.5		14.9		

Characteristics of Participants by Gender, Nicotine Use Status, and in the Total Sample

Note. Analyses of variance and chi-square tests used to identify mean differences between groups.

**Chi-square tests revealed two differences, $p \le .01$. First, the percentage of participants that were aware of nicotine pouch existence differed between users and non-users, but not genders. Individual chi-square tests indicate that men non-users are less aware than both men and women users, while women non-users only differ from women users. Second, the percentage of women users that currently used nicotine pouches was significantly higher than men users.

Materials and Procedures

We created a 33-item questionnaire using Qualtrics (https://www.qualtrics.com) that consisted of relevant demographic variables to nicotine use history and available validated measures of proximal predictors to tobacco use (Adkison, Bansal-Travers, et al., 2016; Hanson, 2005; see Appendix B). These measures were modified to be snus and nicotine pouch-specific, while keeping the wording of the questions broadly applicable to participants of each stratified group in order to make the questionnaire more pragmatic (Glasgow, 2013). Gender, age, highest level of education completed, tobacco use, snus use, nicotine pouch use, and smoking history data were collected. The questionnaire was translated from English to Swedish in its entirety to match the population's native language using a back-translation method (Gudmundsson, 2009). One researcher compiled the items and drafted the questionnaire, one bilingual expert translated the English questionnaire to Swedish, and a second independent bilingual expert translated the Swedish version back to English. The two independent English questionnaires were contrasted, and differences were reconciled by a bilingual third party. We conducted a pilot study to test the questionnaire and receive feedback from participants regarding clarity and length. One set of eleven items, developed by Adkison, O'Connor, et al. (2016) to measure social normative beliefs, was originally administered in the pilot study but was substituted for a single item in the main study to limit participant burden.

Participants were recruited through social media platforms, by word of mouth, and inperson visits to university campus buildings in Sweden to complete the questionnaire. After documented consent was collected from participants, demographic information and nicotine-use history was assessed, followed by a questionnaire measuring proximal predictors of nicotine pouch use, in addition to affective attitudes toward snus. Snus and nicotine pouch items were presented in separate blocks. Block order was randomized to account for order effects. Brief descriptions and lists of common nicotine pouch and snus brands were included to educate and clarify which substance the items were referring to. The questionnaire included a control question item, "Please fill in *10. Very Likely*", in the larger affective attitude matrices to ensure the reliability of participant responses. Lastly, participants were asked how likely they were to try or continue using nicotine pouches over the next 30 days, which was then followed by a debrief page.

Assessment of Self-Efficacy/Perceived Behavioral Control

A three-item scale was administered to assess the proximal predictors along the interpersonal stream. These items were adapted from Hanson's (2005) study assessing these constructs in regard to cigarette smoking intention among American female teenagers and were altered to be nicotine pouch-specific. Self-efficacy and perceived behavioral control are the two underlying interpersonal mechanisms influencing tobacco use according to the TTI. These constructs were measured using the following three items: (a) "If I wanted to, I could easily not use nicotine pouches during the next month." (*Agree—Disagree*)?— (b) "How much control do

you think you have over whether you use nicotine pouches?'' (*Complete Control—No Control*)— and (c) ''Do you think it would be difficult or easy for you not to use nicotine pouches during the next month?'' (*Easy—Difficult*). Internal consistency for this scale was high (Cronbach's $\alpha = 0.928$) among participants in the final sample of the present study. Items were answered on 7-point Likert-type scales with the anchors labeled as described above. Items were averaged to create a self-efficacy/perceived behavioral control index.

Assessment of Social Normative Beliefs

A single item was used to assess the proximal predictor along the social-contextual stream, "If I use nicotine pouches, most people who are important to me would... (*Disapprove*—*Approve*)". This item was also adapted from Hanson (2005) and answered on a 7-point Likert-type scale to yield a social normative beliefs index for each participant.

Assessment of Affective Attitudes

Two sets of the snus-modified Smokeless Tobacco Expectancies Questionnaire (Adkinson et al., 2016b), originally adapted to be snus-specific from Gottlieb and colleagues (2013), were adapted to remain snus specific in one set and altered to be nicotine pouch specific in another set. This questionnaire was previously used to assess smokeless tobacco and snus expectancies among American adolescents, young adults, and older adults. Five items assessed negative health consequences and five assessed positive reinforcement of the specified substance (nicotine pouches or tobacco-containing snus). These ten items were answered on a 10-point Likert-type scale, 1 representing an unlikely effect (Very Unlikely) and 10 representing a likely effect (Very Likely) as a result of snus/nicotine pouch use. Internal consistency was high for negative health consequences of snus (Cronbach's $\alpha = 0.732$), positive reinforcement of snus (α = 0.839), negative health consequences of nicotine pouches ($\alpha = 0.746$), and positive reinforcement of nicotine pouches ($\alpha = 0.807$) among participants in the final sample of the present study. The average of the negative health consequences subscale was subtracted from the average of the positive reinforcement subscale to generate an affective attitude index. A positive score represented positive affect and a negative score represented negative affect toward snus or nicotine pouches.

Assessment of Interest in Trying/Continuing Use of Nicotine Pouches

The final item assessed intention to try nicotine pouches, "How likely are you to try or continue using nicotine pouches in the next month?", which was answered on a 10-point Likert-

type scale, 1 representing next to no chance (*No Chance, Almost No Chance*) and 10 representing practical certainty (*Certainly, Practically Certain*). This item was adapted from the same study by Adkison, O'Connor, et al. (2016) discussed earlier. The question was altered to assess willingness to try instead of willingness to purchase because individuals can seek these products through numerous avenues, not just purchasing them from a store.

Design

Statistical analyses were conducted using IBM SPSS Statistical Software, version 25.0 (IBM Corp, 2017) and R (R Core Team, 2019). An ordinal logistic regression analysis was first conducted to examine the relationships between the likelihood or willingness to use nicotine pouches in the next month based on an ordinal scale (Jamieson, 2004) as a function of four predictors: gender, self-efficacy/perceived behavioral control, social normative beliefs, and affective attitudes toward nicotine pouches. A follow-up regression was then conducted to control for nicotine-use and age. Further, we ran a Mann-Whitney U test to measure differences between genders on intention scores without the influence of other variables. Lastly, a paired-samples t-test was conducted to measure differences in affective attitudes toward nicotine pouches.

Ethical Considerations

The present study was conducted in accordance with the principles described under the Law on Ethics of Research Involving Humans (SFS 2003:460). Data were collected anonymously via the Qualtrics anonymous link, and stored on a password-protected computer in a locked safe as mandated by the General Data Protection Regulation (*The protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC [General Data Protection Regulation]*, Regulation 2016/679). In the consent form of the questionnaire, participants were informed about the methods to be used, procedures for data protection, how to contact the researchers, their right to withdraw their data, and that participation is voluntary and may be discontinued at any time. To ensure participants the right to withdraw their data, participants were asked to create a unique ID code before answering any questions. They were informed that they could relay this code to the researchers via email in order to retrieve and delete their data. None of the participants exercised their right to have their data removed from the analysis.

To avoid mentally affecting or priming participants to try nicotine pouches, the debrief at the end of the questionnaire emphasized that nicotine pouches are highly addictive and there is a lack of research regarding the safety of this substance, and whether it is safer or less addictive than tobacco-containing snus or other nicotine products. Since nicotine pouches are not regulated by the Swedish tobacco law (Lag om tobak och liknande produkter, SFS 2018:2088), advertisements for these products reach their audiences through numerous channels (social media platforms, podcasts, websites, social events, kiosks, grocery stores) daily. Thus, subjects participating in the current study were not exposed to risks greater than those encountered in normal everyday life.

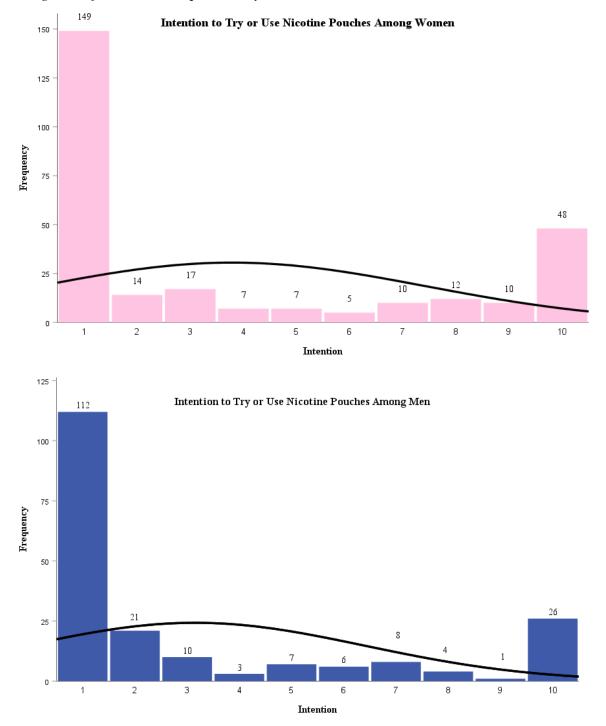
Results

Analyses of variance and chi-square tests were used to probe for differences in participant demographic measures between stratified groups. There were no significant mean differences between groups in age, F(1, 474) = .165, p > .05, nor education, $\chi^2 (3, N = 478) = 3.808$, p > .05. Nicotine-users were significantly more aware of nicotine pouch existence than non-users, $\chi^2 (1, N = 478) = 13.550$, p < .001, but there were no differences in awareness between genders $\chi^2 (1, N = 478) = 1.573$, p > .05. Individual and grouped chi-square tests revealed that users were significantly more aware than men non-users, $\chi^2 (1, N = 478) = 16.304$, p < .001, while women non-users only differed from women users $\chi^2 (1, N = 478) = 5.261$, p = .02. There were no significant differences in awareness between women and men non-users, $\chi^2 (1, N = 478) = 1.640$, p > .05, as well as women and men users, $\chi^2 (1, N = 478) = 0.049$, p > .05. There were significantly more women currently using nicotine pouches than men in our sample, $\chi^2 (1, N = 241) = 11.173$, p < .001.

Each component was entered into the following regressions as a centered variable. Uncentered means and standard deviations for each scale by gender and nicotine-use status are presented in Appendix C. Both gender groups followed a positively skewed leptokurtic distribution in regard to intention scores (Figure 2). Prior to data analysis, data were probed for outliers within each predictor. Within self-efficacy/perceived behavioral control among nonusers, twelve outliers were detected that were more than 1.5 box-lengths from the edge of the box in a boxplot. Only one of these values represented an extreme outlier and was removed from further data analysis. There were no outliers within the social normative beliefs variable. Within affective attitudes toward nicotine pouches and snus, three outliers were detected that were more than 1.5 box-lengths from the edge of the box in a boxplot. Inspection of their values did not reveal them to be extreme and they were kept in the analysis.

Two ordinal regressions were conducted in order to produce models that could be compared to one another. The first model consisted of four predictors of nicotine pouch use intention: self-efficacy/perceived behavioral control, social normative beliefs, affective attitudes toward nicotine pouches, and gender. The second model added nicotine-use status and age as controls. The four predictors were expected to remain significant across both models even after the introduction of the control variables. As a result of the intention dependent variable not being normally distributed (Figure 2), a nonparametric Mann-Whitney U test was conducted to measure differences in intention between genders, which was expected to yield a significant difference between genders. Lastly, a paired-samples t-test was conducted to assess differences in affective attitudes within-subjects toward nicotine pouches and snus, which was expected to be significant.

Figure 2



Histograms of Intention Frequencies by Gender

Note. The above figure illustrates the distributions of the dependent variable between genders with a superimposed normal distribution curve.

Hypothesis 1

Model 1 - Gender and the TTI Streams

A cumulative odds ordinal logistic regression with proportional odds was conducted to determine the effect of gender, self-efficacy/perceived behavioral control, social normative beliefs, and affective attitudes toward nicotine pouches on participant intention to use nicotine pouches in the next 30 days. There were no issues of multicollinearity, but the assumption of proportional odds was violated, as assessed by a full likelihood ratio test comparing the fit of the proportional odds model to a model with varying location parameters, $\chi^2(32) = 119.852$, p < 100.001. Separate binomial logistic regressions to assess the assumption of proportional odds revealed tenable proportions for all but one ratio. The gender dummy variable of one category was 1.96 times the odds ratio of the other dependent variables. The deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $\chi^2(3767) = 1145.090$, p = 1.00, however, there were 3753 (89.4%) cells with zero frequencies, meaning the overall model fit is not considered viable. A likelihood ratio-test revealed that the final model significantly predicted intention better than the intercept-only model, $\chi^2(4) = 269.981$, p < .001. Gender did not have a statistically significant effect on intention, $\chi^2_{gender}(1) = 2.025$, p = .155, with the odds ratio of having higher intention for women versus men being 1.330, 95% CI [0.898, 1.970]. An increase in self-efficacy/perceived behavioral control was associated with a decrease in odds of having higher intention, with an odds ratio of .366, 95% CI [.309, .433], a statistically significant effect, Wald $\chi^{2}_{SE-PBC}(1) = 135.983$, p < .001. An increase in social normative beliefs was associated with greater odds of having higher nicotine pouch use intention, with an odds ratio of 1.120, 95% CI [1.017, 1.266], Wald $\chi^2_{SNB}(1) = 3.992$, p = .046. Positive affective attitudes toward nicotine pouches was associated with an increase in the odds of having higher intention, with an odds ratio of 1.219, 95% CI [1.129, 1.317], a statistically significant effect, Wald $\chi^2_{AA-Nicotine Pouches}(1)$ = 25.353, p < .001. Overall, this model demonstrated that each of the TTI components were significant predictors of intention to use nicotine pouches.

Model 2 - Nicotine-Use Status and Age Controls

A follow-up regression was conducted to control for nicotine-use status and age in the final model. Nicotine-use status and age were entered as dummy and continuous variables, respectively. Again, there were no issues with multicollinearity, but the assumption of proportional odds was violated, as assessed by a full likelihood ratio test comparing the fit of the

proportional odds model to a model with varying location parameters, $\chi^2(48) = 114.345$, p < .001. Separate binomial logistic regressions to assess the assumption of proportional odds revealed several ratios that were untenable in the nicotine and gender dummy variables. The deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $\chi^{2}(4242) = 1119.542$, p = 1.00. However, there were 4237 (90.0%) cells with zero frequencies, meaning the overall model fit is not considered viable. A likelihood ratio-test revealed that the final model statistically significantly predicted intention better than the intercept-only model, $\chi^2(6) = 370.756$, p < .001. While controlling for age and nicotine-use status, the effect of gender on nicotine pouch use intention approached significance, $\chi^2_{gender}(1) = 3.694$, p = .055, with the odds ratio of having higher intention for women versus men being 1.507, 95% CI [.992, 2.289]. An increase in self-efficacy/perceived behavioral control was associated with a decrease in odds of having higher intention, with an odds ratio of .460, 95% CI [.389, .544], a statistically significant effect, Wald $\chi^2_{SE-PBC}(1) = 81.772$, p < .001. The effect of social normative beliefs lacked statistical significance in the model, Wald $\chi^2_{SNB}(1) = .046$, p = .830, with an odds ratio of .986, 95% CI [.868, 1.120]. More positive affective attitudes toward nicotine pouches were associated with an increase in the odds of having higher intention, with an odds ratio of 1.144, 95% CI [1.054, 1.243], Wald $\chi^2_{AA-Nicotine Pouches}(1) = 10.245$, p = .001. A summary of these ordinal regressions is presented in Table 3.

Table 3

Model	В	Wald X ²	р	β	95% Wald CI	
				-	LL	UL
Model 1						
Gender	.285	2.025	.155	1.330	.898	1.970
SE-PBC	-1.006	135.983	<.001	.366	.309	.433
SNB	.113	3.992	.046	1.120	1.017	1.266
AA-Nicotine Pouches	.198	25.353	<.001	1.219	1.129	1.317
Model 2						
Gender	.410	3.694	.055	1.507	.992	2.289
SE-PBC	776	81.772	<.001	.460	.389	.544
SNB	014	.046	.830	.986	.868	1.120
AA-Nicotine Pouches	.135	10.245	.001	1.144	1.054	1.243

Summary of Ordinal Logistic Regressions - Model 1 and Model 2

Note. Continuous variables were centered. Model 1 regressed gender, affective attitudes toward nicotine pouches, self-efficacy/perceived behavioral control, and social normative beliefs on intention to use nicotine pouches. Model 2 added age and nicotine-use status as controls. SE-PBC = self-efficacy/perceived behavioral control, SNB = social normative beliefs, AA = affective attitudes, CI = confidence intervals, LL = lower limit, UL = upper limit. Gender dummy variable coded as 0 = Women, 1 = Men.

Hypothesis 2

Differences Between Genders on Intention

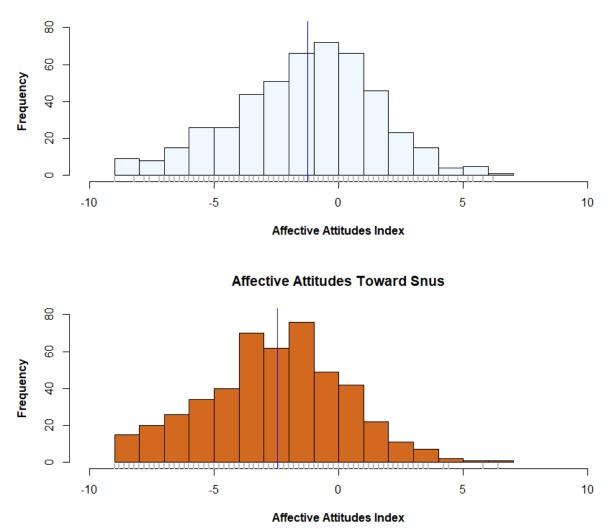
A Mann-Whitney U test was conducted to determine if there were differences in intention scores between men and women without the influence of other variables. Our data required a nonparametric method because intention was not normally distributed for both genders. The distributions of intention scores were, however, similar between genders, as assessed by histogram inspection (Figure 2). The test revealed that median scores for men ($Mdn_{men} = 1$) and women ($Mdn_{women} = 1$) were not statistically significant from one another, U = 25746, z = -1.386, p = .166.

Hypothesis 3

Differences Within-Subjects on Nicotine Pouch Versus Snus Affective Attitudes

A paired-samples t-test was conducted to determine whether there were mean differences between the affective attitudes toward nicotine pouches and snus within-subjects (Figure 3). As a precaution, an additional pair-samples t-test was run without the outliers and the same result was found. The differences between nicotine pouch and snus affective attitudes were normally distributed, as assessed by visual inspection of a Normal Q-Q Plot, thus, a parametric method was selected. Participants had more positive affective attitudes toward nicotine pouches (M = -1.24, SD = 2.88) than snus (M = -2.47, SD = 2.80). The mean of the nicotine pouch affective attitudes index was 1.22, 95% CI [1.058, 1.391] points higher than the snus index, t(476) =14.474, p < .001, d = .66, signifying that the mean difference was statistically different from zero. Figure 3

Affective Attitudes Indices Between Nicotine Pouches and Snus



Affective Attitudes Toward Nicotine Pouches

Note. Blue line signifies mean within each Affective Attitudes variable ($M_{AA-Nicotine\ Pouches} = -1.24$, $M_{AA-Snus} = -2.47$.

Discussion

Three hypotheses were posed to address our study aims in regard to the predictors for intention to use nicotine pouches and differences in affective attitudes between substances: (1) self-efficacy/perceived behavioral control, social normative beliefs, and affective attitudes toward nicotine pouches would be significant predictors as theorized using the theory of triadic influence (TTI); (2) gender would be a significant predictor for intention as the marketing and

product design appeals more to women; and (3) there would be a difference in affective attitude scores between nicotine pouches and snus. The results lent partial support to our primary hypothesis, no support to our second hypothesis, and full support to our final hypothesis.

Two of the four predictor variables—self-efficacy/perceived behavioral control and affective attitudes toward nicotine pouches—significantly predicted nicotine pouch use intention among our sample of Swedish young adults. Respondents who expressed more favorable attitudes toward nicotine pouch use and perceived relatively little control over their own user behavior reported stronger intention to use nicotine pouches in the next month. Conversely, respondents who expressed unfavorable attitudes toward nicotine pouches and were confident in their ability to control their own nicotine pouch use behavior reported lower intention to use nicotine pouches in the next month ouse nicotine pouches in the next month. Gender and social normative beliefs were not reliable predictors across both models. Lastly, affective attitudes were significantly more positive toward nicotine pouches than tobacco-containing snus among participants.

Hypothesis 1: Proximal predictors of the TTI

Self-Efficacy/Perceived Behavioral Control

The TTI recognizes that inherited traits, personality dispositions, and affective states contribute to health-related decisions and behaviors (Flay & Petraitis, 1994). The TTI predicts that people with stronger self-efficacy/perceived behavioral control will be more interested in planning, regulating and restraining their health-related behaviors. In contrast, those who hold unfavorable or incoherent self-images are assumed to be more prone to take risks, act impulsively and not care as much about the possible consequences of their health-related behaviors (Flay & Petraitis, 1994). The findings from the present study support this perspective and extend it to include nicotine pouch use intention, which has not been directly studied before. Respondents with lower self-efficacy/perceived behavioral control reported higher intention to use nicotine pouches within the next 30 days, which is in accordance with earlier studies on tobacco intention (Hanson, 2005; Topa & Moriano, 2010). Additionally, self-efficacy/perceived behavioral control was the predictor that explained the most variance in the present study. This finding is in line with previous research which has found perceived behavioral control to be the most important predictor when predicting tobacco-use intention and cessation (Karimy et al., 2015; Norman et al., 1999).

Social Normative Beliefs

According to the TTI, social settings contribute to an individual's health-related behaviors by affecting the health-related attitudes, values, and behaviors of other people in the same environment. In turn, these factors are thought to affect one's perceptions of norms concerning a given behavior (Flay et al., 1994; Flay & Petraitis, 1994). The findings of the present study did not support this assumption for nicotine pouch use intention. This may be a result of nicotine pouches being a relatively new product on the market, meaning social norms may not be fully established yet among the population. Another explanation may be that the social normative beliefs may not mirror those of smokeless tobacco use and smoking in other cultures. (Adkison, Bansal-Travers, et al., 2016; Hanson, 2005; Holman et al., 2013; Page et al., 2011).

A meta-analysis by Armitage and Conner (2001) found a weakness of the association between social normative beliefs and intention when compared to the associations of affective attitudes and perceived behavioral control with intention. The authors argued that this is due to the fact that many researchers use single item measures, as opposed to more reliable multi-item scales. Social normative beliefs were found to have a reasonably strong relationship with intention when appropriately measured with multiple-item scales (Armitage & Conner, 2001). The weak association between social normative beliefs and intention in the present study could have been a result of the use of a single item measuring social normative beliefs. In a metaanalysis by Rivis and Sheeran (2003) they found a stronger correlation between social normative beliefs and intention for younger samples than for older samples. Children and adolescents might be more susceptible to social normative beliefs than adults because of young people's need to establish their self-identity. Therefore, another explanation for why there was a non-significant association between social normative belief and intention in the present study may be due to age, as the respondents in the present study were young adults and not children or adolescents. *Affective Attitudes*

In addition to the biological and social influences affecting health-related decisions, the TTI recognizes that attitudes or feelings toward a particular behavior directly influence the levels of intention one has toward executing it (Flay et al., 1999). The results from the present study lend support that this proximal predictor along the cultural-environmental stream of the TTI is a reliable predictor for nicotine pouch use intention. Participants that attributed more positive

affective attitudes toward nicotine pouches were more likely to express higher intention to use them. This finding is in line with previous studies measuring intention to use other tobacco products with affective attitudes as a predictor (Hanson, 2005; Stewart & Moreno, 2013; Topa & Moriano, 2010).

According to the TTI, cultural convention, societal practices, access to information, and public policies influence people's attitudes and perceptions surrounding health and risk behaviors (Flay & Petraitis, 1994; Petraitis et al., 1995). In the present study, respondents' affective attitudes toward nicotine pouches may have been affected by the marketing and advertisement of nicotine pouches, including social media marketing, packaging design, additive flavors, and the labeling of nicotine pouches as "potentially reduced-risk products". Previous literature clearly indicated that mere exposure to tobacco and nicotine advertisements increased positive affect and willingness to try these kinds of products (Depue et al., 2015; Difranza et al., 2006; Farrelly et al., 2015; Mantey et al., 2016). It is also possible, as seen in previous literature on e-cigarettes (Goniewicz et al, 2013; Morean et al., 2016; Willett et al., 2019), that people are unaware of the concentration of nicotine in nicotine pouches and of nicotine pouches present the amount of nicotine on their packaging in different ways and some do not include the precise levels of nicotine on their packaging (Appendix A). This affects people's access to information, which influences their attitudes towards the product.

Hypothesis 2: Gender

We hypothesized that gender would be a significant predictor for intention because marketing and product design—including flavor additives and light-colored packaging— have been found to appeal more to women than men (Amos et al., 2012; Hoek & Robertson, 2015; Kostygina et al., 2016; Mejla & Ling, 2011; Scheffels & Lund, 2017). However, the results from the present study are not in agreement with the results from earlier studies. There was not a significant difference in intention to use nicotine pouches between men and women, nor was gender a reliable predictor across both models. A potential explanation for this finding is that snus is traditionally considered a manly behavior in Sweden. Even though the marketing strategy arguably appeals more to women, snus use is tied to Swedish masculine gender norms (Edvardsson et al, 2012; Levy, 2017). Men have a higher base rate for smokeless tobacco use than women (WHO, 2019) and the opposite has been found for nicotine pouch use in previous literature (SnusBolaget, 2020a) and in our sample. Masculine ties to smokeless tobacco use could be a predisposition for Swedish men to use nicotine pouches, leading them to express more interest and intention in the new product. On the other hand, nicotine pouch marketing and advertising is arguably aimed toward women (Amos et al., 2012; Hoek & Robertson, 2015; Kostygina et al., 2016; Scheffels & Lund, 2017) enticing them to enter the nicotine product market and exhibit intention toward the product. This may have contributed to the result of statistically equal odds in intention between genders and a lack of significance between genders. This is highlighted in our finding of a higher base rate for current nicotine pouch use among women users than men users in our sample. Women currently use nicotine pouches more, but men have a similar amount of interest or intention because they are predisposed to nicotine product use to a greater extent than women. An effect may exist, but a population-representative sample would have been needed to conclusively test this hypothesis, rather than having evenly stratified groups. Lastly, our ability to interpret the results was blurred by the failure to satisfy the assumption of proportional odds and the inability of the Mann-Whitney U test to correct for ties. It is entirely possible that an effect exists, but the gender variable is not statistically reliable to draw conclusions from.

Hypothesis 3: Nicotine Pouch Versus Snus Affective Attitudes

The paired-samples t-test revealed that there was a significant within-subjects difference between nicotine pouch and snus affective attitudes scores. Nicotine pouches were perceived as less harmful than tobacco-containing snus. This may be due to advertising and lack of regulation. According to the TTI, ultimate predictors of the cultural-environmental stream include media depiction, advertising and government policies. These predictors are located at the top of the stream and will have broad ramifications since they can influence many other variables (Flay et al., 1995). The fact that nicotine pouches are labeled and marketed as "tobacco-free" may reduce people's perceived risk toward nicotine pouches, despite there being a lack of research regarding the long-term effects of tobacco-free snus. One can argue that removing tobacco from a product's label eliminates many consumer fears of experiencing the possible adverse health effects associated with tobacco use (cancer, heart disease, etc.). However, consumers may not take into account or understand how nicotine pouches differ from snus in ingredients and manufacturing methods. Many nicotine pouch brands contain tobacco leaf derived nicotine (Robichaud et al., 2019) or nicotine salts (OnNicotine, n.d.), for which the health effects of these compounds are not completely understood (Jackler & Ramamurthi, 2019), but the few publications available associate these entities with aversive health effects and greater risk for addiction (Duell et al., 2019). Additionally, it is not safe to assume that all consumers understand the relationship between tobacco and nicotine, and many people may think that they are completely distinct entities. Nicotine is naturally produced within the tobacco plant and is the compound responsible for the addictive properties of tobacco use (United States National Library of Medicine, 2019). Labeling products as tobacco-free may misguide consumers into believing that the product will be far less addictive than its tobacco-containing counterparts, thereby, reducing the perceived risk of consumers toward nicotine pouches.

The various manufacturers of snus and tobacco-free snus products present the amount of nicotine on the packaging in different ways. The e-cigarette literature highlights that consumers were confused as to how much nicotine was present in their e-cigarette, or if it was present at all (Goniewicz et al., 2013; Morean et al., 2016; Willett et al., 2019). It is possible that snus and nicotine pouch manufacturers are confusing consumers in a similar way because standardized scales and labeling methods are not used across brands (Appendix A). Participants may falsely conclude that nicotine pouches do not contain the same amount of nicotine as snus since they are labeled as tobacco-free, ultimately reducing the perceived risk of the product when compared to its counterpart.

Two principal ways in which nicotine pouches are marketed as superior products to consumers are through introducing new packaging designs and flavor additives, as the use of many traditional media outlets have been outlawed (Henriksen, 2012). Most nicotine pouches sold in Sweden have light colored packaging designs, compared to tobacco-containing snus that primarily have darker designs. Nicotine pouches are also available in a range of different flavors (SnusBolaget, 2020b). Several studies have found light colored packages and flavor additives to be more attractive to younger populations (Corey et al., 2015) and perceived as less harmful, as well as better tasting, than dark colored packaged and non-flavored tobacco products (Couch et al., 2017; Hoek & Robertson, 2015; Kostygina et al., 2016; Kostygina & Ling, 2016; Lewis & Wackowski, 2006; Scheffels & Lund, 2017; White et al., 2012). Nicotine pouches are also marketed as "potentially reduced-risk products" (British American Tobacco, n.d.), which likely factored into participants perceiving nicotine pouches to be less harmful than tobacco-containing snus. Since there is a lack of scientific evidence stating that nicotine pouches are less harmful

than tobacco-containing snus (Robichaud et al., 2019), we cannot be certain that they are indeed reduced-risk products. There is a high likelihood that products marketed as "reduced-risk products" contribute to a sustained high level of nicotine addiction by reducing the interest in quitting or success in achieving abstinence. This finding was evident in the filtered and low-tar cigarette literature (Borland et al., 2004; Hamilton et al., 2004; O'Connor et al., 2005; Shiffman et al., 2004) and may be the case for nicotine pouches. There is also a concern that marketing messages of lower risk increases the rate of adolescent initiation of nicotine use (Zeller & Hatsukami, 2009). Furthermore, there are no marketing regulations in Sweden concerning nicotine pouches, while tobacco-containing snus is regulated by both the Swedish tobacco law and Swedish food act (Lag om tobak och liknande produkter, SFS 2018:2088; Livsmedelsverkets föreskrifter om snus och tuggtobak, LIVSFS 2012:6). The Swedish tobacco law states that it aims to limit the health consequences of tobacco product use and the usage of similar products (Lag om tobak och liknande produkter, SFS 2018:2088). However, contrary to those remarks, not including nicotine pouches in these regulations may signal that these products are not as harmful as tobacco-containing products.

Theoretical and Practical Implications

Examining factors underlying the initiation of nicotine pouches, as proposed by the TTI, has not been directly studied before. These data provide preliminary evidence that portions of the TTI can be used to predict nicotine pouch use intention. Nicotine pouches join an extensive list of risk behaviors that are able to be predicted using the TTI (Bricker et al., 2009; Chun, 2015; Egbe et al., 2017; Gupte et al., 2020; Holman et al., 2013; Sussman et al., 2000). Several scales have been developed to measure the streams of the TTI. Adkison, O'Connor, et al. (2016) adapted and validated a questionnaire with eleven items to measure social normative beliefs associated with smokeless tobacco/snus. Adkison, Bansal-Travers, et al. (2016) adapted the Smokeless Tobacco Expectancies Questionnaire (Gottlieb et al., 2013) to snus in order to measure affective attitudes. To our knowledge, a validated self-efficacy/behavioral control scale has yet to be constructed for smokeless tobacco or nicotine pouches. The three-item scale used in the present study from Hanson (2005) has been found to have high internal consistency across studies, but has not been previously validated to measure self-efficacy/perceived behavioral control for snus/nicotine pouches is developed and validated, a complete TTI questionnaire can be constructed to measure

intention based on all three streams properly. The data suggest that using the TTI as a predictor for nicotine pouch use and other forms of nicotine consumption is promising, but there are several steps that need to be taken in regard to scale validation before studies can understand the full picture using a completely validated questionnaire.

Self-efficacy/perceived behavioral control was significantly associated with participant's intention to use nicotine pouches. Participants with lower self-efficacy/perceived behavioral control showed higher intention to use nicotine pouches. According to self-efficacy theory, it is possible to increase the likelihood of behavioral performance by strengthening self-efficacy through enactive mastery experiences, vicarious learning, verbal persuasion, and emotive experiences (Bandura, 1977). Hyde and colleagues (2008) conducted a systematic review of intervention studies designed to enhance self-efficacy in the context of addiction. They found that seven of ten studies reported positive effects using self-efficacy change. If the concept of heightened self-efficacy can be conclusively linked with behavior change, interventions can focus on strengthening self-efficacy in order to effectively modify health-related behaviors.

The present study found that nicotine pouches are perceived as less harmful than tobaccocontaining snus, despite there being a lack of research on the subject. This may be, as discussed, due to the lack of legislative and marketing regulations of nicotine pouches. Nicotine pouches are marketed as potentially reduced-risk products (British American Tobacco, n.d.), which is a claim that is scientifically unsubstantiated at the time of this study's publication. Fortunately, Plurphanswat and colleagues (2020) found that only a low percentage (4%) of people that currently use ZYN nicotine pouches had been completely tobacco-free prior to initiating use. Despite this promising finding, until further research is conducted regarding the health effects of nicotine pouches, regulations should be in place. The regulation policies of tobacco-free nicotine products are currently under review by the Swedish government (Kommitédirektiv 2020:9) and the findings of the present study may have practical implications for policy changes. One topic that may be debated in their review will be the ability for manufacturers to label their products as tobacco-free, despite there being tobacco leaf-derived nicotine in many nicotine pouch products. They must consider the effects of allowing these products to be labeled in this manner. Data from the present study and from Plurphanswat and colleagues (2020) hint that labeling nicotine pouches as a tobacco-free alternative could alter individuals' affective attitudes toward nicotine pouches in a positive way when compared to tobacco-containing snus.

The current Swedish tobacco law regulates the sales and advertising of smokeless tobacco products (Lag om tobak och liknande produkter, SFS 2018:2088), but the same law does not regulate nicotine pouches. One area of particular concern is the use of social media platforms like Instagram to advertise nicotine pouch products (A Non-Smoking Generation, 2020). Many tobacco companies use influencer marketing to market their tobacco-free products to consumers (LYFT Sverige, n.d.). With the growing number of younger users on the platform (Anderson & Jiang, 2018), it is difficult to control who is subject to such advertising, since sponsoring Instagram influencers and having advertisements posted on social media may reach this younger audience despite controls that are in place to deter minors from seeing certain content. Snus manufacturers have made some efforts to deter minors and non-users from taking up nicotine pouches. Currently, media advertisements streamed on social media platforms (Instagram, Facebook, etc.) by LYFT display a notice that the sale of these products is prohibited to minors under the age of 18, that the substance includes nicotine, and it is very addictive (LYFT Sverige, 2020). On their website, the same notice can be found but is not viewable unless the user scrolls all the way down to the bottom of the webpage (LYFT, n.d.). By regulating the marketing of nicotine pouches on social media, affective attitudes toward nicotine pouches among adolescents and young adults can be based more on empirical evidence.

Strengths and Limitations

Strengths

The present study has a number of strengths. Primarily, the incorporation of pragmatic designs and scales (Glasgow, 2013) allowed the researchers to draw conclusions from the data during usual conditions, rather than ideal conditions that are constructed in a laboratory setting, which offer their own set of advantages and limitations. The goal of implementing a pragmatic approach was to better balance internal and external validity. While there was a target population of Swedish young adults, the present study emphasized the use of fewer criteria aimed to exclude participants within this cohort. By not excluding certain groups, such as current nicotine pouch users, we obtain a more realistic picture of the prevalence of nicotine pouch use and what factors influence its uptake across all individuals. Further, the translating, condensing, and elimination of unnecessary items in the questionnaire made the measures themselves more pragmatic and led

to lower participant burden and drop-out rate. Scales were selected based not only on their validity and reliability, but also on their broad applicability. With the participants' perspective in mind, the items were carefully worded to be relevant to every participant regardless of the demographic group they were stratified into. Glasgow (2013) emphasized that more studies need to take a pragmatic approach in order to achieve a better balance with laboratory randomized controlled trials. Taking a pragmatic approach threatened the internal and statistical validity of the present study but simultaneously boosted its external validity.

The large sample size provides ample statistical power for our analyses. The researchers can be confident that power is not a threat to the validity of the described effects in the present study. Additionally, the use of ordinal logistic regression, instead of the more commonly used multiple linear regression, more accurately measures the predictors of our dependent variable, intention. Although debated heavily in the literature, Likert scales are ordinal, rather than interval in nature (Jamieson, 2004, Liddell & Kruschke, 2018; Sullivan & Artino, 2013). Sullivan and Artino Jr. (2013) argue that parametric tests can be used to analyze Likert scale data and are more robust than nonparametric tests. On the other hand, a more recent study by Liddell and Kruschke (2018) provided evidence that treating ordinal data as metric led to increased Type I and Type II errors in regression trend analyses. The decision to run an ordinal regression, while controversial, was arguably the safer of the two options and avoids the potential errors that come about when conducting linear regression on ordinal data.

Limitations

The ordinal regression models were used to determine how effective the streams of the TTI model were in predicting nicotine pouch use intention. Model 2 was an improvement from Model 1 as it accounted for age and nicotine-use status, indicating that only self-efficacy/perceived behavioral control and affective attitudes were significant predictors across both models. However, the full likelihood ratio tests and binomial logistic regressions revealed some limitations in the data that threatened statistical validity and required caution when interpreting the results of certain predictors. In Model 1, proportions were not approximately equal across all categories for the gender dummy variable. Likewise, both the nicotine-use status and gender dummy variables in Model 2 did not have proportional odds across categories. The odds ratios reported in Model 1 may be more accurate than those of Model 2, as

nonproportionality of two variables affect the ratios of the other variables to a greater extent in Model 2 than in Model 1.

The wording of the item measuring the dependent variable, intention, may have threatened its reliability. It was the intention of the researchers to modify the wording of the item to "try or continue using nicotine pouches" in an effort to make the item more logical to both non-users and users. However, the concepts of trying versus continuing to use a substance are fundamentally different. The motivations of a non-using participant responding with a high degree of intention to try nicotine pouches will be different when compared to a current user responding with the same high degree of intention to continue using. This may be a significant confound in the data and would have been avoided if separate items were posed to participants based on their current nicotine use status.

The present study used a convenience sampling method due to cost effectiveness and a lack of a sampling frame. Convenience sampling entails a high degree of bias and makes the study less replicable since it is a non-random sampling technique. In an effort to recruit a representative sample from the population, we recruited participants through various online channels that were not associated with tobacco use (e.g., student groups, market groups, city groups, etc.). We aimed to recruit a similar number of participants for each group in accordance with our preliminary power analysis, but a disproportionate number of women users completed the questionnaire before a quota was introduced. Therefore, we altered our recruitment strategy to recruit an equal number of participants per group within each gender, whilst also reaching the sample size per group required for sufficient power. This led to a noticeable difference in sample sizes between genders, which weakens the study's ability to conclusively assess differences between genders since the sample is not representative of the population as a whole. In addition, making gender a dichotomous variable led other gender groups (non-binary, other, etc.) to be unrepresented in the final analysis, and thus our results are not generalizable to these populations. Similarly, making tobacco use status dichotomous commands that we group occasional, former, and non-users into the same group. Variation in tobacco use within these groups was not accounted for, resulting in it being a potential statistical confound.

The use of an internet-based survey includes several disadvantages, such as the inability to collect a truly random sample of the targeted population. Some members of the population had no chance of participating because they lacked membership to the social media sites the survey link was posted on. This increased the risk of selection bias. The inability to verbally instruct participants and answer questions during the research processes, resulting in a lack of control over the research material, is another disadvantage of internet-based surveys. In order to prevent this, participants of the pilot study were asked to give feedback on the clarity of the questions and the instructions of the pilot study, which were taken into consideration when constructing the final version of the survey. A lack of control over the research material also raises ethical issues related to informed consent and debriefing. We cannot be sure that participants read the consent and debrief forms in their entirety. However, as recommended by Mahon (2014), an information sheet was set as the first page of the survey, in which participants were required to check a box to indicate consent before accessing the survey. This ensures that participants have access to the same information they would receive prior to completing an offline survey (Mahon, 2014). Despite the disadvantages of internet-based surveys, an online approach was required in the present study since it was conducted during the COVID-19 pandemic of Winter-Spring 2020.

Questioning participants about their level of control, social beliefs, and affective attitudes toward nicotine pouches may have altered their perceptions of the product positively or negatively. This change in perception could have inflated or primed the manner in which participants scored their level of intention to use nicotine pouches in the next month.

Insignificant results may have resulted from limitations in the questionnaire itself. The present study used a back-translation method to construct the questionnaire to match the sample's native language. There are a number of issues with this method as pointed out by Gudmundsson (2009), namely that translators know that their translations will be later back translated, so they use grammar and vocabulary that eases the translation process for the back translator at the expense of translation's validity. Translation validity is threatened when some of the meaning and understanding in the non-translated version of the survey is lost because translator bias leads them to simplify the items instead of translating them with the precise meaning (Gudmundsson, 2009). Translators and back-translators were made aware of this bias so they could monitor themselves during the translation process. Although we did not have a check to verify that these extra instructions influenced their final translations, the third party recognized few discrepancies between the original and back-translated versions, signaling relative agreement between the two independent translators. An additional issue with our questionnaire that may have convoluted our findings is the lack of clarity in some items. The interpretation of

self-efficacy/perceived behavioral control items by dual-user populations was varied. Several participants from the pilot and present study questioned whether their perception of relative control should be influenced by their simultaneous use of tobacco-containing snus, as it would be significantly more difficult to give up nicotine pouches if they also needed to not use tobaccocontaining snus at the same time. The interaction of dual product usage was not within the scope of the present study and may confound the measures of self-efficacy/perceived behavioral control among users in our sample. Another possible questionnaire limitation was our use of single-item scales for social normative beliefs and intention. Studies have shown that social normative beliefs can serve as a strong predictor for intention when appropriately measured (Armitage & Conner, 2001). Using multiple items to measure constructs avoids the pitfalls associated with single-item and aggregated ordinal scales in the areas of content validity, sensitivity, and reliability (Liddell & Krusche, 2018). A validated multi-item social normative beliefs scale with three factors was initially chosen to be adapted to nicotine pouch use but was substituted in order to reduce participant burden and the number of predictors needed to be entered into the model. The scale we used to measure intention could have been adapted to include multiple items to assess probability of trying and buying. This would give us a better idea as to how drawn the participants are toward involving themselves with the behavior at hand. The final limitation of our questionnaire involves the use of the nicotine pouch-modified Smokeless Tobacco Expectancies Questionnaire (Gottlieb et al., 2013). The questionnaire has been previously validated for expectancies involving snus (Adkison, Bansal-Travers, et al., 2016), however, nicotine pouches may have their own unique set of positive reinforcement effects and negative health consequences associated with use. This may threaten the construct validity of the nicotine pouch-adapted version and inflate the differences observed in affective attitudes between nicotine pouches and snus. Altogether, the limitations in our questionnaire may have influenced the interpretations of our findings, but the changes and simplifications were warranted in order to make it more feasible for participants to complete.

Future Studies

Future studies should assess the influences of nicotine pouch advertising on intention and subsequent use. The present study hints that advertising a product as tobacco-free alters consumer perception to attribute significantly fewer adverse health consequences to nicotine pouches. The literature suggests strong direct and modulatory effects of tobacco advertising on

the streams of the TTI (Figure 1; Flay et al., 2009), but will need to be adapted to nicotine pouch advertising and use. The present study did not measure the effects of advertising on nicotine pouch use intention, but the evolving methods of advertising and marketing as well as the lack of regulation creates a perfect storm for effective marketing to target populations. A potential area of interest for future experimental research could be influencer marketing of nicotine pouches on social media and its association with adolescents' nicotine pouch behavior. Social media is a modern and lucrative advertising tool that nicotine pouch producing companies are utilizing (Hébert et al., 2017). Social media use has become habitual among some age groups – especially among millennials and younger generations (Perrin, 2015). Influencer marketing is a highly efficient marketing strategy and can be used to reach target populations effectively. Despite there being controls in place to deter minors from seeing certain pages, influencer posts that advertise nicotine pouch use can still reach younger audiences that follow them on these platforms (Anderson & Jiang, 2018).

The present study examined the association between the proximal predictors of the TTI and Swedish young adults' intention to use nicotine pouches. Numerous correlational studies indicate that intention predicts behavior. For instance, Sheeran (2002) analyzed 10 previous meta-analyses (422 studies in total) and found a large sample-weighted average correlation between intentions measured at one point and measures of behavior taken at a subsequent point. However, the linkage between intent and action is complex and research shows that intentions are an important but insufficient prerequisite for successful behavior (Bhattacherjee & Sanford, 2009). This phenomenon has been labeled the intention-behavior gap (Sheeran, 2002). In order to circumvent the intention-behavior gap, future correlational studies should examine the association between the proximal predictors of the TTI and young adults' nicotine pouch use behavior directly. In addition, several predictors for nicotine pouch use intention were examined in the present study, but further experimental research is needed to establish causal relationships between interpersonal, intrapersonal and environmental risks factors, and the relationships of all of these with nicotine pouch use intention and actual use. According to the TTI, the etiology of experimental tobacco use is complex and involves both indirect and direct paths, moderating effects, and reciprocal effects. Future experimental studies need to include the complex causal process by which variables contribute to nicotine pouch use intention and behavior.

To the best of our knowledge, there has not been any literature that investigates nicotine awareness in tobacco-free snus products among Swedish young adults and adolescents. The results from the present study indirectly indicate that individuals have more positive attitudes toward nicotine pouches than tobacco-containing snus. As discussed earlier, the variation in package labeling of e-cigarette products in the United States induced significant confusion among users and non-users whether there was nicotine in their e-cigarettes or not (Morean et al., 2016; Willett et al., 2019). Similar variations are evident for snus and nicotine products, where different scales are often used and the exact amount of nicotine is not always presented on the packaging (see Appendix A). Labeling the product as tobacco-free and not including the amount of nicotine on the packaging might confuse consumers. Future studies should conduct crosssectional experiments to determine if users and non-users have accurate perceptions of how much nicotine these products contain.

There is a significant gap in the literature in respect to the long-term effects of tobaccofree snus and dual-use. Currently, there is only one study that investigates the phasic physiological changes associated with these newly introduced products. Antoniewicz and colleagues (2018) measured divergent vascular responses, but the tobacco-free snus was administered in tandem with tobacco-containing snus, making it impossible to determine if the tobacco-free product was responsible for eliciting these responses, or if the tobacco-containing snus was solely responsible. Studies assessing health effects are urgently needed in order to evaluate the risks involved with this substance. Prescribing nicotine pouches to patients as a nicotine replacement therapy (NRT) could be a possibility in the future on the grounds that it is rigorously tested in clinical trials.

Self-efficacy/perceived behavioral control was a significant predictor in the present study. Self-efficacy has been found to be relevant in all stages of a health behavior change process (Bandura, 1991), but the construct is multifaceted in nature. The relevancy and type of self-efficacy at play is determined by the individual's stage in the change process (Schwarzer, 1992 as cited in Schwarzer, 2016). The health action process approach originally proposed by Schwarzer (1992) distinguishes between action self-efficacy, maintenance self-efficacy, and recovery self-efficacy. The author emphasizes that it is important to distinguish between different phase-specific self-efficacy beliefs since different beliefs are required to master different tasks. An individual might, for example, be confident in their ability to make an attempt to abstain from a certain behavior (i.e. high action self-efficacy), but might not have the same level of confidence in resuming abstinence after a relapse (i.e. low recovery self-efficacy; Schwarzer, 2016). Future studies could examine phase-specific self-efficacy beliefs in order to get a deeper understanding of nicotine pouch use intention at different stages of the behavioral change process.

Summary and Concluding Discussion

The purpose of the present study was to investigate the underlying factors associated with nicotine pouch use among Swedish young adults using the theory of triadic influence (TTI; Flay et al., 1995). Results indicated that self-efficacy/perceived behavioral control and affective attitudes were significant predictors of nicotine pouch use intention. Participants with lower self-efficacy/perceived behavioral control and higher affective attitudes towards nicotine pouches showed higher intention to use nicotine pouches within the next 30 days. Neither social normative beliefs nor gender were significant predictors of intention. The results show that the TTI may be a suitable model to predict nicotine pouch use intention among Swedish young adults and that gender did not play a significant role in predicting intention in this particular sample.

The present study confirmed that participants attribute more positive affective attitudes toward nicotine pouches than tobacco-containing snus. The differences in affective attitudes between nicotine pouches and snus signify that the sample demographic has a more positive outlook on nicotine pouches than tobacco-containing snus, despite there being a lack of empirical evidence regarding the long-term effects of nicotine pouch use. The fact that nicotine pouches are marketed freely in Sweden due to the lack of regulation may be the reason behind this finding.

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Front and Back of Prominent Swedish Nicotine Pouch Packages

English translation of messages pertaining to nicotine content on each carton is as follows:

LYFT by British American Tobacco:

Strength 2 / 4. Contains nicotine that is addictive. Nicotine pouches 16.8g.

ZYN by Swedish Match:

2 / 4. This product contains nicotine which is a very addictive substance. Weight 8g, 0.4g/nicotine pouch. Nicotine 0.75%.

on! by Råå Snus AB:

3 / 6. Tobacco Free. Net Weight 6.4g, 0.32g/pouch. One pouch contains 3mg of nicotine. Contains nicotine that is addictive.

Nordic Spirit by Nordic Snus:

3 / 5. This product contains nicotine which is a very addictive substance. Weight 13g. Nicotine content approx: 9mg/portion (14mg/g).

Appendix A

Appendix B

Questionnaire - Swedish Version

Uppfattning av risker och attityder gentemot snus och tobaksfria nikotinpåsar

Start of Block: Consent

Uppfattning av risker och attityder gentemot snus och tobaksfria nikotinpåsar. Vi vill fråga dig om du vill delta i ett forskningsprojekt för en masteruppsats i psykologi vid Lunds universitet. På den här sidan får du information om projektet och vad det innebär att delta.

Studien syftar till att undersöka unga vuxnas uppfattning av risker och attityder gentemot snus och tobaksfria nikotinpåsar. Tobaksfria nikotinpåsar är snusliknande produkter som nyligen introducerats och nu marknadsförs i Sverige. Studien kommer att ta <u>10-15 minuter</u> att genomföra.

För att delta i studien behöver du vara mellan 18 och 29 år. Enkäten utförs online och du som deltagare garanteras anonymitet. Insamlad data kommer överföras till en lösenordskyddad dator som enbart studiens forskare och handledare har tillgång till. Studien följer dataskyddsförordningens reglering (GDPR), vilket försäkrar skydd av insamlad data och informationen kommer inte kunna härledas till individuella deltagare. Data kommer enbart att användas i forskningsprojektets syfte och kommer att raderas efter projektet avslutats. Du har rätt att begära att uppgifter om dig raderas. I enighet med denna rätt kommer vi be dig att på nästföljande sida fylla i en unik ID-kod. Om du sedan skickar ett mail med denna ID-kod till någon av studiens forskare kommer dina uppgifter att raderas.

Deltagandet är frivilligt och du kan när som helst välja att avbryta din medverkan. Om du har frågor, samt om du vill ta del av forskningsprojektets resultat när projektet är avslutat, var god kontakta oss via mail:

Mitchell Andersson mi1450an-s@student.lu.se Kajsa Lundkvist kajsa.lundkvist.320@student.lu.se Sofia Bunke sofia.bunke@psy.lu.se

Genom att klicka i boxen nedan intygar du att du är mellan 18 och 29 år samt att du samtycker till att du blivit informerad om studiens syfte, de åtgärder som förekommer för att skydda din data och din rätt att radera din data.

Jag är mellan 18 och 29 år och samtycker till att delta i studien.

Page Break -----



I enlighet med din rätt att begära att uppgifter om dig raderas, var vänlig fyll i en 8-siffrig kod nedan.

De tre första bokstäverna ska vara de tre första bokstäverna i din favoritstad (t.ex. LUN för Lund).

De nästa två siffrorna ska vara ditt födelsedatum (t.ex 11 för 11 augusti).

De tre sista bokstäverna ska vara de tre första bokstäverna i ditt favoritdjur (t.ex. BJÖ för björn).

Till exempel: LUN11BJÖ (Lund, 11 augusti, björn)

End of Block: Consent

Start of Block: Demographics Block

Var vänlig fyll i följande information om dig själv:



Könstillhörighet

O Man

🔾 Kvinna

O Icke binär

O Annat

🔾 Vill ej svara

Högsta nivå av avslutad utbildning

- O Grundskoleutbildning eller lägre
- O Gymnasieutbildning
- O Kurs vid universitet
- O Kandidatexamen vid universitet
- O Masterexamen vid universitet eller högre
- 🔾 Vill ej svara

Page Break -----

End of Block: Demographics Block

Start of Block: Tobacco History Block

Följande frågor handlar om ditt tobaks- och nikotinanvändande. Du kommer att få frågor om nikotinpåsar. Nikotinpåsar är snusliknande produkter utan tobak, men med nikotin, som nyligen lanserats i Sverige. Kända märken är till exempel LYFT, ZYN och on! Du kommer även få frågor om snus som innehåller både tobak och nikotin. Dessa frågor handlar om det vanliga, traditionella snuset som funnits i Sverige i många år. Kända märken är till exempel Göteborgs Rapé, General, Lundgrens och Knox.

Page Break -

Har du använt tobaksprodukter (t.ex. cigaretter, snus, cigarrer, egenrullade cigaretter, cigariller, elektroniska cigaretter, tuggtobak) eller nikotinpåsar (tobaksfritt snus) under de senaste 30 dagarna?

◯ Ja ◯ Nej ◯ Vet ej

Page Break -

Vilken av följande beskriver ditt snusanvändande (antingen med eller utan tobak)?

Jag använder dagligen.

O Jag använder mer sällan än dagligen.

 \bigcirc Jag har tidigare använt eller provat snus åtminstone en gång, men jag snusar inte i dagsläget.

O Jag har aldrig snusat.

🔿 Vet ej

Vilken av de följande beskriver ditt cigarettanvändande eller e-cigarettanvändande?

O Jag röker dagligen.

O Jag röker mer sällan än dagligen.

Jag har tidigare rökt åtminstone en gång, men jag röker inte i dagsläget.

O Jag har aldrig rökt.

◯ Vet ej

Page Break -----

Använder	dut	för	tillfället	nikot	tinpå	isar?
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⊖ Ja
◯ Nej
◯ Vet ej

Har du hört talas om nikotinpåsar eller sett reklam för dem?

⊖ Ja	
◯ Nej	
◯ Vet ej	

End of Block: Tobacco History Block

Start of Block: Snus Block

Vänligen svara på följande frågor om snus som innehåller tobak och nikotin (t.ex. Göteborgs Rapé, General, Lundgrens, Knox, etc.)

Det finns inga rätt eller fel svar. Svara i enlighet med vad DU tror, även om du inte vet säkert. Svara även om du inte använt snus.

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Följande frågor handlar om dina attityder gentemot användandet av snus.

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Vänligen svara hur sannolika de följande påståenden om snus som innehåller tobak och nikotin är (t.ex. Göteborgs Rapé, General, Lundgrens, Knox, etc.).

	1. Väldigt osannolikt	2	3	4	5	6	7	8	9	10. Väldigt sannolikt
Snus orsakar tandköttsjukdomar.	0	C	C	C	С	C	C	C	C	0
Snus orsakar nikotinberoende.	0	C	C	C	C	C	C	C	C	0
Snus påverka hälsan negativt.	0	C	C	C	C	C	C	C	C	0
Snus orsakar missfärgade tänder.	0	C	C	С	С	C	С	C	C	0
Snus orsakar karies/hål i tänderna.	0	C	C	C	C	C	C	C	C	0
Snus får en att känna sig tillfreds.	0	C	C	C	C	C	C	C	C	0
Snus får det att kännas som att tiden går fortare.	0	C	C	C	С	C	C	C	C	0
Snus ger energi.	0	C	C	C	С	C	С	C	C	0
Snus bidrar till högre fokus.	0	C	C	C	C	C	C	C	C	0
Kontrollfråga: Vänligen fyll i "10. Väldigt sannolikt"	0	C	C	C	С	C	C	C	C	0
Snus håller en sysselsatt.	0	C	C	C	C	C	C	С	C	0

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End of Block: Snus Block

Start of Block: NP Block

Vänligen svara på följande frågor om nikotinpåsar (tobaksfritt snus) (t.ex. LYFT, ZYN, on!, etc.)

Det finns inga rätt eller fel svar. Svara i enlighet med vad DU tror, även om du inte vet säkert. Svara även om du inte använt nikotinpåsar.

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Följande frågor handlar om din upplevda kontroll över användande av nikotinpåsar.

Vänligen svara (1-7) på dessa frågor om nikotinpåsar (tobaksfritt snus) (t.ex. LYFT, ZYN, on!, etc.)

Det skulle vara enkelt för mig att **inte** använda nikotinpåsar kommande månaden, om jag skulle vilja.

- Håller inte alls med 1
- 02
- O 3
- 05
- 06
- Håller med fullständigt 7

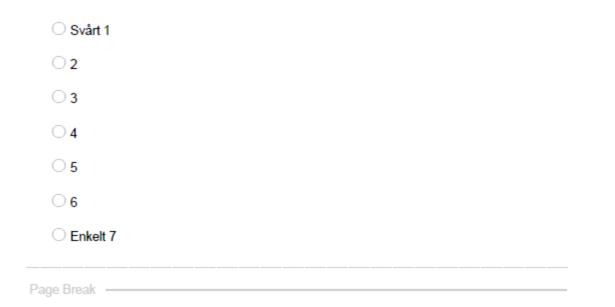
63

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Hur mycket kontroll anser du dig ha över om du kommer använda eller inte använda nikotinpåsar?

O Ingen kontroll 1
○ 2
○ 3
○ 4
○ 5
○ 6
O Full kontroll 7

Tror du att det skulle vara svårt eller enkelt för dig att **inte** använda nikotinpåsar den kommande månaden?



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Följande påstående handlar om upplevda normer kring användandet av nikotinpåsar. Normer är oskrivna regler som beskriver hur vi bör eller inte bör uppföra oss i sociala sammanhang.

Vänligen svara (1-7) på följande påstående om nikotinpåsar (t.ex. LYFT, ZYN, on!, etc.)

Om jag använde nikotinpåsar skulle de flesta människor som är viktiga för mig i mitt liv...

Inte acceptera det 1
○ 2
⊖ 3
○ 4
○ 5
○ 6
O Acceptera det 7

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Följande frågor handlar om dina attityder gentemot användandet av nikotinpåsar. Vänligen svara hur sannolika de följande påståenden om nikotinpåsar är (t.ex. LYFT, ZYN, on!, etc.).

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Nikotinpåsar orsakar tandköttsjukdomar. O C <th>10. äldigt nnolikt</th>	10. äldigt nnolikt
orsakar nikotinberoende.OCCC </th <th>0</th>	0
påverka hälsan negativt.OCCC </th <th>0</th>	0
orsakar missfärgade tänder.OCC	0
orsakar karies/hål i tändema.OCC <t< th=""><th>0</th></t<>	0
att känna sig tillfreds.OCCC </td <td>0</td>	0
det att kånnas som att tiden går fortare. O C C C C C C Nikotinpåsar ger energi. O C C C C C C C	0
	0
	0
Nikotinpåsar bidrar till högre fokus O C C C C C	0
Nikotinpåsar håller en sysselsatt.	0

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Page Break -----

End of Block: NP Block

Start of Block: Intention Block

Hur troligt är det att du kommer testa eller fortsätta använda nikotinpåsar (tobaksfritt snus) den kommande månaden?

Ingen chans, i princip ingen chans 1
2
3
4
5
6
7
8
9
Säkerligen, praktiskt taget säkert 10

End of Block: Intention Block

Tack för din medverkan!

Syftet med studien är att undersöka vilka faktorer som kan ligga bakom unga vuxnas intention till att använda de tobaksfria nikotinpåsarna som nyligen introducerats i Sverige. Även om tobaksfria nikotinprodukter kan exkludera många av de farliga ingredienser som finns i andra tobaksprodukter (t.ex. cigaretter), är det viktigt att poängtera att den principiella ingrediensen i utvecklandet av beroende, nikotin, fortfarande finns i nikotinpåsar. Dessa produkter är dessutom nya och har inte forskats på under en längre tidsperiod. Därför kan vi inte uteslutande säga att dessa produkter är säkrare än andra nikotin- eller tobaksprodukter på marknaden. Enligt studiens forskare och majoriteten av professionella inom det medicinska området bör nikotin inte brukas på något sätt. Om du har frågor gällande studien, vänligen kontakta en av forskarna.

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Appendix C

Means and Standard Deviations of the TTI Qu	uestionnaire and Intention by Group
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Variable		Wo	men		Men				Full sample			
	Users Non-users			Us	Users Non-users			Wo	Women		Men	
	М	SD	М	SD	M	SD	Μ	SD	М	SD	M	SD
SE-PBC ^a	5.38	1.86	6.89	.50	5.67	1.78	6.96	.17	6.14	1.55	6.29	1.44
SNB^b	5.47	1.58	4.13	2.01	5.93	1.44	4.50	1.99	4.79	1.93	5.24	1.87
AA-Nicotine Pouches	08	2.34	-2.45	3.92	29	2.69	-2.15	2.74	-1.28	2.90	-1.18	2.86
Positive Affect ^c	6.42	1.62	5.00	2.11	5.57	1.85	4.77	2.01	5.70	2.01	5.19	1.97
Negative Affect ^c	6.50	1.64	7.45	1.69	5.86	1.67	6.92	1.60	6.98	1.73	6.37	1.72
AA-Snus	-1.59	2.39	-3.91	2.60	88	2.54	-3.31	2.55	-2.76	2.75	-2.05	2.82
Positive Affect ^c	6.58	1.86	4.92	2.14	6.29	1.77	5.02	2.17	5.74	2.17	5.67	2.07
Negative Affect ^c	8.16	1.39	8.84	1.11	7.17	1.50	8.33	1.25	8.50	1.30	7.73	1.50
Intention to Use ^d	6.27	3.63	1.36	1.22	4.86	3.62	1.29	1.13	3.79	3.64	3.15	3.26

Note. NP and Snus Affective Attitudes calculated by taking difference between positive and negative affect. One participant failed to complete the nicotine pouch

affective attitudes and intention scales. SE-PBC = Self-Efficacy/Perceived Behavioral Control, SNB = Social Normative Beliefs, AA = Affective Attitudes.

^aLikert scale (1-7; Agree—Disagree, Complete Control—No Control, Easy—Difficult). Quasi-interval scale through aggregation from an ordinal scale.

^bLikert scale (1-7; *Disapprove*—Approve). Single-item ordinal scale. Medians are as follows: <u>Mdnwomen users</u> = 6, <u>Mdnwomen non-users</u> = 4, <u>Mdnmen users</u> = 7, <u>Mdnmen non-users</u> = 5.

^c Likert scale (1-10; Very Unlikely—Very Likely). Quasi-interval scale through aggregation from an ordinal scale.

^d Likert scale (1-10, No Chance, Almost No Chance—Certainly, Practically Certain). Single-item ordinal scale. Medians are as follows: <u>Mdnwomen users</u> = 7,

 $Mdn_{women non-users} = 1, Mdn_{men users} = 4, Mdn_{men non-users} = 1.$