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Perceived Harm of Tobacco Products and Individual Schemas of a Smoker in Relation to Change in Tobacco Product Use Over One Year Among Young Adults

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Abstract

Introduction—Given increases in nondaily smoking and alternative tobacco use among young adults, we examined the nature of change of various tobacco product use among college students over a year and predictors of use at one-year follow-up.

Methods—An online survey was administered to students at six Southeast colleges and universities (N = 4,840; response rate = 20.1%) in Fall 2010, with attempts to follow up in Fall 2011 with a random subsample of 2,000 participants (N = 718; response rate = 35.9%). Data were analyzed from 698 participants with complete data regarding tobacco, marijuana, and alcohol use over a one-year period, perceived harm of tobacco use, and schemas of a "smoker" (as per the Classifying a Smoker Scale).

Results—Baseline predictors of current smoking at follow-up included being White (p = .001), frequency of smoking (p < .001), alternative tobacco use (p < .001), and perceived harm of smoking (p = .02); marginally significant predictors included marijuana use (p = .06) and lower scores on the Classifying a Smoker Scale (p = .07). Baseline predictors of current smoking at follow-up among baseline nondaily smokers included more frequent smoking (p = .008); lower Classifying a Smoker Scale score was a marginally significant predictor (p = .06). Baseline predictors of alternative tobacco use at follow-up included being male (p = .007), frequency of smoking (p = .04), alternative tobacco use (p < .001), and frequency of alcohol use (p = .003); marginally significant predictors included marijuana use (p = .07) and lower perceived harm of smokeless tobacco (p = .06) and cigar products (p = .08).

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Conclusions—Tobacco control campaigns and interventions might target schemas of a smoker and perceived risks of using various tobacco products, even at low levels.

Keywords

smoking; tobacco use; youth; smoking cessation; tobacco control

Introduction

Tobacco use is the leading preventable cause of morbidity and mortality in the United States (Centers for Disease Control and Prevention [CDC], 2005a, 2005b; US Department of Health and Human Services [USDHHS], 2010). All forms of tobacco are addictive (USDHHS, 2004). Preventing initiation and promoting cessation of tobacco use among young adults is imperative (Orleans, 2007; Rigotti, Lee, & Wechsler, 2000; USDHHS, 2012).

An estimated 45.3 million people in the United States smoke cigarettes (CDC, 2011). Cigarettes have been the main source of tobacco consumption in young adults (Rigotti et al., 2000; Smith-Simone et al., 2008). Interestingly, smoking patterns have changed dramatically in recent years. Although the prevalence of daily smoking in the United States has declined to 17.5% (CDC, 2014), nondaily smoking (i.e., smoking on some days but not every day) is increasing (CDC, 2003), particularly among young adults (Carpenter et al., 2009; Pierce, White, & Messer, 2009; Schane, Glantz, & Ling, 2009a, 2009b; Substance Abuse and Mental Health Services Administration [SAMHSA], 2009; Wortley et al., 2003). Nondaily smoking may be a stable pattern or a transitory phase to or from daily smoking (Mello et al., 1980; Orlando et al., 2004; Tyas & Pederson, 1998; USDHHS, 1994, 2012).

Interestingly, over half of college students who smoke do not self-identify as smokers (Berg et al., 2009; Levinson et al., 2007), with nondaily smokers being most likely to deny being a smoker. These individuals are also less likely to perceive smoking as harmful to their health (Moran, Wechsler, & Rigotti, 2004). Moreover, various factors, such as frequency of smoking, time since smoking initiation, and whether one buys or borrows cigarettes, are used in different ways by young adults in their schemas of what constitutes a smoker (Berg et al., 2010). Thus, how young adults perceive what constitutes a smoker may have an impact on cigarette and alternative tobacco product use over time.

While young adult cigarette use has been extensively examined, less is known about the predictors of use of alternative tobacco products or the impact of alternative tobacco product use on smoking behavior. Alternative tobacco products, including cigar products, smokeless tobacco products, waterpipe or *hookah*, and electronic cigarettes, are becoming increasingly popular among college students (Etter, 2010; Knishkowy & Amitai, 2005; McMillen, Maduka, & Winickoff, 2012). From 1993 to 2006, small cigars were the fastest growing tobacco products in the market (USDA Economic Research Service, 2007), with unit sales of little cigars increasing from 37% to 47% and cigarillos increasing from 25% to 32%. In spite of small cigar growth, large cigar unit sales dropped from 37% to 22% (Kozlowski, Dollar, & Giovino, 2008). A 2010 national survey of US adults found that 5.1% had tried snus, 0.6% had tried dissolvables, 9% had tried hookah, and 2% had tried electronic

cigarettes (McMillen et al., 2012). Thus, predictors of use of alternative tobacco products and their consequences are an important research area.

Alternative tobacco products are marketed as safer alternatives to traditional cigarettes (Gray et al., 2005; Stepanov et al., 2008). These marketing efforts have been largely successful. Users of small cigars (Richter, Pederson, & O'Hegarty, 2006; Sterling et al., 2013), smokeless tobacco (Tomar, 2007; Tomar & Hatsukami, 2007), hookah (Braun et al., 2012; Eissenberg & Shihadeh, 2009; Primack et al., 2008), and electronic cigarettes (Pearson et al., 2011) believe the products they consume are less harmful than cigarettes. Moreover, electronic cigarettes have been marketed as both a cessation device and an alternative to cessation (Etter, 2010), regardless of little data (Bullen et al., 2013; Grana, Popova, & Ling, 2014; Popova & Ling, 2013) regarding the utility of electronic cigarettes in promoting cessation. These tobacco products have also been marketed for use where smoking is not allowed (Gartner et al., 2007), as smokeless tobacco, hookah, and electronic cigarettes are often not included in smoke-free policies. Finally, these products may especially appeal to youth due to their attractive packaging, flavoring, dissolvable delivery systems (McMillen et al., 2012), and social appeal (Klein, 2008; Martinasek, McDermott, & Martini, 2011; Smith et al., 2011).

In addition, alcohol and marijuana use are positively correlated with tobacco use, with those who smoke tobacco being more likely also use alcohol and marijuana (Harrison & McKee, 2008; Ramo & Prochaska, 2012). Thus, examining the rates of use of these substances in relation to the rates of use of tobacco products is relevant. Furthermore, these factors may also be important predictors of tobacco use.

Most tobacco use research among college students is cross-sectional. Therefore, transitions in tobacco use, particularly alternative tobacco product use, over time or predictors of various tobacco product use are not well understood. Thus, the current study investigated the: (1) frequency of change and nature of transition of cigarette use among college students over a one-year period; (2) past year use and likelihood of future use of alternative tobacco products among college students; and (3) predictors of cigarette consumption at a one-year follow-up among all participants, of continued smoking at one-year follow-up among nondaily smokers, and of alternative tobacco use at one-year follow-up among all participants. The main predictors of interest in the current study included socio-demographics, baseline tobacco, alcohol, and marijuana use, individual schemas regarding what constitutes a smoker (as per the Classifying a Smoker Scale; Berg et al., 2011a), and perceived harm of tobacco use.

Methods

Survey Participants and Procedures

In Fall 2010, students at six colleges in the Southeastern United States were recruited to complete an online survey (for more details, see Berg et al., 2011a). We recruited 24,055 students, yielding 4,849 responses (20.1% response rate), with complete data from 4,438 students. The participants were asked for permission to contact them for future research, but they were not given indication that a follow-up survey would be conducted subsequently (as

there was not a plan initially to conduct a follow-up survey). Then in Fall 2011 we randomly selected 2,000 participants of the 2010 survey and recruited them to participate in a follow-up survey (see Berg, 2014). Of the 2,000 students who received the invitation to participate, 718 (35.9%) returned a completed survey. The Emory University Institutional Review Board approved this study, IRB# 00030631.

Measures

Demographic Characteristics—We assessed students' age, gender, and race/ethnicity. Race/ethnicity was categorized as non-Hispanic White, non-Hispanic Black, and other due to the small proportion of participants reporting other races/ethnicities.

Tobacco Product Use—At both time points, we asked: "In the past 30 days, on how many days did you smoke a cigarette (even a puff)?" Using the American College Health Association (ACHA) and the SAMHSA (ACHA, 2009; Office of Applied Studies, 2006) definitions, we categorized students who reported no past 30-day cigarette use as nonsmokers, those who reported smoking from 1 to 29 days of the past 30 days as nondaily smokers, and those who reported smoking each of the past 30 days as daily smokers.

To assess alternative tobacco product use at both time points, participants were asked the following: "In the past 30 days, on how many days did you: smoke cigars (please do not include little cigars or cigarillos, such as Black and Milds, when answering this question)?, smoke little cigars (such as Black and Milds)?, smoke cigarillos (such as Swisher Sweets cigarillos)?, use chewing tobacco, snuff, or dip, such as Redman, Levi Garrett, Beechnut, Skoal, Skoal Bandits, or Copenhagen?, and smoke tobacco from a water pipe (hookah?" At follow-up, we also included electronic cigarettes in the assessment. These assessments were adopted from measures utilized by the ACHA surveys, National College Health Risk Behavior Survey (NCHRBS), and Youth Risk Behavior Survey (YRBS), and their reliability and validity have been documented by previous research (ACHA, 2008; CDC, 1997). These variables were dichotomized as "have used" versus "had not used these substances in the past month." In addition, an aggregate variable for alternative tobacco use was created.

At follow-up, we asked, "Which products have you used or tried in the past year: cigarettes; chewing tobacco, snuff, or dip; cigars; little cigars; cigarillos; tobacco from a waterpipe (also known as hookah); snus; electronic cigarettes." We also asked them to indicate which products they "have used or tried *for the first time* in the past year" from each of the aforementioned tobacco products. Finally, we asked, "How likely are you to use each of the following in the next year?" with response options of 1 = Definitely yes; 2 = Probably yes; 3 = Probably not; or 4 = Definitely not. We collapsed this data into two categories: likely (1 or 2) versus unlikely (3 or 4).

Alcohol and Marijuana Use—To gauge relative use compared with other substances, we also assessed the past 30-day use of alcohol and marijuana at each time point (ACHA, 2008; CDC, 1997). We analyzed alcohol use as a continuous variable given that less than half of the participants did not use alcohol (45.8%); we analyzed marijuana use as a categorical variable given that the vast majority did not use marijuana (75.2%). At follow-up, we also

asked the participants to indicate past year use and the first time use in the past year of alcohol and marijuana as well as likelihood of use in the upcoming year.

Classifying a Smoker Scale—At both time points, we administered the Classifying a Smoker Scale (Berg et al., 2011a), which is a 10-item scale based on qualitative data with young adult smokers (Berg et al., 2010) and theoretically based on schema theory (Bartlett, 1932). The participants were instructed to "On a scale of 1 to 7, indicate the extent to which you agree with the following statements" with anchors of 1 = strongly disagree, 4 = neutral, and 7 = strongly agree. The stem leading into each statement was "In order for me to consider someone a smoker…" with items covering a variety of criteria (e.g., smoke frequently, smoked for a long time, buy their own cigarettes). The scale is scored by summing the Likert responses to each item resulting in a total score (range 10 to 70). Higher scores indicated stricter criteria for defining a smoker. That is, a score of 70 suggests that only those who smoke most frequently, who have smoked for longer periods of time, who buy their own cigarettes, and so on are considered smokers. On the other hand, a score of 10 suggests that even infrequent smokers, with a more recent initiation of smoking, who may borrow the cigarettes they smoke, and so on may be considered smokers. In Fall 2010, Cronbach's alpha for the scale was 0.91; in Fall 2011, Cronbach's alpha for the scale was 0.92. Test-retest reliability among the Fall 2011 participants was 0.35 ($p < .001$).

Perceived Harm—In Fall 2010, participants were asked, "Do you believe there is any harm in having an occasional cigarette?" with response options of "yes" or "no" (Minnesota Department of Health, 2008). They were also asked, "Compared to cigarettes, how harmful is smokeless tobacco? cigars, cigarillos, and little cigars?" Response options were 0 = less harmful, 1 = equally harmful, or 2 = more harmful.

Data Analyses

Participant characteristics were summarized using descriptive statistics. We then examined changes in cigarette smoking behavior from Fall 2010 to Fall 2011. We also examined tobacco product, alcohol, and marijuana use in the past year, first time use in the past year, and likelihood of future use. Three logistic regression models were created to examine our predictors of interest (i.e., socio-demographics, baseline substance use, schema of a smoker, perceived harm) in relation to (1) current smoking status at follow-up among all participants; (2) continued smoking at follow-up among baseline nondaily smokers; and (3) current alternative tobacco product use at follow-up among all participants. We forced all predictors of interest into the models, with the exception of perceived harm of occasional smoking and perceived harm of smokeless tobacco and cigar products, which were entered into the respective models for predicting their use. SPSS 21.0 was used for all data analyses. Statistical significance was set at $\alpha = 0.05$ for all tests.

Results

Table 1 highlights participant characteristics of our sample. Current tobacco use (past 30 days) decreased slightly over one-year period, from 23.1% to 21.3%. Inversely, alternative tobacco use increased slightly over one-year period, from 21.9% to 23.4%.

Table 2 displays change in smoking status by smoker type over the one-year period. Smoking status remained most stable in nonsmokers (93.5%) followed by daily smokers (73.6%). Among nonsmokers who changed smoking status, 5.4% transitioned to nondaily and 1.1% transitioned to daily smoking. A proportion of daily smokers transitioned to nondaily smoking (15.1%) or nonsmoking (11.3%). The most significant change was observed among nondaily smokers, with 38.0% transitioning to nonsmoking and 8.3% converting to daily smoking.

Table 3 displays reports of past year use, first time use in the past year, and likelihood of next year use of alternative tobacco products. Past year use of tobacco products was highest for cigarettes (24.1%), followed by hookah (13.3%). The rate of first time use in the past year was comparable across types of tobacco products, with the highest rate for first time use of hookah (3.4%). The likelihood of using tobacco in the next year was highest for hookah (21.4%) followed by cigarettes (17.5%). Marijuana past year use and likelihood of use in the next year were relatively comparable, 21.5% and 20.6% respectively, with the rate of first time use in the past year being 2.9%. Similar statistics are presented for alcohol as a reference point: alcohol had the highest past year use at 64.7%, and 74.0% reported that they are likely to use alcohol in the next year, with the rate of first time use in the past year being 5.8%.

Table 4 includes the regression models indicating the predictors of (1) current cigarette smoking at follow-up for all participants; (2) current cigarette use at follow-up for baseline nondaily smokers; and (3) current alternative tobacco product use at follow-up among all participants. In the multivariate model predicting current smoking among all participants at follow-up, baseline predictors included being White ($p = .001$), number of days of smoking ($p < .001$), any alternative tobacco use ($p < .001$), and perceived harm of smoking ($p = .02$). Marginally significant predictors included marijuana use ($p = .06$) and lower scores on the Classifying a Smoker Scale ($p = .07$). Baseline predictors of current smoking at follow-up among baseline nondaily smokers included more frequent smoking ($p = .008$), with lower scores on the Classifying a Smoker Scale being a marginally significant predictor ($p = .06$). Among all participants, baseline predictors of current alternative tobacco use at follow-up included being male ($p = .007$), number of days of smoking ($p = .04$), alternative tobacco use ($p < .001$), and number of days of alcohol use ($p = .003$). Being a minority ($p = .06$), marijuana use ($p = .07$), lower perceived harm of smokeless tobacco ($p = .06$), and lower perceived harm of cigar products ($p = .08$) were also marginally significant baseline predictors of alternative tobacco product use at follow-up.

Discussion

The current research investigated the frequency of change and nature of transition of various tobacco product use among college students over a one-year period. In addition, we examined predictors of cigarette consumption and alternative tobacco product use at one-year follow-up among college students. The more novel findings included the instability of nondaily smoking status, the use rates and likelihood of future use of alternative tobacco products, and one's schema of a smoker and perceptions of harm of differing tobacco products in relation to risk for future tobacco use.

Nondaily smokers demonstrated the greatest instability in their smoking behavior over the one-year period. Overall, the vast majority of nonsmokers and daily smokers showed stable behavior, whereas roughly half of nondaily smokers showed stable smoking patterns. While 38.0% transitioned to nonsmoking, unfortunately 8.3% converted to daily smoking. Of nonsmokers and daily smokers, those that transitioned were most likely to transition to nondaily smoking. Another study of college students over a four-year period (Wetter et al., 2004) found that, among nondaily smokers, 14.4% progressed to daily smoking and 34.9% remained nondaily smokers. Among daily smokers, almost 60% continued to smoke on a daily basis with 28.2% reducing their smoking. These previous findings are somewhat consistent with our findings, highlighting the highly volatile nature of smoking patterns among young adults.

In terms of risk factors for smoking at follow-up, we found the anticipated associations between race/ethnicity such that being White was a predictor (CDC, 2011). Our examination of substance use identified interesting relationships. Smoking at follow-up among all the participants was associated with baseline smoking and alternative tobacco product use and marginally associated with marijuana use, as expected (Halperin, Smith, Heiligenstein, Brown, & Fleming, 2010; Harrison & McKee, 2008; Nichter et al., 2010; Ramo & Prochaska, 2012; Sutfin et al., 2009). However, baseline smoking level was the only substance use factor associated with smoking at follow-up among nondaily smokers. Interestingly, alcohol use was unrelated to smoking at follow-up in either model. Perhaps, the high prevalence of alcohol use does not suggest that this is a particularly high-risk behavior in terms of transition to cigarette use.

In addition, lower scores on the Classifying a Smoker Scale (reflecting a more inclusive definition of a smoker) were marginally associated with increased risk of smoking at follow-up among all participants and among baseline nondaily smokers. These findings add complexity to the cross-sectional research, indicating that nondaily smokers have the least inclusive definition of a smoker followed by daily smokers and then nonsmokers (Berg et al., 2011a). Perhaps, perceiving that a greater proportion of people fit into the category of “smoker” makes it easier to transition into smoking behavior. Furthermore, not perceiving there to be harm in occasional smoking was associated with smoking at follow-up among all participants, which highlights that this is an important intervention target in this study population (Halpern-Felsher et al., 2004; Tomar & Hatsukami, 2007). However, this finding did not hold true among baseline nondaily smokers. Perhaps, nondaily smokers' lack of identification of a smoker also dismisses whether the harm of occasional smoking impacts smoking behavior or quitting.

The most notable findings of the present study are in relation to the reported use and interest in use of alternative tobacco products. Past year use of tobacco products was highest for cigarettes, followed by hookah. Rate of first time use in the past year was comparable across types of tobacco products, with the highest rate of first time use of hookah. The likelihood of using tobacco in the next year was highest for hookah, followed by cigarettes. Interestingly, marijuana use in the past year and likelihood of use in the next year was high, comparable with the rates of cigarettes. This is contextually significant, given that marijuana is considered an illicit drug in Georgia (the setting of this study). This is important to note for

substance use researchers, as research has shown that use of certain tobacco products, particularly hookah and cigar products, is most highly associated with marijuana use (Enofe, Berg, & Nehl, 2014).

The use of alternative tobacco products has various concerns, including current smokers using these products as an alternative to cessation (Etter, 2010; Henningfield, Rose, & Giovino, 2002) or use of these products may lead to relapse among former smokers (McMillen et al., 2012). Nonsmokers, particularly young adults, who experiment with these products may become regular or addicted users (DiFranza & Wellman, 2005; Henningfield et al., 2002; Wetter et al., 2004) or polytobacco users (Berg et al., 2011b; Bombard et al., 2009; McMillen et al., 2012; Sterling et al., 2013; Wetter et al., 2004). This is important to note, given our multivariate findings that baseline cigarette use and alternative tobacco product use were the strongest predictors of cigarette smoking at one-year follow-up.

The multivariate regression indicated that participants who used an alternative form of tobacco at baseline were five times more likely to use an alternative tobacco product at follow-up. In addition, consistent with prior research (McMillen et al., 2012; Sterling et al., 2013), males were significantly more likely to use alternative tobacco products than females. Baseline cigarette, alternative tobacco product, and alcohol use was associated with risk of alternative tobacco use at follow-up. Other marginally significant risk factors included being a racial/ethnic minority and perceiving cigars and smokeless tobacco products to be less harmful than cigarettes. These latter marginal findings may be related to the lack of inclusion of measures related to other tobacco products. However, prior research has found that users of small cigars (Richter et al., 2006; Sterling et al., 2013), smokeless tobacco (Tomar, 2007; Tomar & Hatsukami, 2007), electronic cigarettes (Pearson et al., 2011), and hookah (Braun et al., 2012; Eissenberg & Shihadeh, 2009; Primack et al., 2008) believe that the products they consume are less harmful than cigarettes. Thus, perceived harm is clearly an important intervention target for curtailing the use of alternative tobacco products. In terms of the minority finding, this may be related to the pooling of alternative tobacco products. Whites are more likely to use hookah than Blacks (McMillen et al., 2012) whereas Blacks are more likely to use small cigars (Sterling et al., 2013).

These findings have important implications for research and practice. Researchers should examine the sequence of uptake of cigarettes, alternative tobacco products, and other substances over time as well as concurrent use. In addition, perceptions of harm of various product use, frequency of use, and concurrent use are important to examine. Finally, how schemas of a smoker function in relation to tobacco use warrants further examination. In practice, addressing perceptions of harm of tobacco products and assessing prior use of and future interest in using alternative tobacco products should be involved in clinical encounters, particularly with college students. Furthermore, policies around the use of alternative tobacco products should be increased, particularly given that many of these products are allowed in public places where smoking is not allowed and are not taxed like cigarettes have been.

Limitations

This study has some limitations. First, the survey sample was largely female and drawn from Southeast colleges. While our sample was reflective of age ranges, race/ethnicity, and other key socio-demographics of the college students at these schools, females were over-represented in this sample. Second, the survey response rates may seem low and might suggest responder bias. However, previous online research has yielded similar response rates (29–32%) among the general population (Kaplowitz, Hadlock, & Levine, 2004) and a wide range of response rates (17–52%) among college students (Crawford, McCabe, & Kurotsuchi Inkelas, 2008). Prior work has demonstrated that, in spite of lower response rates, internet surveys yield similar statistics regarding health behaviors compared with mail and phone surveys (An et al., 2007). Also, we did not anticipate following up the participants a year later and thus did not inform them of the follow-up survey during the initial 2010 survey; thus, we experienced relatively low retention. Relatedly, we had a small number of nondaily smokers in our final sample, which limited our statistical power for that regression model. Finally, our lack of inclusion of perceptions of harm of all tobacco products and the specificity of the Classifying a Smoker Scale to cigarettes limit our ability to fully understand the perceptions of students regarding the various tobacco products.

Conclusions

The present study provided information about perceived harm and schema of a smoker in reference to tobacco product use over time. We also documented great instability in cigarette use patterns, particularly among nondaily smokers, as well as high rates of use and interest in future use along an array of alternative tobacco products. Future research should further examine factors predicting the initiation and maintenance of tobacco use and other substances among college students. Lastly, the utility of targeting perceived harm and schemas of a smoker should be examined to prevent tobacco use initiation and maintenance.

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Glossary

Cigarettes	Flavored, hand-rolled, and traditional cigarettes
Cigar products	Clove cigars, large cigars, little cigars, and cigarillos
Combustible tobacco	Cigarettes and cigar products
Current tobacco use	Any use of tobacco in the past 30 days, including tobacco or any of the tobacco products
Daily smoking	Smoking every day in the past 30 days
Electronic cigarettes	Also known as a personal vaporizer (PV) or electronic nicotine delivery system (ENDS); a battery-powered vaporizer that generally uses a heating element known as an atomizer that vaporizes a liquid solution known as e-liquid
Hookah	A single or multi-stemmed instrument for vaporizing and smoking flavored tobacco called shisha, in which the vapor or smoke is passed through a water basin—often glass-based—before inhalation

Nondaily smoking	Smoking from 1 to 29 days of the past 30 days
Smokeless tobacco	Chew, snus, dissolvable tobacco products

Biographies

Carla J. Berg, PhD, is an assistant professor in the Department of Behavioral Sciences and Health Education, Emory University Rollins School of Public Health. She earned her PhD in clinical health psychology from the University of Kansas, completed her clinical residency in Behavioral Medicine at Harvard Medical School/Massachusetts General Hospital, and her postdoctoral fellowship at the University of Minnesota. Her research interests are tobacco control, young adult health promotion, marijuana use, health disparities, cancer prevention and survivorship, health communication, and the use of marketing strategies to influence health behaviors.

Devan Romero, DrPH, is a health behavioral change specialist with expertise in tobacco research. She is currently an assistant professor at California State University San Marcos. Devan received Bachelor of Science in exercise science from Barry University, Master's in Science in kinesiology from California State University Fullerton, and a Doctoral in Public Health from Loma Linda University with an emphasis on health education and promotion. Her research background is in survey development to measure tobacco use and specifically smoking behavior among young adults. In addition, she is interested in examining behavior of other types of tobacco use and health disparities.

Kim Pulvers, PhD, is a clinical health psychologist and associate professor at California State University San Marcos. Kim received her Master's in Public Health and PhD in Clinical Health Psychology from the University of Kansas and completed her postdoctoral fellowship at the University of California, San Diego. Kim's research focuses on how psychological factors impact health behavior change. Her areas of interest are disease prevention and health promotion; health disparities; nicotine and tobacco use and other addictive behaviors; stress and mental health; distress tolerance; and positive psychology.

Table 1

Participant characteristics, *N* = 698

Variable	*N* (%) or mean (SD)
Socio-demographic factors	
Age years (SD)	20.34 (2.78)
Gender (%)	
Males	138 (19.4)
Females	560 (78.8)
Ethnicity (%)	
Non-Hispanic White	279 (39.2)
Non-Hispanic Black	276 (38.8)
Other	143 (20.1)
Baseline past 30-day tobacco use	
Current cigarette use (%)	
No	537 (76.9)
Yes	161 (23.1)
Alternative tobacco use (%)	
No	555 (78.1)
Yes	133 (21.9)
Follow-up past 30-day tobacco use	
Current cigarette use (%)	
No	549 (78.7)
Yes	149 (21.3)
Alternative tobacco use (%)	
No	542 (76.2)
Yes	166 (23.4)
Baseline past 30-day other substance use	
Number of days of alcohol use (SD)	3.03 (4.63)
Marijuana use (%)	
No	535 (75.2)
Yes	176 (24.8)
Baseline psychological factors	
Classifying a Smoker Scale (SD)	39.84 (16.54)
Perceived harm of occasional cigarette (%)	
No	170 (24.4)
Yes	528 (75.6)
Perceived harm of smokeless tobacco vs. cigarettes (%)	
Less	91 (13.1)
Equal	494 (70.9)
More	112 (16.1)
Perceived harm of cigar products vs. cigarettes (%)	
Less	48 (6.9)

Variable	*N* (%) or mean (SD)
Equal	461 (66.6)
More	183 (26.4)

Table 2

Changes in cigarette smoking among young adults over a one-year period

	Fall 2011		
Fall 2010	**Nonsmoker**	**Nondaily smoker**	**Daily smoker**
Nonsmoker	502 (93.5%)	29 (5.4%)	6 (1.1%)
Nondaily smoker	41 (38.0%)	58 (53.7%)	9 (8.3%)
Daily smoker	6 (11.3%)	8 (15.1%)	39 (73.6%)

Note: Row totals equal 100%.

$\chi^2 = 534.46$, $p < .001$.

Table 3

Past year use, first time use, and likelihood of use of alternative tobacco products

Variable	Past year use *N* (%)	First time use in past year *N* (%)	Likely to use in the next year *N* (%)
	Tobacco products		
Cigarettes	176 (24.1)	16 (2.2)	121 (17.5)
Cigars	31 (4.3)	15 (2.1)	37 (5.8)
Little cigars	37 (5.1)	19 (2.6)	44 (6.9)
Cigarillos	63 (8.6)	19 (2.6)	51 (8.0)
E-cigarettes	25 (3.4)	20 (2.7)	24 (3.8)
Hookah	97 (13.3)	25 (3.4)	138 (21.4)
Chew	21 (2.9)	6 (0.8)	14 (2.1)
Snus	7 (1.0)	2 (0.3)	5 (0.8)
Marijuana	157 (21.5)	21 (2.9)	134 (20.6)
Alcohol	472 (64.7)	42 (5.8)	493 (74.0)

Table 4

Baseline predictors of current smoking and alternative tobacco product use at follow-up over a one-year period

	Current smoking						Alternative tobacco use		
	All participants			Baseline nondaily smokers*			All participants		
Variable	**OR**	**CI**	***p***	**OR**	**CI**	***p***	**OR**	**CI**	***p***
Age	1.05	0.95, 1.16	.38	0.99	0.82, 1.20	.91	0.92	0.83, 1.01	.07
Gender									
Male	Ref	–	–	Ref	–	–	Ref	–	–
Female	0.98	0.53, 1.80	.94	1.16	0.34, 3.96	.82	0.52	0.32, 0. 83	.007
Race/ethnicity									
White	Ref	–	–	Ref	–	–	Ref	–	–
Minority	0.40	0.20, 0.81	.001	0.37	0.10, 1.43	.15	1.60	0.98, 2.59	.06
Number of days smoking	1.15	1.11, 1.20	<.001	1.12	1.03, 1.21	.008	1.03	1.01, 1.05	.04
Alternative tobacco use	3.17	1.77, 5.67	<.001	1.81	0.61, 5.37	.29	5.63	3.50, 9.03	<.001
Number of days alcohol use	1.04	0.99, 1.10	.11	0.96	0.88, 1.04	.32	1.07	1.03, 1.12	.003
Marijuana use	1.82	0.99, 3.39	.06	0.84	0.33, 2.78	.93	1.63	0.96, 0.78	.07
Classifying a Smoker Scale	0.98	0.97, 1.00	.07	0.97	0.94, 1.00	.06	0.99	0.98, 1.01	.71
Harm of occasional smoking	0.53	0.31, 0.89	.02	0.76	0.28, 2.08	.60	–	–	–
Harm of smokeless tobacco	–	–	–	–	–	–	0.70	0.46, 1.01	.06
Harm of cigar products	–	–	–	–	–	–	0.81	0.62, 1.02	.08

Notes: Nagelkerke R^2 = 0.518; Nagelkerke R^2 = 0.235; Nagelkerke R^2 = 0.278 respectively.

*N = 108.