



Do personality traits related to affect regulation predict other tobacco product use among young adult non-daily smokers?



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HIGHLIGHTS

- Young adults with traits related to affect regulation may use OTPs more frequently.
- Those who reported greater sensation seeking reported more frequent OTP use.
- Greater lack of premeditation was associated with more frequent OTP use.
- It may be useful to examine use of OTPs both collectively and individually.

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ABSTRACT

Introduction: Understanding factors that influence non-cigarette tobacco use is important given these products' prevalence and health risks. The goal of this study was to test the hypothesis that personality traits related to affect regulation would be associated with greater frequency of other tobacco product (OTP) use in a sample of young adult non-daily smokers.

Methods: Participants ($n = 518$, 51% male) aged 18–24 were non-daily cigarette smokers recruited from the community for a longitudinal study of tobacco use. Personality characteristics (impulsivity, anhedonia, and negative affectivity) were measured at baseline, and participants reported recent tobacco use at baseline and 3, 6, and 9 months later. Assessments were conducted online or via mobile phone.

Results: Across the 4 assessments, 33–52% of participants reported recent OTP use, with frequency of use decreasing over time. Longitudinal negative binomial regression models indicated that greater sensation seeking and lack of premeditation were associated with more frequent OTP use ($ps < 0.05$). These effects were consistent over time.

Conclusions: Findings suggest that young adult non-daily cigarette smokers with greater propensity for immediately rewarding behaviors may use OTPs more frequently. Young, non-daily cigarette smokers with high levels of sensation seeking and/or lack of premeditation may be at increased risk for harms related to OTP use and may benefit from prevention and cessation strategies that specifically address affect.

1. Introduction

Non-cigarette tobacco or nicotine product (other tobacco products; OTPs) use is increasing and is most pervasive among younger cigarette smokers (Lee, Hebert, Nonnemaker, & Kim, 2014, 2015). In 2012, 70% of youth and 62% of young adult cigarette smokers reported using OTPs in addition to cigarettes, compared with 6% and 10% of non-smoking youth and adults, respectively (Lee et al., 2014, 2015). OTPs most commonly include but are not limited to e-cigarettes, hookah, cigars, and smokeless tobacco. These products each have associated health risks, including cancer, cardiovascular diseases, and respiratory issues

(Baker et al., 2000; Critchley & Unal, 2003; Ferrence & Stephens, 2000; Maziak, 2013; Vardavas et al., 2012). Among cigarette smokers, another concern is that OTPs may exacerbate cigarette-related health risks (Centers for Disease Control and Prevention, 2010) by promoting cigarette progression (Doran, Godfrey, & Myers, 2015; Doran et al., 2017) and nicotine dependence (Timberlake, 2005, 2009). While younger cigarette smokers may be vulnerable to OTP use and its effects, little is known about the characteristics of multiple tobacco product users.

One possible motive for OTP use is affect regulation (Doran & Brikmanis, 2016; Lee, Lin, Seo, & Lohrmann, 2017; Pokhrel, Little, Fagan, Muranaka, & Herzog, 2014; Wong, Haardörfer,

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Windle, & Berg, 2016). Affect regulation refers to the process by which people attempt to alter their emotional states (Larsen & Prizmic, 2004). Affect regulation expectancies and motives have been associated with specific OTPs (Doran & Brikmanis, 2016; Pokhrel et al., 2014; Wong et al., 2016). These studies suggest young adults use OTPs at least partly for affect modulation. Thus, they may be at an increased risk for progressive tobacco use as cigarette-specific studies have found that affect regulation beliefs contribute to progressive consumption (Kassel et al., 2007; Weinstein & Mermelstein, 2013; Wetter et al., 2004). Given this, it may be beneficial to examine associations between OTP use and traits related to affect regulation.

Impulsivity, anhedonia, and negative affectivity are affect regulation-related traits that have been positively associated with cigarette behaviors and expectancies (Bloom, Matsko, & Cimino, 2014; Johnson et al., 2008; Kassel, Stroud, & Paronis, 2003; Leventhal & Zvolensky, 2015). Individuals with these characteristics may expect that nicotine increases positive affect and reduces negative affect, making them more prone to using cigarettes. There is evidence that individuals with these traits find nicotine disproportionately reinforcing (Cook, Spring, & McChargue, 2007; Doran et al., 2006). Because of these expectancies, individuals with high levels of personality traits related to affect regulation may be similarly vulnerable to using nicotine from any source including OTPs.

Impulsivity is conceptualized as a multidimensional construct consisting of five factors: lack of premeditation, lack of perseverance, sensation seeking, and positive and negative urgency, or the tendency to act impulsively during positive and negative affective states (Cyders et al., 2007; Whiteside & Lynam, 2001). Impulsive individuals are prone to engaging in immediately rewarding behaviors (e.g., nicotine intake) regardless of potential long-term consequences (Bloom et al., 2014) and appear to smoke cigarettes for positive and negative reinforcement (Doran, McChargue, & Cohen, 2007). Impulsivity has been linked to e-cigarette, hookah, and cigar use (Doran & Trim, 2015; Enofe, Berg, & Nehl, 2014; Fielder, Carey, & Carey, 2012; Leventhal et al., 2016; Sterling, Berg, Thomas, Glantz, & Ahluwalia, 2013). Specifically, sensation seeking and positive urgency were associated with the likelihood of recent OTP use (Doran & Trim, 2015). Another study found that positive and negative urgency were highest among dual cigarette and e-cigarette users, followed by e-cigarette only users, and then non-users (Leventhal et al., 2016). Therefore, individuals high in sensation seeking and urgency may be particularly prone to OTP use. Most previous studies have either focused on one component of impulsivity or used composite impulsivity scores. Because the components of impulsivity are related but distinct constructs with different underlying causes that interact to influence behavior (Lejuez, Aklin, Bornovalova, & Moolchan, 2005), the present study sought to evaluate the prospective relations between the five factors and OTP use.

Another possible OTP risk factor is anhedonia, or reduced capacity to feel pleasure in response to rewards (Gard, Gard, Kring, & John, 2006). Those with high levels of anhedonia may be more likely to engage in behaviors, like cigarette use, to compensate for deficiencies in positive affect (Leventhal & Zvolensky, 2015). Anhedonia has been associated with cigarette initiation and progression and nicotine dependence (Leventhal & Zvolensky, 2015). Little research has examined the relationship between anhedonia and OTP use. In one study, anhedonia was highest among dual cigarette and e-cigarette users, moderate among single-product users, and lowest among non-users (Leventhal et al., 2016). While few OTP studies have focused on anhedonia alone, hookah and cigar use has been associated with scores on a two item measure assessing frequency of depressed mood and anhedonia (Berg, Schauer, Asfour, Thomas, & Ahluwalia, 2011; Sterling et al., 2013). These initial studies suggest that those high in anhedonia may be vulnerable to OTP use.

A third trait that may impact OTP use is negative affectivity, the tendency to experience negative affective states. Rather than using substances to increase positive affect, such individuals may use to

ameliorate negative affect (Myers, Aarons, Tomlinson, & Stein, 2003). To our knowledge, no previous studies have examined the association between negative affectivity and OTP use. Literature has linked negative affectivity and neuroticism, a related construct, to cigarette use (Kassel et al., 2003; Malouff, Thorsteinsson, & Schutte, 2006; Munafò, Zetteler, & Clark, 2007). Those high in negative affectivity may also be disproportionately prone to OTP use to alleviate negative moods.

The purpose of the present secondary analysis was to examine personality traits related to affect regulation as prospective predictors of OTP use in a sample of young adult non-daily cigarette smokers. To the extent that individuals with affect regulation-related traits use nicotine to manage affect, they are likely at greater risk for OTP use. We hypothesized that higher levels of the sensation seeking and positive and negative urgency facets of impulsivity; anhedonia; and negative affectivity would be associated with greater OTP frequency. We also predicted that OTP frequency would escalate more quickly over time among individuals higher in these traits. Finally, we explored whether the effects of impulsivity, anhedonia, and negative affectivity differed among the most common individual OTPs (i.e. e-cigarettes, hookah, and cigars).

2. Materials and methods

2.1. Participants

Participants ($n = 518$; 51% male) were young adults (18–24 years old; $M = 20.5$, $SD = 1.8$) in a longitudinal study of tobacco. The sample was 48.8% non-Hispanic White, 15.8% Asian American, 26% Hispanic/Latino, and 9.3% from other or multiple racial/ethnic backgrounds. Eligibility criteria included smoking cigarettes monthly or more for at least the past six months, never smoking cigarettes daily for one month or more, and California residency. Because all assessments were completed online, consistent internet access was required.

2.2. Procedure

Participants were recruited primarily via online advertisements. After online eligibility screening, interested candidates provided informed consent and completed the baseline assessment. At the 3, 6 and 9 month follow-ups, participants completed brief daily assessments for 9 consecutive days. Incentives included a \$25 gift card for completion of baseline assessment and up to \$40 for each of the three quarterly assessments. All procedures were approved by the University of California, San Diego Institutional Review Board. Data were collected March 2015–December 2016.

2.3. Measures

Demographic characteristics assessed included age, sex, race/ethnicity and current student status. Race was collapsed into four categories: non-Hispanic White ($n = 253$), Asian American ($n = 82$), Hispanic or Latino ($n = 135$), and other or multiple backgrounds ($n = 48$). Student status was collapsed into full time students (60%) versus others (40%).

Cigarette and OTP use were measured at baseline, and 3, 6, and 9 months later. OTPs included e-cigarettes, hookah, cigars, smokeless tobacco (SLT), and snus. At baseline, participants reported whether they used cigarettes and OTPs on each of the past 14 days using the Timeline Followback (Sobell & Sobell, 1992, 1996), which has strong validity and reliability with nondaily smokers (Harris et al., 2009). At 3, 6, and 9 months, participants completed daily assessments and reported whether they had used OTPs and cigarettes during the previous day. Assessments were completed on 9 consecutive days, always starting on a Saturday. Overall, participants completed 84.9% of assessments. The majority (51–55%) of participants completed all 9 days across time-points. Studies have shown that self-reported smoking frequency is

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