Original investigation

Distinct Motives for Use Among Polytobacco Versus Cigarette Only Users and Among Single Tobacco Product Users

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Abstract

Background: Alternative tobacco product (ATP) use as well as co-use of various tobacco products has increased in recent years, particularly among young adults. However, little is known about the differential role of motives for ATP or polytobacco use.

Methods: We examined (1) motives for tobacco use in relation to polytobacco versus cigarette only use and (2) motives for tobacco use in relation to levels of tobacco use across products. We analyzed data from past 30-day tobacco users at Wave 2 (Spring 2015) of a six-wave longitudinal study of 3418 students aged 18–25 years from seven U.S. colleges/universities. Variables included sociodemographics, tobacco use (cigarettes, little cigars/cigarillos [LCCs], smokeless tobacco [SLT], hookah, and e-cigarettes), and tobacco use motives (social, self-enhancement, boredom relief, and affect regulation).

Results: Multivariate analyses found that boredom relief motives were associated with polytobacco use versus cigarette only use ($p = .007$). Higher consumption levels demonstrated the following associations: cigarettes—positively with boredom relief ($p = .025$) and affect regulation motives ($p < .001$); LCCs—positively with affect regulation motives ($p = .035$); SLT—negatively with social ($p = .003$) and positively with self-enhancement ($p = .017$) and boredom relief motives ($p = .007$); and hookah—positively with social ($p = .002$) and boredom relief motives ($p = .033$) and negatively with self-enhancement ($p = .004$) and affect regulation motives ($p = .001$).

Conclusions: Distinct motives for use were associated with polytobacco use among smokers. Moreover, higher levels of use among single product users also demonstrated distinct associations across use motives. These data should inform targeted cessation interventions addressing motives for use in ATP and polytobacco users.

Implications: Interventionists, public health practitioners, and health care providers must address the increasing issue of ATP and polytobacco use and tailor interventions to reduce ATP and polytobacco use in light of the distinct motives for use.

Introduction

Tobacco use is one of the leading causes of mortality and morbidity in the United States.^{1,2} In the past decade, significant public

health efforts have led to the decline in total cigarette consumption by 32.8% (from 435.6 billion cigarettes in 2000 to 292.8 billion in 2011).³ Unfortunately, the attenuation in the consumption of traditional cigarettes in the past decade has been accompanied by

the alarming rise in consumption of alternative tobacco products (ATPs), particularly in the young adult population.⁴⁻⁹ The use of ATPs (ie, cigarillos, little cigars [LCCs], smokeless tobacco [SLT], e-cigarettes, and hookah) among young adults is increasing due to reasons such as widespread misunderstanding of safety, attractive smell and taste, and social appeal.¹⁰⁻¹⁵

Nearly all cigarette use in the United States starts during adolescence with experimentation, often leading to nicotine dependence.¹⁶ Research has shown that most adolescents who continue smoking into young adulthood become regular users.^{2,16} Young adults are now the highest risk group for using ATPs.⁵ With the experimentation tendencies of this population, the need for research assessing the potential harms and methods to control the use of these ATPs in the young adult population is great.

The recent rise in ATP use has increased the occurrence and concern of multiple tobacco product or polytobacco usage.^{2,17} Roughly 15%–30% of young adult smokers currently use more than one tobacco product.^{9,18} However, among ATP users, multiple tobacco product use has increased alarmingly to 40%–50%.^{7,19} Different tobacco products have potentially different levels of nicotine; thus, multiple tobacco product usage may be associated with increased risks of nicotine dependence.^{2,20-22}

Thus, it is critical to understand why young adults use the various ATPs. Motives to use tobacco measures have been studied to guide the development of intervention and cessation programs for smokers.^{23,24} Historically, however, these motives for use have only been examined in traditional cigarette smokers.²³⁻²⁹ With the emerging trend in ATP use, these measures need to be examined within the specific contexts of these distinct products. ATP companies realize the unique user profiles of their products and tailor their marketing strategies accordingly.^{13,30} Given the tobacco companies' inclination to sell their different products in unique ways, the various ATPs are likely to have differing smoker typologies.^{19,24}

Given the emergence of ATPs in the market, and the increased use of ATPs and polytobacco use among young adults, it is critical to understand the motives for using the various ATPs. As such, this study will examine (1) whether motives for tobacco use differentiate cigarette only users from cigarette smokers also using ATPs and (2) motives for tobacco use in relation to tobacco consumption levels among single tobacco product users. Results from this study will be timely and address a significant gap in the literature. Moreover, this research will inform efforts to determine appropriate tobacco use prevention and control activities.

Methods

Study Design

The current study is an analysis of data from Project DECOY: Documenting Experiences with Cigarettes and Other tobacco in Young adults. This study was approved by the Emory University and ICF International Institutional Review Boards as well as those of the participating colleges. The methods employed in Project DECOY are documented in detail elsewhere.³¹ In short, it involved a 2-year longitudinal cohort study involving 3418 racially/ethnically diverse young adults attending seven Georgia colleges/universities in the context of a sequential mixed-methods research design.³² Data collection began in Fall 2014 and consists of individual assessments every 4 months for 2 years (during Fall, Spring, and Summer).

Participants

The primary sampling frame includes seven Georgia campuses, including two public universities, two private colleges/universities,

two community/technical colleges, and a historically black university with representation from rural and urban settings. The rationale for sampling from these institutions was to obtain a broad range of young adults in terms of sociodemographic backgrounds and to contextualize study findings within the context of campus-related factors and campus tobacco control policies and activities. Inclusion criteria for participants were (1) age ≥ 18 and ≤ 25 (to include the broad range of young adult ages but reduce overall age variability) and (2) ability to read English.

College E-mail addresses were obtained from the registrar's office from each college/university for students meeting eligibility criteria. Three thousand 18- to 25-year olds were randomly selected from one private and two public universities. The remainder of the schools had 18- to 25-year-old student populations of fewer than 3000; thus, the entire student population of that age range at those schools was included in recruitment. Response rates ranged from 15.4% to 27.6% at the technical colleges; 12.0% and 19.2% at the public colleges/universities; 18.8% and 59.4% at the private universities; and 23.1% at the historically black university. Thus, our total response rate of 22.9% ($N = 3574/15\,607$), albeit low, was over a very short timeframe and met our sampling targets. Seven days after initial recruitment and completion of the baseline survey, we asked participants to confirm their participation by clicking a "confirm" button included in an E-mail sent to them. The E-mail reiterated the tasks involved in the study and its timeline. Once participants clicked "confirm," they were enrolled into the study and sent their first incentive in the form of a \$30 gift card via E-mail. The confirmation rate was 95.6% ($N = 3418/3574$). We employed a graduated compensation schedule (\$30 for the first two assessments, \$40 for the second two, and \$50 for the final two), with an additional \$100 incentive for participating in all assessments.

The current analyses examined data from Wave 2 of the study, which was conducted during March/April 2015. The sample size during Wave 2 was 2969 (86.9% retention rate). The current analyses focused on tobacco use behaviors and motives that were assessed among participants who reported any tobacco use in the past 4 months. Of the 2969 Wave 2 participants, 22.9% ($n = 679$) of the sample used tobacco in the past 4 months. (This timeframe was used to capture information between each assessment.) When examining the prevalence of use in the past 4 months within specific tobacco products, 14.9% ($n = 441$) of the sample used cigarettes, 11.7% ($n = 348$) used LCCs, 3.9% ($n = 116$) used SLT, 15.8% ($n = 468$) used e-cigarettes, and 12.5% ($n = 371$) used hookah. Of the tobacco users in the sample, 60.2% ($n = 409$) were single product users, 25.9% ($n = 176$) were two product users, and 13.9% ($n = 94$) used three or more tobacco products.

Measures

Data for the current analyses were drawn from the baseline survey assessment of sociodemographics and from the Wave 2 assessment of tobacco use and motives for tobacco use. These specific variables are described below.

Tobacco Use

The outcomes for aims 2 and 3 of the current study were derived from measures assessing levels of tobacco product use. The survey asked, "How many days of the past 4 months did you use: Cigarettes? Flavored little cigars (such as Black and Milds) or cigarillos (such as Swisher Sweets cigarillos)? Chewing tobacco, snuff, or dip (such as Redman, Levi Garrett, Beechnut, Skoal, Skoal Bandits,

or Copenhagen)? Snus (such as Camel or Marlboro Snus)? Dissolvable tobacco products (such as Ariva, Stonewall, Camel orbs, Camel sticks, or Camel strips)? Electronic cigarettes or e-cigarettes (such as Ruyan, Blu, or NJOY)? Tobacco from a hookah or a waterpipe?" Those reporting use within the past 4 months were then asked to report the number of days they used the respective tobacco products in the past 30 days.³³ Related to aim 2, participants reporting use of more than one tobacco product in addition to cigarettes were considered polytobacco users and were compared to cigarette only users. To obtain additional data regarding levels of use, participants reporting cigarette use were asked, "On the days when you do smoke cigarettes, how many do you smoke?" The wording of the question was changed to accommodate the ATPs. In order to calculate an estimate of the level of past 30-day tobacco consumption as outcomes for aim 3, these two variables (past 30-day use, use per day) were multiplied.

The Motives for Tobacco/Nicotine Use

The primary predictors of interest for aims 2 and 3 of the current study were motives for tobacco or nicotine use, assessed using an adapted version of the Motives for Smoking Scale.^{28,29} This scale assesses the extent to which each of 15 smoking-related motives is true for the participant (1 = not at all true, 5 = very true). The measure contains questions about four common motives: social (4 items, eg, "Smoking helps you fit in with other people"; range 4–20), self-enhancement (4 items, eg, "Smoking makes you feel more self-confident"; range 4–20), boredom relief (2 items, eg, "Smoking is something to do when you're bored"; range 2–10), and affect regulation (5 items, eg, "Smoking helps you calm down when you're feeling tense or nervous"; range 5–25). The verbiage was adapted in the current study to be applicable to all types of tobacco and nicotine product use (Supplementary Table 1). Higher scores indicated that the motive was endorsed more frequently. In the current study, Cronbach's alpha for the social subscale, the self-enhancement subscale, the boredom relief subscale, and the affect regulation subscale were .89, .86, .94, and .92, respectively.

Sociodemographics

We accounted for selected sociodemographic factors (age, sex, race, and ethnicity) as covariates in current analyses.

Data Analysis

Descriptive analyses were conducted to summarize participant characteristics. Due to the nonnormality of consumption level, a natural log transformation was used to normalize the use consumption

variables for LCCs, SLT, e-cigarettes, and hookah. No transformation was performed on cigarette consumption due to the normality of its distribution among smokers. Bivariate analyses were conducted to examine associations among the outcome variables and correlates of interest.

For the first regression model, the study sample was restricted to those participants who used cigarettes in the past 30 days, regardless of whether they used other tobacco or nicotine products. Addressing our first aim, a binary logistic regression model was then conducted to examine motives for use in relation to polytobacco use versus cigarette only use.

For the final sets of regressions, the samples were restricted to single product users in the past 30 days to address our second study aim, specifically examining motives for use (per the adapted Motives Scale) in relation to level of consumption of each tobacco product, respectively. Preliminary analyses were conducted using dichotomous outcomes (ie, use vs. no use in the past 30 days) and continuous outcomes (ie, level of consumption in the past 30 days). Results were similar; thus, we presented the results using level of consumption to preserve statistical power. Of note, for each regression, the covariates of age, sex, and race/ethnicity and predictors of interest were included in the models. Alpha was set at .05, and all analyses were conducted using SPSS 23.0.

Results

Descriptive Analyses

Among the 679 participants who reported tobacco use in the past 4 months, the average age was 20.55 years ($SD = 1.86$), 54.93% ($n = 373$) were female, 398 (58.6%) were White, 154 (22.7%) Black, 23 (3.4%) Hispanic, 42 (6.2%) Asian, and 62 (9.2%) Other.

Table 1 provides an overview of tobacco use and co-use. Cigarettes were the most commonly used tobacco product in the past 30 days (48.9%, $n = 332$), using an average 5.82 ($SD = 10.22$) days. Of the sample, 29.2% ($n = 198$) used LCCs, 12.8% ($n = 87$) used SLT, 30.0% ($n = 204$) used e-cigarettes, and 36.1% ($n = 245$) used hookah in the past 30 days. The median number of days these products were used were 2 for LCCs, 15 for SLT, 2.5 for e-cigarettes, and 1 for hookah. Across products, single product smokers comprised the highest proportion of users of hookah ($n = 116$, 47.3%) and cigarettes ($n = 140$, 42.2%). Cigarettes had the highest rates of concomitant use among tobacco products, with a range of 28.6%–52.0% of ATP users also reporting cigarette use.

Table 1. Past 30-Day Polytobacco Use Patterns Across Cigarettes and Alternative Tobacco Products Among all Past 4-Month Tobacco Users ($n = 679$)

Product	Cigarettes $n = 332$ (48.9%)	LCCs $n = 198$ (29.2%)	SLT $n = 87$ (12.8%)	E-cigarettes $n = 204$ (30.0%)	Hookah $n = 245$ (36.1%)
Only	140 (42.2)	65 (32.8)	29 (33.3)	59 (28.9)	116 (47.3)
Cigarettes	—	77 (38.9)	36 (41.4)	106 (52.0)	70 (28.6)
LCCs	77 (23.2)	—	22 (25.3)	56 (27.5)	61 (24.9)
SLT	36 (10.8)	22 (11.1)	—	29 (14.2)	19 (7.8)
E-cigarettes	106 (31.9)	56 (28.3)	29 (33.3)	—	53 (21.6)
Hookah	70 (21.1)	61 (30.8)	19 (21.8)	53 (26.0)	—

LCC = little cigars/cigarillos; SLT = smokeless tobacco.

All use is within the past 30 days. Cell proportions indicate proportion of users represented by column header (eg, 23.2% of cigarette users are also LCC users).

^aIn the past 30 days.

Table 2. Binary Logistic Regression Examining Motives for Use in Relation to Polytabacco Use Versus Cigarette Only Use Among all Past 30-Day Cigarette Smokers (*n* = 332)

Variable	OR	CI	<i>p</i>
Sociodemographics			
Age	0.79	0.70, 0.90	<.001
Sex			
Male	Ref	—	—
Female	0.39	0.24, 0.65	<.001
Race/ethnicity			
White	Ref	—	—
Black	3.79	1.61, 8.91	.002
Hispanic	0.67	0.17, 2.68	.567
Asian	1.37	0.51, 3.72	.532
Other	1.26	0.58, 2.73	.557
Motives subscales			
Social	1.03	0.94, 1.13	.567
Self-enhancement	1.02	0.91, 1.15	.680
Boredom	1.19	1.05, 1.35	.007
Affect regulation	0.97	0.91, 1.02	.218

CI = confidence interval; OR = odds ratio.

Nagelkerke R^2 = 0.182.

Use Motives in Relation to Polytabacco Use in Cigarette Smokers

Logistic regression indicated that younger age (odds ratio [OR] = 0.79; confidence interval [CI] = 0.70, 0.90; $p < .001$), being male (OR = 0.39; CI = 0.24, 0.65; $p < .001$), being Black (OR = 3.79; CI = 1.61, 8.91; $p = .002$), and higher boredom relief motives (OR = 1.19; 95% CI = 1.05, 1.35; $p = .007$) predicted polytabacco use versus cigarette only use (Nagelkerke R^2 = 0.182; Table 2).

Use Motives in Relation to Levels of Consumption in Single Product Users

Among single product users, bivariate analyses indicated that levels of past month cigarette, SLT, and e-cigarette consumption were significantly correlated with all four of the motive scores (p values < .001, respectively). The level of hookah consumption had a negative association with affect regulation scores ($r = -0.13$, $p = .001$). LCC consumption was not associated with any of the motive scores.

Table 3 presents the results of five ordinary least squared regression models examining tobacco use motives in relation to past month use levels of cigarettes and ATPs, respectively, among single product users. Higher levels of cigarette consumption were associated with older age, being female, not being Black, and higher boredom relief and affect regulation motive scores. Higher levels of LCC consumption were associated with younger age, being Black, and higher affect regulation motives. Higher levels of SLT consumption were associated with being male, not being Asian, lower social motives subscale scores, and higher self-enhancement and boredom relief motives. Higher levels of e-cigarette use were associated with not being Black or Hispanic. Higher levels of hookah use were associated with being Black, being Asian, higher social and boredom relief motives, and lower self-enhancement and affect regulation motives.

Discussion

The current study documented important and novel findings regarding distinct motives for ATP and polytabacco use in young adults.

Among cigarette smokers, boredom relief as a motive for tobacco use predicted polytabacco use. Additionally, the motives for tobacco use differed among single tobacco product users across products. To our knowledge, this is the first study to examine these research questions.

Addressing our first aim, results indicated that, of four tobacco use motives, only boredom relief was a predictor of polytabacco use among cigarette smokers. This is a concern, given that polytabacco use may lead to higher levels of use over time and ultimately nicotine dependence. (Results not shown indicated that, among cigarette smokers in this sample, levels of e-cigarette and SLT use were positively associated with measures of nicotine dependence per the Hooked on Nicotine Checklist.³⁴) The college student population is known to engage in risky behaviors with many substances, such as drugs and alcohol among other things, and sensation seeking is highly correlated to substance use.^{35,36} Thus, these findings are consistent with prior research. Our findings may also reflect the lower perceived harm and addictiveness of ATPs and the higher perceived social acceptability of these products.¹⁵ College students who are both bored and have more positive perceptions of ATPs may be more likely to use multiple tobacco products.

Sociodemographic predictors of polytabacco use in our data reflect findings similar to those of previous studies conducted with college and adult populations, such that prevalence of polytabacco use declines with age and is substantially lower in females.^{2,9,37-39} The finding related to age may indicate that, as people age, they commit to the single use of conventional cigarettes. Another possible explanation for the significance of the age variable in this model is the age cohort effect of the students, as older students in this sample may not have been influenced to use ATPs given how recently ATPs emerged. Our data also indicated that only Blacks are more likely to be polytabacco users compared to Whites. Other studies have suggested that Whites have the highest odds or prevalence rates of polytabacco use.^{9,38} These variations may be attributable to geographic differences in study populations and substance use behaviors.

Addressing our second research aim, results indicated that tobacco use motives were distinct among single product users of the various tobacco products. The boredom relief and affect regulation motives were significantly correlated with consumption of cigarettes in the current sample. Findings from the original study from which the tobacco use motives scale was adapted indicated that boredom and affect regulation motives were correlated with smoking in males, but social and affect regulation motives were correlated with smoking in females.²⁸ Our analyses were not stratified by gender, as our primary research aims were focused on product user differences rather than sex differences in use motives. Future studies, with ample sample size, should be conducted to compare the differences in motives for using differing tobacco products between sexes.

Our findings reflect that the use of LCCs is similar to the use of cigarettes through the affect regulation motive dimension. However, due to the sole significance of the affect regulation motive, this indicates that LCC only use may be for specific coping purposes, in contrast to the use of cigarettes also serving as a source of stimulation when bored. A previous study has suggested that LCC users versus nonusers were more likely to have significant depressive symptoms and report higher levels of perceived stress.⁴⁰ As such, these findings suggest instrumental use of LCCs for affect regulation to address such psychological states. It is interesting to note that this association was not found in the bivariate results. It may be that accounting for effects of sociodemographic factors (eg, age and race) on levels

Table 3. Ordinary Least Squared Regression Models Examining Motives Scale Subscale Scores in Relation to Consumption Levels of Cigarettes, Little Cigars/Cigarillos (LCCs), Smokeless Tobacco (SLT), E-Cigarettes, and Hookah Only Among Single Users of Respective Tobacco Product

	Cigarettes (<i>n</i> = 140)			LCCs ^a (<i>n</i> = 65)			SLT ^a (<i>n</i> = 29)			E-cigarettes ^a (<i>n</i> = 59)			Hookah ^a (<i>n</i> = 116)		
	<i>B</i>	CI	<i>p</i>	<i>B</i>	CI	<i>p</i>	<i>B</i>	CI	<i>p</i>	<i>B</i>	CI	<i>p</i>	<i>B</i>	CI	<i>p</i>
Sociodemographics															
Age	0.72	0.17, 1.27	.011	-0.06	-0.09, -0.02	.001	0.01	-0.03, 0.05	.548	-0.04	-0.09, 0.01	.129	-0.01	-0.04, 0.03	.627
Sex															
Male	Ref	—	—	Ref	—	—	Ref	—	—	Ref	—	—	Ref	—	—
Female	4.46	2.14, 6.78	<.001	-0.06	-0.20, 0.08	.401	-0.47	-0.62, -0.31	<.001	-0.13	-0.34, 0.08	.222	0.13	-0.02, 0.27	.085
Race/ethnicity															
White	Ref	—	—	Ref	—	—	Ref	—	—	Ref	—	—	Ref	—	—
Black	-5.55	-8.19, -2.90	<.001	0.70	0.55, 0.86	<.001	-0.14	-0.32, 0.04	.118	-0.34	-0.59, -0.10	.005	0.31	0.15, 0.48	<.001
Hispanic	2.02	-4.36, 8.39	.534	-0.13	-0.51, 0.25	.515	-0.42	-0.84, 0.00	.052	0.69	0.10, 1.27	.021	-0.12	-0.52, 0.28	.556
Asian	0.06	-4.47, 4.58	.980	-0.14	-0.41, 0.13	.313	-0.41	-0.71, -0.11	.008	-0.36	-0.77, 0.06	.091	0.62	0.33, 0.90	<.001
Other	-2.52	-6.36, 1.33	.199	-0.01	-0.23, 0.23	.982	-0.12	-0.38, 0.13	.340	0.13	-0.22, 0.48	.460	0.13	-0.12, 0.37	.307
Motives subscales															
Social	-0.31	-0.75, 0.13	.172	0.01	-0.01, 0.04	.319	-0.05	-0.07, -0.02	.003	-0.02	-0.07, 0.02	.234	0.04	0.02, 0.07	.002
Self-enhancement	-0.36	-0.93, 0.21	.218	-0.01	-0.04, 0.03	.703	0.05	0.01, 0.08	.017	0.04	-0.02, 0.09	.186	-0.05	-0.09, -0.02	.004
Boredom	0.82	0.10, 1.54	.025	-0.02	-0.07, 0.01	.263	0.07	0.02, 0.11	.007	-0.01	-0.10, 0.04	.356	0.05	0.01, 0.09	.033
Affect regulation	0.91	0.63, 1.20	<.001	0.02	0.01, 0.04	.035	0.01	-0.01, 0.02	.651	0.01	-0.02, 0.03	.685	-0.03	-0.05, -0.01	.001
Model fit															
Adjusted R ²		0.237			0.186			0.184			0.050			0.150	

CI = confidence interval.

^aIndicates natural log transformation.

of use allowed the identification of the association between affect regulation and level of LCC use.

Regarding SLT, social motives were negatively associated with consumption, while self-enhancement and boredom relief motives were positively associated. These findings may be explained by the current trend and masculine identity of SLT use.^{41,42} SLT use has been found to be associated primarily with younger age, White race, living in rural areas, residence in the South, and low educational attainment.⁴³ As such, SLT users in this sample of college students may feel embarrassed to use SLT in front of peers but may still be using it as a method to maintain their self-perceptions of masculinity, resulting in the positive predictive values of the self-enhancement and boredom relief motives.

None of the tobacco use motive dimensions predicted the use of e-cigarettes in the regression model. Previous studies have found that the main reason for the use of e-cigarettes is either experimentation or for the purpose of quitting use of conventional cigarettes.^{43,44} One study found that nearly two-thirds of those who had used e-cigarettes later discontinued use.⁴³ Nearly half of the e-cigarette users who discontinued reported that they were only experimenting with the product. A significant percentage of our population was likely to be comprised of experimenters as well. These experimenters would not be particularly motivated toward a certain reason to use the product. Therefore, their levels of e-cigarette use would not be sensitive to the tobacco use motives utilized in our study.

All four of the tobacco use motives were significant predictors of hookah use. Interestingly, the self-enhancement and affect regulation motives were negatively associated. Hookah has been known to be used primarily for socialization, pleasure, and entertainment,⁴⁵⁻⁴⁷ and thus hookah use may be reflective of motivation to use socially or due to boredom. These findings confirm the prior literature and suggest that self-enhancement and affect regulation motives do not increase hookah consumption.

This study has important implications for research and practice. In terms of research, future studies on this topic require larger sample sizes in order to better detect differences in motives for use among ATP and polytobacco users. Moreover, further detailed information regarding polytobacco use is needed. Additionally, traditional tobacco use measures typically designed to address cigarette smoking must be examined in relation to their validity among ATP users. Future research should also target motivational factors in noncollege young adult populations. These populations, with less education, are at higher risk of substance use and will likely have different profiles.² In practice, public health professionals must address the specific ATP user profiles in relation to motives for use in intervention efforts.

Limitations

Limitations to this study include limited generalizability of the findings due to its recruitment from colleges and universities in the Southeast region of the United States. In addition, the sample sizes for the LCCs, SLT, and e-cigarette regression models were relatively small to detect statistical significance unless the effect sizes were large.⁴⁸ An additional limitation is the relatively low response rate (22.9%) through the E-mail recruitment method. Possible selection and/or response bias may have affected the data and the conclusions we were able to draw. However, the intent of the recruitment method was to target participants more engaged with E-mail, and subsequently more likely to be retained throughout the duration of the longitudinal study.

Conclusions

Use of ATPs and polytobacco use are associated with distinct motives for use. As such, current findings offer specific intervention targets among tobacco users, specifically addressing the risk for increased nicotine dependence resulting from polytobacco use, as well as addressing the motives that drive the use of ATPs.

Supplementary Material

Supplementary Table 1 can be found online at <http://www.ntn.oxfordjournals.org>

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Declaration of Interests

None declared.

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