DECOY: <u>D</u>ocumenting <u>E</u>xperiences with <u>C</u>igarettes and <u>O</u>ther Tobacco in <u>Y</u>oung Adults

Carla J. Berg, PhD,

Associate Professor, Department of Behavioral Sciences and Health Education, Rollins School of Public Health, Emory University, Atlanta, GA

Regine Haardörfer, PhD,

Research Assistant Professor, Department of Behavioral Sciences and Health Education, Rollins School of Public Health, Emory University, Atlanta, GA

Michael Lewis, PhD,

Associate Professor, Department of Marketing, Goizueta Business School, Emory University, Atlanta, GA

Betelihem Getachew, MPH,

Project Coordinator, Department of Behavioral Sciences and Health Education, Rollins School of Public Health, Emory University, Atlanta, GA

Steven A. Lloyd, PhD,

Professor and Chair, Department of Psychological Science, University of North Georgia, Dahlonega, GA

Sarah Fretti Thomas, MS,

Instructor, Department of Exercise Physiology, Valdosta State University, Valdosta, GA

Angela Lanier, EdD,

Associate Professor and Chair, Department of Kinesiology, Berry College, Mount Berry, GA

Kelleigh Trepanier, MS,

Assistant Director, Burruss Institute, Kennesaw State University, Kennesaw, GA

Teresa Johnston, MA,

Director, Center for Young Adult Addiction and Recovery, Kennesaw State University, Kennesaw, GA

Linda Grimsley, PhD,

Associate Vice President for Academic Affairs, Professor, Department of Nursing, Albany State University, Albany, GA

Bruce Foster, PhD,

Correspondence: Dr Berg; cjberg@emory.edu.

Human Subjects Statement

This study was approved by the Institutional Review Boards of Emory University, ICF Macro International, Albany State University, Berry College, University of North Georgia, and Valdosta State University.

Statement Conflict of Interest

The authors declare no conflicts of interest.

Executive Director, Campus Life, Central Georgia Technical College, Warner Robins, GA

Stephanie Benson, MEd,
Vice President for Adult Education, Athens Technical College, Athens, GA

Alicia Smith, PhD,
Associate Professor, Department of Psychiatry and Behavioral Sciences, School of Medicine, Atlanta, GA

Dana Boyd Barr, PhD, and
Department of Environmental Health, Emory University School of Public Health, Atlanta, GA

Michael Windle, PhD
Professor, Department of Behavioral Sciences and Health Education, Rollins School of Public Health, Emory University, Atlanta, GA

Abstract

Objectives—We examined psychographic characteristics associated with tobacco use among Project DECOY participants.

Methods—Project DECOY is a 2-year longitudinal mixed-methods study examining risk for tobacco use among 3418 young adults across 7 Georgia colleges/universities. Baseline measures included sociodemographics, tobacco use, and psychographics using the Values, Attitudes, and Lifestyle Scale. Bivariate and multivariable analyses were conducted to identify correlates of tobacco use.

Results—Past 30-day use prevalence was: 13.3% cigarettes; 11.3% little cigars/cigarillos (LCCs); 3.6% smokeless tobacco; 10.9% e-cigarettes; and 12.2% hookah. Controlling for sociodemographics, correlates of cigarette use included greater novelty seeking (p < .001) and intellectual curiosity (p = .010) and less interest in tangible creation (p = .002) and social conservatism (p < .001). Correlates of LCC use included greater novelty seeking (p < .001) and greater fashion orientation (p = .007). Correlates of smokeless tobacco use included greater novelty seeking (p = .006) and less intellectual curiosity (p < .001). Correlates of e-cigarette use included greater novelty seeking (p < .001) and less social conservatism (p = .002). Correlates of hookah use included greater novelty seeking (p < .001), fashion orientation (p = .044), and self-focused thinking (p = .002), and less social conservatism (p < .001).

Conclusions—Psychographic characteristics distinguish users of different tobacco products.

Keywords

tobacco use; young adults; alternative tobacco; risk factors

In recent years, little cigars and cigarillos (LCCs), snus, dissolvable tobacco products, and electronic nicotine delivery systems or "e-cigarettes" have been introduced to the tobacco market in the United States (US), and the use of waterpipes or hookahs have increased in popularity.[1–7] Alternative tobacco products are marketed by the tobacco industry as safer alternatives to traditional cigarettes.[8,9] Accordingly, users of LCCs,[10,11] smokeless tobacco,[12,13] e-cigarettes,[14] and hookah[15–17] believe the products they use are less harmful

than cigarettes. Whereas some of these products might be less harmful than cigarettes,[1,8,9] others may have similar or greater risk than cigarettes if used at a similar rate.[19] However, abstinence from all of these products is safer than any level of use.[20] Other concerns include current smokers using these products as an alternative to cessation[2,21] or use of these products leading to relapse among former smokers.[4] Moreover, nonsmokers, particularly young adults who experiment with these products, may become regular or addicted users[21–23] or polytobacco users.[4,10,23–25] A related concern is that these products may have special appeal to young adults due to the marketing strategies used to promote them, such as attractive packaging, flavoring, dissolvable delivery systems,[4] and social appeal.[26–28]

Young Adults as a High-risk Population

Little is known about the epidemiology of alternative tobacco product use among young adults. Young adults are at the greatest risk for using alternative tobacco products,[4] undoubtedly due to continued tobacco industry efforts to exploit them based on psychosocial characteristics (eg, sensation seeking).[29,30] Over 18 million students, mostly young adults, are enrolled in colleges and universities in the US.[31] Young adulthood, particularly the transition to college, is a critical period for engaging in many health-compromising behaviors, including tobacco use[32,33] and alcohol use.[34,35] Roughly 87% of first use of cigarettes occurs by age 18 years, with nearly all first use by 26 years of age.[36] Longitudinal research has found that most individuals who use tobacco in adolescence and into young adulthood become regular users.[20,37,38]

Project DECOY

The current study analyzes baseline data from a large-scale longitudinal study entitled "Project DECOY – **D**ocumenting **E**xperiences with **C**igarettes and **O**ther Tobacco in **Y**oung Adults." The major goals of the project are to: (1) identify market segments of young adults attending colleges/universities in Georgia based on their psychographic profiles using market research methods; (2) examine the longitudinal epidemiology of tobacco use among these market segments over a 2-year period, including the sequencing of tobacco product use change and changes in psychosocial sequelae; and (3) investigate reasons for use of alternative tobacco and how best to frame messages to alter attitudes about these products among users representing different segments. We address the first major goal related to the identification of dimensions to be used for psychographic profiles to be examined in relation to use of alternative tobacco products. To address this goal, we use cross-sectional data from the baseline survey.

Diffusion of Innovation Theory (DOI)[39] suggests that a population can be broken down into 5 different segments based on their propensity to adopt an innovation: innovators (roughly 2.5% of the population); early adopters (13.5%); early majority adopters (34%); late majority adopters (34%); and laggards (16%). The current study hypothesizes that using market research tactics allows us to identify young adult innovators and early adopters of different tobacco products using psychographic factors (ie, lifestyle, attitudes, goals, values, preferred activities).[40,41]

Little public health research has used psychographic profiling to segment young adults. Traditionally, public health has focused on demographics (eg, race, sex, age) as the major way of segmenting the population. The shortcoming of this approach is that, even though individuals in a demographic category share some characteristics, there is great variability in psychographics (eg, values, goals, beliefs) and motivations for a behavior. Marketing campaigns, such as those developed by the tobacco industry,[42–45] are based on market research, which divides a population by psychographic characteristics into market segments, or groups of consumers, who respond similarly to marketing messages or engage in similar consumer behaviors.[29,43,46,47] This psychographic research is used to develop new marketing messages and strategies.[48–50]

The "Values, Attitudes and Lifestyles" (VALS) scale[51] is a proprietary assessment based on several large national surveys of consumer opinion that examines individual attitudes, needs, wants, beliefs, and demographics.[51] This scale was selected for this study because it is one of only a few instruments that has been used widely in industry and has a robust research base correlating the traits identified with consumer preferences about products, activities, and media.[52] The VALS classifies people into 8 segments (ie, innovators, thinkers, believers, achievers, strivers, experiencers, makers, survivors) based on interests and motivations per the VALS items (Table 1). Public health has not segmented the population, including the young adult population, using such an approach; indeed, the utility of the VALS in determining meaningful segments of young adults, particularly in relation to their tobacco use behaviors, has not been examined. This is compelling given the diversification of tobacco products on the market and the range of advertising strategies used to promote them.

Aims of the Current Analyses

Our aims in this paper are 2-fold. First, we aim to describe our research strategy and our baseline sample. Second, borrowing from our prior research[41,53] and leveraging the VALS as a unique way to characterized young adults, the current analyses aim to identify meaningful factors within the VALS that ultimately could be used to determine market segments of young adults with distinct tobacco use behaviors. Specifically, we examine the factor structure of the VALS within our sample and identify sociodemographic and psychographic factors associated with the use of the range of diverse tobacco products.

METHODS

Study Design

The current study uses a sequential mixed-methods research design,[54] specifically an explanatory design (ie, quantitative research preceding qualitative research)[54] to obtain longitudinal quantitative data regarding tobacco use that can inform in-depth assessment of these behaviors and related attitudes. We are conducting a 2-year longitudinal cohort study involving 3418 racially/ethnically diverse young adults attending 7 Georgia colleges or universities. Data collection began in Fall 2014 and consists of individual assessments every 4 months for 2 years (during Fall, Spring, and Summer). The frequency of the assessments was guided by our prior research indicating significant changes in tobacco use patterns over a one-year period.[55] Our prior focus group data[56] also indicated that seasonal factors,

particularly those related to changes within and beyond the academic year and during the summer months (eg, changes in living arrangements, stress),[56] influence tobacco use. Thus, the chosen assessment schedule provides comprehensive 6-wave data and sufficient statistical power to investigate change in tobacco use over time.

Participants

The primary sampling frame includes 7 Georgia campuses, including 2 public universities, 2 private colleges/universities, 2 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. Supplementary Table 1 provides a summary of each college and university included. We established a Community Advisory Board (CAB) consisting of key contacts at each campus. The CAB plays an active role in implementing all research phases. CAB members obtained directory information (eg, email addresses) of potential participants, assisted in recruitment, promoted the study with flyers on campus and postings on campus websites, and facilitated retention. Inclusion criteria for participants were being: (1) age 18 and 25 (to include the broad range of young adult ages but reduce overall age variability); and (2) able to read English.

Sampling and Recruitment

Figure 1 provides a participant flowchart. College email addresses were obtained from the registrar's office from each college or university for students meeting eligibility criteria. Three thousand 18–25 year olds were selected randomly from one private and 2 public universities. The remainder of the schools had 18–25 year-old student populations of less 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. Enrollment was staggered, starting at the 2 technical colleges, where recruitment lasted one week. Recruitment at the remainder of the schools lasted 48 to 72 hours, at which point we had reached our recruitment goals. Thus, our total response rate of 22.9% (N=3574/15,607), albeit low, was over a short time frame 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 email sent to them. The email 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 email. The confirmation rate was 95.6% (N=3418/3574). Our intent was to enroll participants who were engaged in email and were potentially more likely to be retained in the subsequent waves of data collection.

Retention

For the longitudinal component of this study, several retention efforts are in use: (1) obtaining Facebook account information and alternate email addresses; (2) providing

participants with a telephone number and email address to report changes of contact information; (3) obtaining names and telephone numbers of a collateral (eg, parents) likely to know their whereabouts; and (4) small gifts with the Project DECOY website, Facebook page, and Twitter account to facilitate engagement. We also send text messages to all participants one month prior to each assessment using Trumpia (DoCircle, Inc., Anaheim, California), a mass text messaging service, notifying them that the next survey is due shortly and asking them to provide updates to their email addresses. During each assessment, participants are given the opportunity to update contact information. We also employ a graduated compensation schedule ($30 for the first 2 assessments, $40 for the second 2, $50 for the final 2), with an additional $100 incentive for participating in all assessments. For Waves 2 to 6, participants receive an initial email via their preferred email address 4 months after the completion of the prior assessment. Email prompts every 3 days for the next 18 days are delivered, allowing participants approximately 3 weeks to complete each survey. We estimated roughly 80% retention across waves of assessment, yielding a sample size of 1200 with complete data at the end of the 2-year period. Waves 2 and 3 of data collection are complete to date, yielding retention rates of 86.9% (N = 2969) and 83.9% (N = 2867) respectively.

Measures

The baseline survey assessed a range of factors including sociodemographics, tobacco and other substance use behaviors, psychosocial factors (eg, depressive symptoms), sociocontextual factors (eg, parent and friend use of substances), and other important participant characteristics. Current analyses focus on essential sociodemographics, tobacco use data, and the most novel of characteristics assessed in this study – the psychographic factors. These specific variables are described below.

Sociodemographics—We assessed a range of sociodemographic factors as well as some college student specific measures. For the current analyses, we included age, sex, race, and ethnicity. We also include the type of college or university attended.

Tobacco use—We asked: "How many days of the past 30 days 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 wa-terpipe?"[57]

Market research measures—The most novel of our measures is the "Values, Attitudes and Lifestyles" (VALS),[51] which is our foundational assessment for defining the market segments among young adult college students (see introduction for additional information on the measure). Table 1 presents includes specific items and results from our exploratory factor analysis. We used a PRO-MAX rotation (an oblique rotation), which was selected because we assumed that some of the factors identified within the VALS items may be correlated. Factors were selected based on the scree plot and eigenvalues greater than one.

This analysis identified 9 factors that accounted for 56.44% of total variance. The 9 factors were labeled based on the thematic content of items loading on each factor: novelty seeking, fashion orientation, tangible creation, social conservatism, intellectual curiosity, feelings of competency, self-focused thinking, narrowed interests, and mechanical interests. Cronbach's alpha for items loading onto each factor ranged from .61 (narrowed interests) to .89 (fashion orientation).

Data Analysis

We focus the analysis on describing our baseline sample in terms of sociodemographics, tobacco use behaviors, and our key novel predictor of interest – the VALS. First, we present the results of a factor analysis of the VALS. Then, we present past 30-day tobacco use prevalence data for each tobacco product (ie, cigarettes, LCCs, smokeless tobacco, e-cigarettes, hookah) across key sociodemographic characteristics and campus types as well as in relation to VALS factors. Specifically, chi-square tests are used to examine tobacco use prevalence in relation to categorical variables, and ANOVAs are used to examine the relationship between tobacco use and continuous variables (eg, VALS factor scores). Finally, we present the results of multivariable regression models using forced entry to identify correlates of use of each of the tobacco products. All analyses are based on SPSS 21.0.

RESULTS

Table 2 presents characteristics of the study sample and bivariate analyses regarding tobacco use across key sociodemographic groups and campus types. In terms of tobacco use prevalence over the past 30 days, 13.3% (N = 455) used cigarettes, 11.3% (N = 385) LCCs, 3.6% (N = 123) smokeless tobacco, 10.9% (N = 416) e-cigarettes, and 12.2% (N = 416) hookah. The average numbers of days of use among users of each product were: 12.51 (SD = 11.62) for cigarettes; 5.02 (SD = 6.84) for LCCs; 14.28 (SD = 11.81) for smokeless tobacco; 6.95 (SD = 8.81) for e-cigarettes; and 2.85 (SD = 4.31) for hookah. Moreover, 62.7% used more than one tobacco product in the past 30 days, with 29.6% of tobacco users using 2, 21.9% using 3, and 11.1% using 4 or 5.

Table 3 presents the results of the bivariate analyses examining the VALS factors in relation to use of the various tobacco products. In multivariable analyses including age, sex, ethnicity, race, and type of school (Table 4), significant of correlates of cigarette use included being male (p < .001), not being black (p's < .01), and attending a technical school (p < .001) versus a private school, as well as being a seeker of greater novelty (p < .001), having lower tangible creation interests (p = .002), being less socially conservative thinking (p < .001), and having greater intellectual curiosity (p = .010). Correlates of LCC use included being younger (p = .025), being male (p = .004), being non-Hispanic (p = .005), being black (p's < .01), and attending a public university, technical college, or a historically black university (p's .001), as well as being a seeker of greater novelty (p < .001) and having a greater fashion orientation (p = .007). Correlates of smokeless tobacco use included being male (p < .001), being white (p = .001), and attending a technical college (p = .018), as well as being a seeker of greater novelty (p = .006) and having less intellectual curiosity (p < .001). Correlates of e-cigarette use included being male (p < .001), not being black (p's

< .05), and attending a technical college (p < .001), as well as being a seeker of greater novelty (p < .001) and being less socially conservative thinking (p = .002). Correlates of hookah use included being male (p = .006), being black (p = .001) and attending a public school or historically black university (p's   .001), as well as being a seeker of greater novelty (p < .001), having a greater fashion orientation (p = .044), being less socially conservative thinking (p < .001), and having more self-focused thinking (p = .002).

DISCUSSION

We describe Project DECOY's research approach and baseline study sample with a specific focus on the most novel component of our study – the use of an industry measure to assess consumer characteristics. Our analyses of our key predictor of interests – psychographic characteristics derived from the VALS – yield interesting findings. First, it is important to note that the factors that were gleaned from our exploratory factor analysis were distinct from what the VALS segmentation would suggest (ie, innovators, thinkers, believers, achievers, strivers, experiencers, makers, survivors). This may be due to the relative homogeneity in our sample; that is, our sample was aged 18–25 attending some type of higher educational institution, with a higher proportion being women. As such, the factor structure may be different in this sample. The next steps in this line of research are to use the factors identified here to determine segments, particularly those representing the innovators and early adopters of specific tobacco products, based on these factors and to examine these segments in relation to tobacco use over time in the context of this longitudinal study.

Regarding the association of these factors with tobacco use, novelty seeking was associated with the use of the range of each of the tobacco products, which is consistent with research regarding sensation seeking and tobacco use.[53,58] This is reasonable, given the novelty seeking nature of innovators and early adopters. Additionally, fashion orientation was associated with use of LCCs and hookah; however, this factor was not associated with the use of other tobacco products. This may be a result of the way these products have been marketed to date. These tobacco products have been particularly marketed for use in social settings or shared in a social network, as more fashionable than cigarettes, and also come in a range of flavors that might appeal to "fashion oriented" individuals.[59–61] was that Another general finding less socially conservative thinking was associated with the use of cigarettes, e-cigarettes, and hookah. Whereas these findings might be intuitive, this has not been documented previously. However, measures of the "Big 5 Personality Traits"[62] demonstrate that a potentially related construct – openness to new experiences – is associated with greater likelihood of using a range of substances.[53] One study found that young adults who felt that adulthood was a time of experimentation were more likely to report e-cigarette use; in addition, reporting more role transitions (eg, relational, occupational) and other hallmark experiences were associated with e-cigarette use.[63] Interestingly, intellectual curiosity was only associated with higher likelihood of cigarette use. Additionally, there was an association between lower intellectual curiosity and smokeless tobacco use. This may reflect the fact that smokeless tobacco users are particularly more likely to come from lower socioeconomic backgrounds and obtain lower education levels on average.[64,65]

Regarding sociodemographic correlates of use of the range of traditional and alternative tobacco products, we documented higher prevalence of tobacco use behavior across most tobacco products among men versus women, consistent with prior research.[66–68] The difference in LCC use by sex was not statistically significant, which warrants further examination. In terms of racial/ethnic groups, consistent with prior research, we documented higher use of cigarettes and smokeless tobacco among Whites,[67,68] and higher use of LCCs among Blacks.[10] Interestingly, in our sample, we documented a high prevalence of hookah use among all racial and ethnic minorities, with Whites reporting the lowest prevalence, which somewhat contradicts other literature showing higher prevalence of hookah use among Whites, Asians, and Hispanics.[4,69,70] In our sample, we also found the highest rates of e-cigarette use among Whites, other races, and Hispanics, somewhat contradictory to prior research showing the highest e-cigarette use rates among Hispanics and other races/ ethnicities.[71] However, there is also a documented increase in e-cigarette use among Whites in recent years.[72]

In terms of our research methods, we used a novel online recruitment approach and run-in period to recruit participants to this mixed-methods longitudinal cohort study. This approach was effective in reaching our intended sample size of over 3400 young adults. We were able to obtain a relatively racially and ethnically diverse sample, which is critical given the distinct tobacco use profiles among these subgroups.[66–68] Whereas we have a smaller proportion of men versus women, this will allow us to examine tobacco use behaviors and transitions in behaviors among women, given the lower prevalence of tobacco use within this subgroup.[66–68]

Current findings have implications for future research and practice. We found that a widely used industry assessment aimed at characterizing different segments of consumers may have utility in differentiating the users of the various tobacco products. Analyses of psychographic characteristics often used by industry marketing suggest that differing characteristics might distinguish users of the range of tobacco products and potentially indicate anticipated targets and channels for marketing in the tobacco industry. Likewise, this approach might inform anti-tobacco messaging and channels for disseminating messaging. Tobacco use prevention campaigns and messaging should target the psychographic characteristics of those at risk for using these distinct tobacco products. For example, novelty seeking could be targeted by portraying images regarding how tobacco-related illnesses and diseases can impede activity. Another example is exploiting potential stigma regarding the use of all tobacco products (including LCCs and hookah) to address fashion orientation. Given that less socially conservative thinking was associated with the use of cigarettes, e-cigarettes, and hookah, intervention strategies might highlight rebelling against the manipulative tobacco industry as a way to be liberal or progressive.

Moreover, these findings might inform our regulatory efforts regarding how and where the tobacco industry can market its products and the types of messages the tobacco industry is allowed to use in its marketing strategies. Finally, research should aim to more assess and understand more fully the types of contextual factors that interplay with individual risk factors, potentially identifying policy and systems change that might aid in protecting at-risk young adults.

Limitations

First, the study sample, drawn from colleges and universities in Georgia, is subject to selection bias; thus, it may not generalize to all young adults, particularly those not enrolled in post-secondary education. Of note, this sample does have a slightly higher representation of women than expected. However, given that tobacco use is less prevalent among women, the larger proportion of women may allow us to examine tobacco use, initiation, and trajectories over the course of the study given the larger N. However, our sample is diverse in terms of race/ethnicity, geographic location (urban vs rural), and socioeconomic backgrounds. Our recruitment approach, although intended to provide us with a highly engaged sample, also resulted in a low response rate, which might suggest lack of representativeness; specifically, it is possible that our actual sample may have less tobacco use than among non-responders. Additionally, there is the potential for response bias given the self-report nature of the online survey assessments. Finally, not all theoretically or empirically-supported correlates of tobacco use were included in the current analyses. These analyses were aimed at examining the utility of the VALS in differentiating users of the various tobacco products. Subsequent analyses will provide more detailed multilevel predictors of tobacco use in this study, referencing this manuscript which provides detail regarding the methods used to conduct recruitment and retention of study participants and the general conceptual framework guiding this study.

Conclusions

We identified distinct sociodemographic and psychographic characteristics related to the use of various tobacco products. Thus, the use of psychographics to characterize young adults demonstrates promise in terms of identifying those at greatest risk for using the range of traditional and alternative tobacco products. Moreover, our recruitment approach using online methods, retention, and surveys was successful in obtaining an appropriate study sample that will address the aims of the parent study.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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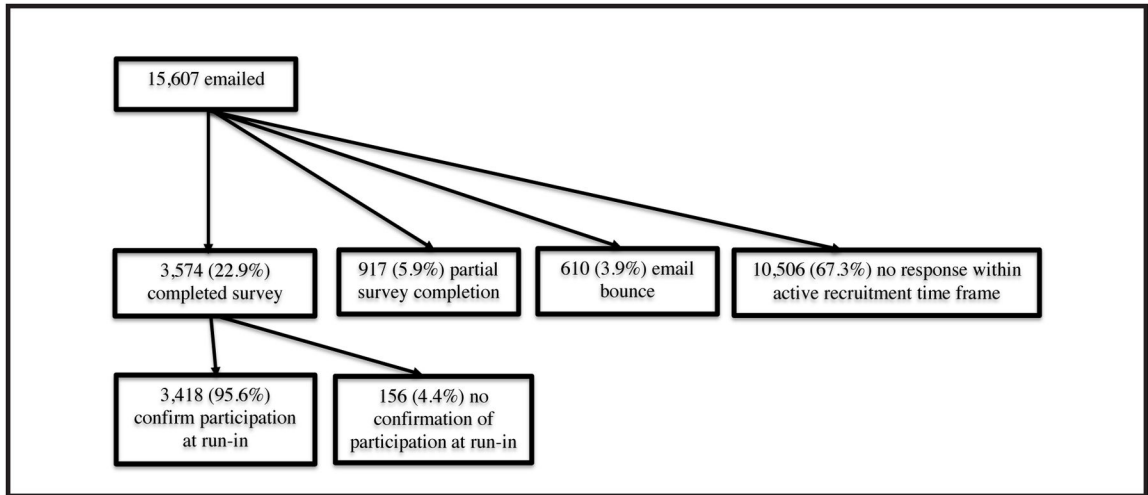
Figure 1.
Participant Flowchart

Table 1

VALS Factors, Items, and Internal Consistency

Factor	Items	1	2	3	4	5	6	7	8	9
	I like a lot of excitement in my life	.807	.055	.010	.021	−.081	.033	.079	.028	−.039
	I often crave excitement	.762	.048	.027	.039	−.037	.042	.071	.121	−.032
	I am always looking for a thrill	.740	.006	−.031	−.010	−.109	−.057	.219	.078	.185
	I like doing things that are new and different	.716	−.036	−.009	.027	.066	.052	−.084	−.082	.067
Novelty seeking	I like a lot of variety in my life	.662	.029	.018	.033	.106	−.085	.079	−.071	−.046
	I like trying new things	.646	−.002	.010	.022	.072	.079	−.128	−.127	.020
	I like outrageous people and things	.521	−.065	−.046	.002	.169	−.218	.354	.065	.028
	I like the challenge of doing something I've never done before	.515	−.048	.070	.001	.061	.262	−.263	−.036	.117
	It is important to have fun at this stage of my life	.509	−.020	.018	−.110	−.017	−.058	.113	.012	−.203
	I like people who make me look at things in new ways	.456	−.060	.000	−.036	.351	.015	−.086	.000	−.172
	I like to dress in the latest fashions	.036	.908	−.003	.008	−.016	−.013	−.023	−.001	−.003
Fashion orientation	I want to be considered fashionable	−.019	.863	.064	−.029	.056	−.028	.046	−.008	−.050
	I follow the latest trends and fashions	.035	.862	.024	−.006	−.059	−.024	−.039	.009	−.032
	I dress more fashionably than most people	−.051	.840	−.008	−.018	.074	.080	.030	−.029	.066
	I like to make things with my hands	.032	.022	.771	−.006	.006	−.005	−.060	−.089	.225
Tangible creation	I would rather make something than buy it	−.008	−.038	.749	.057	.010	−.001	−.043	.030	.081
	I love to make things I can use every day	.056	.123	.729	.026	.040	.017	−.055	−.004	.015
	I like making things of wood, metal, or other such material	−.039	−.027	.634	−.052	−.026	−.015	.100	−.015	.491
	My religion or spirituality is very important to me	−.019	−.046	−.004	.860	.083	−.001	.083	−.084	−.079
	Just as the Bible says, the world literally was created in 6 days	.084	.033	−.031	.767	−.140	.020	−.023	.046	−.006
Social conservatism	The federal government should encourage prayers in public schools	.061	.024	−.017	.766	−.176	.000	−.019	.020	.052
	There is too much sex on television today	−.108	−.060	.081	.723	.216	−.003	.008	.076	−.113
	A woman's life is fulfilled only if she can provide a happy home	.099	.168	−.009	.359	−.172	−.080	.020	.162	.134
	I like to learn about art, culture, and history	−.031	.107	.105	.134	.705	.020	.001	−.053	−.141
Intellectual curiosity	I am often interested in theories	−.004	−.056	−.061	−.017	.689	−.015	.100	.029	.152
	I would like to understand more about how the universe works	−.004	−.055	.014	−.038	.655	−.055	.075	.016	.298

Factor	Items	1	2	3	4	5	6	7	8	9
	I like to learn about things even if they may never be of use to me	.112	−.010	.053	.034	.506	.046	−.152	−.063	.168
	I am politically much more liberal than most people	−.002	.129	−.075	−.239	.474	−.101	.165	.073	−.063
	I would like to spend a year or more in a foreign country	.266	−.005	.112	−.035	.428	.114	.011	.089	−.212
	I like to lead others	.035	−.046	.109	.040	−.077	.839	.146	.018	−.092
	I like being in charge of a group	−.054	−.032	.120	−.019	−.095	.838	.206	.019	−.063
Feelings of competency	I consider myself an intellectual	.027	.063	−.147	−.030	.261	.517	−.168	.031	.120
	I have more ability than most people	.007	.108	−.213	−.023	.060	.501	.018	.017	.351
	I have more self-confidence than most of my friends	.002	−.002	−.117	.088	.013	.309	.185	−.104	.160
Self-focused thinking	I like to be the center of attention	.047	.071	−.019	−.054	.009	.194	.724	−.013	−.060
	I must admit that I like to show off	.069	−.048	−.015	−.090	−.020	.179	.663	.044	.084
	I have a much wider circle of friends than most people	−.011	.018	−.034	.186	.116	−.044	.661	−.234	.140
Narrowed interests	I am really interested in only a few things	.055	−.020	−.035	−.005	.007	.038	−.125	.869	.038
	I must admit that my interests are somewhat narrow and limited	−.036	.001	−.019	.054	−.013	−.014	−.043	.836	.084
	I like my life to be pretty much the same from week to week	−.415	−.010	.053	.074	.200	.066	.085	.344	−.026
Mechanical interests	I like to look through hardware or automotive stores	−.017	−.004	.323	−.017	.010	−.027	.083	.066	.730
	I am interested in how mechanical things, such as engines, work	.013	−.025	.296	−.061	.113	.029	.012	.045	.719
Cronbach's alphas		.864	.890	.797	.782	.692	.709	.652	.614	.766

Note.

The italicized loadings indicate the factor with which the item loads most strongly.

Table 2

Past 30-day Tobacco Use by Age, Sex, Key Racial/Ethnic Groups, and School Types

Variable	Total sample	Cigarette users	LCC users	Smokeless tobacco users	E-cigarette users	Hookah users
	N = 3418 (100.0%)	N = 455 (13.3%)	N = 385 (11.3%)	N = 123 (3.6%)	N = 372 (10.9%)	N = 416 (12.2%)
Age (SD)	20.55 (1.97)	20.81 (2.02)[a]	20.45 (1.87)	20.59 (2.00)	20.41 (2.02)	20.48 (1.84)
Sex (%)[b]		**p < .001**	p = .101	**p < .001**	**p < .001**	**p < .001**
Female	2199 (64.3)	228 (10.4)	233 (10.6)	7 (0.3)	167 (7.6)	238 (10.8)
Male	1215 (35.6)	226 (18.6)	151 (12.4)	116 (9.6)	204 (16.8)	178 (14.7)
Hispanic (%)[c]	255 (7.5)	32 (12.6)	15 (5.9)[d]	3 (1.2)[e]	31 (12.2)	39 (15.3)
Race (%)		**p < .001**	**p < .001**	**p < .001**	**p < .001**	**p < .001**
Black	832 (24.3)	55 (6.6)	172 (20.7)	6 (0.7)	50 (6.0)	137 (16.5)
White	2133 (62.4)	333 (15.6)	175 (8.2)	108 (5.1)	275 (12.9)	207 (9.7)
Asian	213 (6.2)	28 (13.1)	11 (5.2)	6 (2.8)	20 (9.4)	34 (16.0)
Other[f]	240 (7.0)	39 (16.3)	27 (11.3)	3 (1.3)	27 (11.3)	38 (15.8)
School type (%)		**p < .001**	**p < .001**	**p < .001**	**p < .001**	**p < .001**
Private school	1322 (38.7)	160 (12.1)	82 (6.2)	46 (3.5)	125 (9.5)	130 (9.8)
Public	938 (27.4)	114 (12.1)	112 (12.0)	47 (5.0)	109 (11.6)	139 (14.9)
Technical college	749 (21.9)	156 (20.8)	88 (11.7)	29 (3.9)	111 (14.8)	73 (9.7)
Historically black	409 (12.0)	23 (5.6)	102 (24.9)	1 (0.2)	25 (6.1)	73 (17.8)

Note.

p-values for significant findings are boldfaced

[a] p < .001; no other product use prevalence significantly associated with age

[b] 4 participants indicated "other gender"

[c] Not Hispanic/Latino 91.8% (N = 3139); Don't know 0.5% (N = 17); Refused 0.2% (N = 7)

[d] p = .005

[e] p = .031; no other product use prevalence significantly associated with ethnicity

[f]More than one race 4.0% (N = 135); Other 1.6% (N = 53); Don't know 0.7% (N = 24); Refused 0.5% (N = 18)

Table 3

Past 30-day Tobacco Use by VALS Factors

VALS factors	Total sample M (SD)	Cigarettes No M (SD)	Cigarettes Yes M (SD)	LCCs No M (SD)	LCCs Yes M (SD)	Smokeless tobacco No M (SD)	Smokeless tobacco Yes M (SD)	E-cigarettes No M (SD)	E-cigarettes Yes M (SD)	Hookah No M (SD)	Hookah Yes M (SD)
Novelty seeking	3.17 (0.49)	3.16 (0.49)	3.27 (0.51) ***	3.15 (0.49)	3.36 (0.48) ***	3.17 (0.49)	3.27 (0.46) *	3.16 (0.49)	3.27 (0.52) ***	3.15 (0.49)	3.35 (0.48) ***
Fashion orientation	2.53 (0.82)	2.53 (0.82)	2.51 (0.81)	2.51 (0.82)	2.67 (0.80) ***	2.53 (0.82)	2.54 (0.76)	2.53 (0.82)	2.49 (0.82)	2.51 (0.82)	2.70 (0.77) ***
Tangible creation	2.61 (0.73)	2.62 (0.72)	2.60 (0.76)	2.61 (0.73)	2.64 (0.74)	2.61 (0.73)	2.80 (0.70) **	2.61 (0.73)	2.67 (0.71)	2.62 (0.73)	2.57 (0.72)
Social conservatism	2.54 (0.80)	2.58 (0.78)	2.30 (0.84) ***	2.53 (0.80)	2.63 (0.76) *	2.54 (0.80)	2.51 (0.79)	2.56 (0.79)	2.36 (0.81) ***	2.56 (0.79)	2.41 (0.80) **
Intellectual curiosity	2.95 (0.56)	2.93 (0.56)	3.08 (0.57) ***	2.94 (0.56)	3.11 (0.53) **	2.95 (0.56)	2.88 (0.56)	2.94 (0.56)	3.01 (0.55) *	2.93 (0.56)	3.08 (0.55) ***
Feelings of competency	3.00 (0.53)	3.00 (0.52)	3.00 (0.57)	2.98 (0.53)	3.11 (0.53) ***	2.99 (0.53)	3.18 (0.48) ***	2.99 (0.53)	3.03 (0.53)	2.98 (0.53)	3.11 (0.52) ***
Self-focused thinking	2.20 (0.71)	2.18 (0.71)	2.30 (0.75) ***	2.19 (0.71)	2.28 (0.75) *	2.18 (0.71)	2.49 (0.73) ***	2.18 (0.71)	2.31 (0.72) **	2.17 (0.71)	2.39 (0.73) ***
Narrowed interests	2.28 (0.66)	2.29 (0.66)	2.23 (0.69)	2.29 (0.66)	2.21 (0.68) *	2.28 (0.66)	2.37 (0.67)	2.29 (0.66)	2.24 (0.69)	2.29 (0.66)	2.24 (0.65)
Mechanical interests	2.21 (0.91)	2.19 (0.91)	2.34 (0.96) **	2.19 (0.91)	2.36 (0.94) **	2.19 (0.91)	2.80 (0.91) ***	2.19 (0.91)	2.43 (0.96) ***	2.21 (0.91)	2.23 (0.92)

***
p < .001;

**
p < .01;

*
p < .05, per ANOVA

Table 4

Multivariate Regression Indicating Significant Predictors of Use of Cigarettes, LCCs, Smokeless Tobacco, E-cigarettes, and Hookah

Variable	Cigarettes OR (CI)	p	LCCs OR (CI)	p	Smokeless tobacco OR (CI)	p	E-cigarettes OR (CI)	p	Hookah OR (CI)	p
Age	1.04 (0.99, 1.10)	.114	0.94 (0.88, 0.99)	.025	1.04 (0.94, 1.15)	.409	0.93 (0.88, 0.99)	.014	0.97 (0.92, 1.03)	.269
Sex										
Female	Ref		Ref		Ref		Ref		Ref	
Male	1.83 (1.43, 2.35)	<.001	1.50 (1.14, 1.98)	.004	42.41 (18.23, 98.66)	<.001	2.34 (1.78, 3.06)	<.001	1.43 (1.11, 1.85)	.006
Hispanic	0.68 (0.43, 1.05)	.084	0.43 (0.24, 0.78)	.005	0.33 (0.10, 1.11)	.072	1.03 (0.66, 1.61)	.905	1.22 (0.80, 1.84)	.354
Race										
Black	Ref		Ref		Ref		Ref		Ref	
White	2.70 (1.85, 3.95)	<.001	0.52 (0.38, 0.72)	<.001	5.06 (2.00, 12.84)	.001	2.49 (1.65, 3.45)	<.001	0.58 (0.43, 0.80)	.001
Asian	2.16 (1.23, 3.80)	.007	0.34 (0.17, 0.68)	.002	2.05, (0.59, 7.20)	.262	1.83 (0.97, 3.45)	.062	1.02 (0.62, 1.69)	.932
Other[f]	2.89 (1.72, 4.87)	<.001	0.86 (0.52, 1.43)	.555	1.94 (0.43, 8.68)	.387	2.04 (1.14, 3.66)	.016	0.85 (0.52, 1.37)	.494
School type										
Private school	Ref		Ref		Ref		Ref		Ref	
Public school	1.18 (0.90, 1.55)	.225	1.84 (1.35, 2.52)	<.001	1.32 (0.84, 2.07)	.231	1.38 (0.93, 1.84)	.063	1.87 (1.42, 2.47)	<.001
Technical college	3.13 (2.35, 4.18)	<.001	1.87 (1.30, 2.67)	.001	1.97 (1.12, 3.47)	.018	2.70 (1.96, 3.70)	<.001	1.37 (0.97, 1.95)	.074
Historically black	1.47 (0.83, 2.59)	.187	3.16 (2.06, 4.85)	<.001	0.50 (0.06, 4.24)	.525	1.07 (0.95, 1.26)	.115	2.05 (1.33, 3.15)	.001
VALS factors										
Novelty seeking	1.72 (1.31, 2.26)	<.001	1.92 (1.41, 2.61)	<.001	2.12 (1.24, 3.63)	.006	1.70 (1.26, 2.28)	.001	1.92 (1.43, 2.57)	<.001
Fashion orientation	1.04 (0.90, 1.19)	.614	1.44 (1.11, 1.88)	.007	1.08 (0.92, 1.26)	.341	1.02 (0.88, 1.19)	.767	1.16 (1.01, 1.35)	.044
Tangible creation	0.75 (0.63, 0.90)	.002	0.86 (0.71, 1.04)	.108	1.07 (0.76, 1.53)	.692	0.93 (0.77, 1.12)	.444	0.86 (0.72, 1.03)	.096
Social conservatism	0.75 (0.64, 0.87)	<.001	0.94 (0.79, 1.11)	.458	1.18 (0.89, 1.55)	.250	0.77 (0.66, 0.91)	.002	0.70 (0.60, 0.82)	<.001
Intellectual curiosity	1.35 (1.08, 1.71)	.010	1.14 (0.89, 1.47)	.285	0.43 (0.28, 0.65)	<.001	0.92 (0.73, 1.18)	.542	1.21 (0.95, 1.53)	.121
Feelings of competency	0.84 (0.67, 1.05)	.123	1.01 (0.79, 1.29)	.944	1.35 (0.85, 2.15)	.207	0.98 (0.76, 1.25)	.845	1.06 (0.84, 1.35)	.608
Self-focused thinking	1.14 (0.96, 1.35)	.147	1.10 (0.93, 1.31)	.281	0.92 (0.66, 1.27)	.607	1.04 (0.86, 1.25)	.706	1.31 (1.11, 1.55)	.002
Narrowed interests	1.05 (0.88, 1.24)	.610	0.93 (0.78, 1.10)	.392	1.20 (0.88, 1.63)	.256	0.98 (0.82, 1.17)	.819	1.10 (0.93, 1.30)	.279

Variable	Cigarettes		LCCs		Smokeless tobacco		E-cigarettes		Hookah	
	OR (CI)	p	OR (CI)	p	OR (CI)	p	OR (CI)	p	OR (CI)	p
Mechanical interests	1.02 (0.88, 1.19)	.784	1.16 (0.99, 1.36)	.064	1.05 (0.79, 1.41)	.737	1.06 (0.90, 1.24)	.480	0.90 (0.77, 1.05)	.172

Nagelkerke R-squared = 0.118; 0.116; 0.300; 0.090; and 0.094, resppectively.

Note.

p-values for significant findings are boldfaced