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Reasons for Abstaining from Tobacco Use Among Young Adults: Scale Development and Validation

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Reasons for Abstaining from Tobacco Use Among Young Adults: Scale Development and Validation

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Bachelor of Arts

University of Virginia

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Abstract

Reasons for Abstaining from Tobacco Use Among Young Adults:
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By Siobhan N.M. Perks

Introduction: Research focusing on young adults and the range of reasons for abstaining from tobacco use, particularly in the context of a diversified tobacco market, is critical. Thus, this study aimed to develop and test the internal reliability and convergent and discriminant validity of a scale to assess reasons for tobacco abstinence among young adults reporting no tobacco use in the past 4 months.

Methods: We analyzed data from 2,094 US college students (ages 18-25) enrolled in a two-year, six-wave longitudinal study launched in 2014 who reported no past-4-month tobacco use at Wave 5. The newly developed scale included 10 items and was examined in relation to future tobacco use intentions; measures of perceived addictiveness, health risks, and social acceptability; social influences; and uptake of tobacco use at Wave 6.

Results: The average age of participants was 20.48 years (SD=1.94); 66.8% female, and 66.7% White. Factor analysis identified two factors: Social Concern and Instrumentality. Analyses regarding convergent and discriminant validity indicated that both subscales were associated with lower self-reported likelihood of future tobacco use; greater perceived addictiveness; greater perceived harm to health; and lower likelihood of Wave 6 tobacco use across tobacco products (p's$<.05$). While Social Concern subscale scores were associated with all psychosocial factors as anticipated, Instrumentality subscale scores were neither associated with perceived social acceptability of product use nor with parental tobacco use. Multivariable logistic regression indicated that lower Social Concern subscale scores were predictive of any Wave 6 tobacco use ($p=.027$) and were marginally predictive of Wave 6 hookah use ($p=.094$). Lower Instrumentality subscale scores were associated with Wave 6 e-cigarette use ($p=.037$) and were marginally associated with Wave 6 SLT use ($p=.067$). Neither Social Concern nor Instrumentality subscale scores predicted cigarette use or LCC use at Wave 6. However, adding the Reasons for Tobacco Abstinence subscale scores to each model significantly increased Nagelkerke R-squares.

Conclusions: This research yielded a quantitative measure regarding reasons for tobacco abstinence that demonstrated validity. Particularly noteworthy, social concern and issues related to instrumentality may be useful intervention targets to prevent tobacco use or promote abstinence among young adults.

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LITERATURE REVIEW

Background

Tobacco use is the leading cause of preventable death and disease in the United States (1). While there has been significant progress in reducing smoking prevalence, cigarette smoking remains common among young adults, and particularly among college students (1-3). Given that 98% of cigarette smokers initiate use before the age of 26, young adult college students, typically ages 18-25, are at high risk for initiation (1). College students are also the youngest age group that tobacco companies can target for marketing efforts (4). Since tobacco products are no longer limited to cigarettes, students are experimenting with various non-traditional tobacco products, such as little cigars and cigarillos (LCCs), smokeless tobacco (SLT), electronic cigarettes (e-cigarettes), and hookah (4, 5). Although cigarettes remain the most common first tobacco product tried (2), about two-thirds of college students have tried at least one alternative tobacco product, with about 20% using these products in the past 30 days (4, 6).

Preventing the initiation and transition to established smoking are critical public health goals (1). Adolescents can show symptoms of nicotine dependence within days to weeks after the onset of occasional cigarette smoking, and many smokers who begin smoking in adolescence become regular users (1, 7). The short time interval between tobacco initiation and nicotine dependence leaves a small opportunity for intervention for those who experiment with smoking (8). With higher than anticipated rates of tobacco use among young adults, intervention efforts should focus on preventing college students from initiating tobacco use altogether. In developing such intervention strategies, it is especially important to identify risk and protective factors related to tobacco use.

Predictors of Future Tobacco Use

There is vast literature regarding predictors of future tobacco use. These predictors are generally similar regardless of previous smoking experience (9). Predictors of future tobacco use

can be organized into intrapersonal, interpersonal, and community-level factors. Intrapersonal, or individual, predictors of tobacco use include sociodemographic factors, such as sex, race/ethnicity, socioeconomic status, and education level. Specifically, individuals that are male, are of lower socioeconomic status, live in rural areas, and have less education are more likely to initiate tobacco use (10-12). Another major individual level predictor of tobacco use is intention to use. A study from the Centers for Disease Control and Prevention found that, between 2011-2013, intention to smoke cigarettes among US youth was 21.5% among never cigarette users, and that smoking intention was higher among youth who had previously used various alternative tobacco products, including LCCs, SLT, and hookah (10). Researchers from the University of Michigan found that among 12th graders, a firm intention not to smoke exerted a protective effect on the likelihood of future smoking, regardless of the level of smoking experience (13). Specifically, 15% of never smokers with low intentions to smoke were smoking at follow-up compared to 45% of never smokers who had some intention to smoke (13).

In terms of external influences, intrapersonal predictors of tobacco use include poor performance in school, having a sensation-seeking personality, being depressed, and having high-risk cognitions (9, 10, 12). Tobacco use risk factors at the interpersonal level include living with a smoker and having family members and friends who smoke (10, 11, 14). Community-level risk factors include exposure to pro-tobacco marketing, proximity to tobacco retailers, and being in an environment where tobacco use is permitted (10-12, 14-16).

Motives for Smoking

Alongside the wealth of research regarding risk factors for tobacco use, there has been abundant research attempting to characterize smoking motives. This research was primarily conducted from the late 1960s through the 1980s (17). These lines of research have yielded several questionnaires primarily assessing motives for smoking cigarettes, such as cognitive enhancement, taste, and anxiety relief (18). Antecedents of smoking, such as social settings and

negative effects, have also been assessed. Subscales have been created to identify a smoker's most important triggers (18).

More recently, Budd and Preston developed and tested an instrument called the Attitudes and Beliefs about the Consequences of Smoking Scale, which evaluated the perceived positive and negative consequences of smoking among college students. Factor analysis resulted in two positive factors, emotional beliefs and self-confidence, and two negative factors, health hazards and body image (3). Another previously developed scale, the Motives for Smoking Scale, indicated several motives for smoking including social factors, self-enhancement, boredom relief, and affect regulation (19, 20). Reasons for nondaily smoking tend to be similar. The Reasons for Nondaily Smoking Scale identified four factors associated with nondaily smoking: social influence, enhancing buzzes and positive effect, negative affect regulation, and lack of concern about addiction, indicating that social norms and behavioral control are motives for nondaily smoking behavior (21). Social and behavioral motives, such as boredom relief, affect regulation, and self-enhancement have also been identified as reasons for using single tobacco products (22).

Curiosity is another a well-known motive for smoking. In 2018, Khalil et al. tested the reliability and validity of an adolescent smoking curiosity scale. Factor analysis revealed a single-factor structure, which was correlated with measures such as temptation, number of friends who smoke, agreeing with the pros of smoking, sensation seeking, and depression (23). Another study found that adding a measure of curiosity to a susceptibility index enhanced identification of more at-risk future smokers. Specifically, adding curiosity to the susceptibility index increased the proportion of identified at-risk smokers about 20% (24). On the other hand, a California longitudinal study of adolescents found that among never users, curiosity and susceptibility were independently associated with increased likelihood of future smoking; the addition of curiosity to the susceptibility measure reduced rather than improved predictive validity and accuracy (16).

Motives for Tobacco Cessation

An area of research that has also received some attention is motives for quitting smoking, or tobacco cessation. A systematic review of motives for quitting smoking found that concern for health was the primary reason for quit attempts (25). Social concerns, such as pressure from family and friends was the second most mentioned reason (25). Using data from the National Young Adult Health Survey, Villanti et al. similarly found that the most important reasons for smoking cessation were health hazards and encouragement from a friend or relative (26). Physical fitness and cost were also important deciding factors (26). A qualitative study of college students also identified health concerns and social factors as important reasons for quit attempts, although saving money and the fear of addiction were important as well (27).

Many researchers have used the Adolescent Reasons for Quitting (ARFQ) Scale to assess reasons for smoking cessation among adolescents and young adults. For example, Wellman et al. used the ARFQ scale on young adult cigarette users and found that over 70% of smokers thought the most important reasons for quitting smoking were fear of getting sick or still smoking when older (28). Other reasons for wanting to quit included health concerns, such as being out of breath while walking upstairs or having a cough (28). In another study using the ARFQ scale to assess reasons for quitting smoking, factor analyses revealed three subscales: short-term consequences, social disapproval, and long-term consequences. The long-term consequences subscale (health concerns) identified the strongest relationships with intentions for cessation (29).

Several gender and ethnic differences have also been found to be associated with reasons for quitting smoking. For example, Turner and Mermelstein found that Whites were more likely to want to quit smoking because of pressure from parents, high costs, and bad smell (30). Females were more likely to want to quit because of bad smell and stained teeth, however males were more likely to value athletic performance (30). Conversely, Struik et al. found few gender differences when assessing reasons for quitting smoking among adolescents, however this difference may be due to a lack of gender-oriented items in their scale (31).

Motives for Tobacco Abstinence

While several studies address motives for smoking and smoking cessation, the motives for tobacco abstinence are not well known. A qualitative study of nonsmoking adolescents ages 16-17 found that the most important factors in abstaining from smoking were concerns about negative implications for health, self-confidence, social approval, and appearance (8). Similarly, a quantitative study of students in two Northern California high schools found that, compared to adolescents who have ever smoked, adolescents who had never smoked indicated beliefs that smoking is associated with greater social risks, such as getting into trouble, smelling like an ashtray, and having friends be upset with you. These adolescents also reported smoking as being associated with physical, health, and addiction risks (32). While these studies provide valuable data, more recent research focusing on young adults and the range of reasons for abstaining from tobacco use, particularly in the context of a diversified tobacco market, is critical. In addition, developing quantitative measures that can be used longitudinally to examine predictive validity is important in advancing the science and practice related to tobacco use prevention.

Theoretical/Conceptual Framework

Drawing from the Theory of Planned Behavior and the Social Cognitive Theory, individual and contextual characteristics may be associated with various reasons for tobacco abstinence (33-35). For example, social environment and subjective norms may play a role in the decision to not use tobacco products. Those worried about projecting a bad image, gaining respect from others, and not being accepted in society may perceive social norms that are less conducive to tobacco use and may be more sensitive to social context (8, 32). Tobacco abstinence may also be related to a range of outcome expectancies. For example, negative outcome expectancies, such as perceived health risks or potential for addiction, may be driving factors in abstaining from tobacco use (8, 32).

Gaps in the Literature

There has been limited quantitative research conducted to assess reasons for tobacco abstinence in young adults and whether these reasons predict abstinence in the future. Of the available research, many studies were published over two decades ago, and since smoking has become decreasingly socially acceptable and alternative tobacco products have become increasingly prominent in the market, these studies may not reflect current attitudes. Since tobacco use begins in adolescence and addiction begins almost immediately, it is important to conduct quantitative research to assess reasons for tobacco abstinence. It is also important to understand which reasons for abstaining from tobacco use are more likely to predict abstinence in the future. The knowledge gleaned from this research is important in informing intervention efforts aimed at emphasizing these factors among those at risk for tobacco use.

Research Aims

This study aims to develop and test the internal reliability and convergent and discriminant validity of a scale to assess reasons for tobacco abstinence among young adults reporting no tobacco use in the past 4 months. In particular, we will examine whether the scale developed is predictive of future use of various tobacco products.

INTRODUCTION

Tobacco use is the leading cause of preventable death and disease in the United States (1). Although cigarettes remain the most common first tobacco product tried, about two-thirds of college students have tried at least one alternative tobacco product, such as little cigars and cigarillos (LCCs), smokeless tobacco (SLT), electronic cigarettes (e-cigarettes), and hookah, with about 20% using these products in the past 30 days (2, 4, 6). Preventing the initiation and transition to established smoking are critical public health goals (1).

There is vast literature regarding predictors of future tobacco use. These predictors are generally similar regardless of previous smoking experience (9). Predictors of future tobacco use can be organized into intrapersonal (e.g., sociodemographics, intention), interpersonal (e.g., social influences), and community-level factors (e.g., social norms, policy). Alongside the wealth of research regarding risk factors for tobacco use, there has been abundant research attempting to characterize smoking motives, which has included emotional regulation, social motives, boredom, curiosity, and others (3, 18-22). Another area of research that has received some attention is reasons or motivations to quit smoking, which has included health concerns and social implications (25, 26).

While several studies address motives for smoking and smoking cessation, the motives for tobacco abstinence are not well known. A qualitative study of nonsmoking adolescents found that the most important factors in abstaining from smoking were concerns about negative implications for health, self-confidence, social approval, and appearance (8). Similarly, other research found that concerns about social, physical, health, and addiction risks differentiated adolescents who had never smoked from those who had (32).

While these studies provide valuable data, more recent research focusing on young adults and the range of reasons for abstaining from tobacco use, particularly in the context of a diversified tobacco market, is critical. In addition, developing quantitative measures that can be

used longitudinally to examine predictive validity is important in advancing the science and practice related to tobacco use prevention. Drawing from the Theory of Planned Behavior and the Social Cognitive Theory, this study aims to develop and test the internal reliability and convergent and discriminant validity of a scale to assess reasons for tobacco abstinence among young adults reporting no tobacco use in the past 4 months (33-35). In particular, we will examine whether the scale developed is predictive of future use of various tobacco products.

METHODS

Participants and Procedures

The parent study, Project DECOY (Documenting Experiences with Cigarettes and Other Tobacco in Youth), was approved by the Emory University and ICF International Institutional Review Boards, as well as those of the participating colleges and universities. Project DECOY is a two-year, six-wave longitudinal mixed-methods cohort study examining risks for tobacco use among 3,418 young adults ages 18 to 25 across seven Georgia colleges/universities located in urban and rural settings. Two public universities, two private colleges/universities, two community/technical colleges, and a historically black college/university (HBCU) were included. Full study methods are published elsewhere and are briefly summarized here (36).

Students meeting eligibility criteria (age $\geq$ 18 and $\leq$ 25 and able to read English) were recruited using college email addresses obtained from their college/university's registrar office. The study was also promoted on campuses via flyers and school websites. Three thousand randomly selected 18-25-year-olds were selected from one private and two public universities. The remainder of the schools had 18-25-year-old student populations of less than 3,000; 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. The overall response rate was 22.9% (N=3,574/15,607), which met the

researchers' sampling goals for the short time frame (24 hours at the private schools to seven days at the technical colleges) over two years (36). Participants were compensated at several stages for participating in the various assessments.

Data collection for Project DECOY began in Fall 2014 and consisted of online self-report assessments every four months for two years (during Fall, Spring, and Summer), with the intent of enrolling participants who were engaged in email and were therefore more likely to be retained in subsequent waves of the larger, multi-wave longitudinal project. Current analyses focus on participants reporting no tobacco use in the past 4 months at Wave 5 (N=2,094 of the 2,689, or 77.9% of the Wave 5 sample).

Measures

Participants were asked to report a number of sociodemographic, psychosocial, and substance use characteristics. Below we outline our primary measure of focus – the Reasons for Tobacco Abstinence Scale – and the correlates of interest, specifically factors testing discriminant and convergent validity (e.g., self-reported likelihood of using tobacco products in the future, perceptions of tobacco use, social influences, and subsequent tobacco use behavior).

Reasons for Tobacco Abstinence

After reviewing the literature, an expert panel, including the authors of the current paper and colleagues in the area of tobacco use, developed a list of potential reasons for abstaining from tobacco use, which were measured at Wave 5 (Spring, 2016, see Table 1) (37). Participants were asked, "Please indicate the extent to which each is a reason you would not use tobacco" with response options of 0 = "not at all true for me" to 6 = "extremely true for me." This analysis excludes three of the original scale items ("I am concerned that I would become addicted to tobacco"; "Using tobacco might put me at risk for using other drugs"; and "By not using tobacco, I project a positive image of myself"). These items were excluded as they reduced internal consistency of the overall scale and of the derived subscales.

Likelihood of Future Tobacco Use & Perceptions of Tobacco Products

Participants were asked to report the likelihood that they would use each of the respective tobacco products (cigarettes, LCCs, SLT, e-cigarettes, and hookah) in the next year using a Likert scale of 1 = "not at all" to 7 = "extremely." They were also asked about their perceptions for each product including perceived addictiveness, harm to health, and social acceptability using the same Likert scale (38). Likelihood of next year use of the various tobacco products was maintained separately, as correlations ranged from .24 (for SLT and hookah) to .40 (for SLT and e-cigarettes). Correlations for perceived addictiveness ranged from .52 to .78, correlations for perceived harm to health ranged from .47 to .73, and correlations for perceived social acceptability ranged from .47 to .74. Thus, these three factors were summarized as an average for the various products. All factors were measured at Wave 5.

Parental Tobacco Use

Participants were asked if any of their parents currently used any of the tobacco products at Wave 5. Parental tobacco use was operationalized as a dichotomous variable (at least one parent used vs. none) (36).

Tobacco Product Use

In order to examine if participants' reasons for abstaining from tobacco use predicted abstinence subsequently, we included in our analyses tobacco use data obtained at Wave 6 (Summer, 2016). Participants were asked about the number of days they used each tobacco product (i.e., cigarettes, LCCs, SLT, e-cigarettes, hookah) during the past 4 months.

Sociodemographics

Sociodemographic variables were measured at Wave 1. Variables in this analysis include age, sex, sexual orientation, ethnicity, race, parental education, and school type.

Data Analysis

We conducted a factor analysis of the Reasons for Tobacco Abstinence items using Promax rotation. We used eigenvalues of greater than 1 as the criteria for number of factors. We then examined the content and internal consistency of the factors. Next, we conducted bivariate analyses examining each of the factors in relation to the correlates of interest. Lastly, we used binary logistic regression models to predict tobacco use at Wave 6 for each of the tobacco products and for using any tobacco product, respectively. All data were analyzed using SPSS 24.0 statistical software, and alpha was set at .05.

RESULTS

Factor Analysis

Promax rotation converged in 3 rotations. Factor analysis identified two factors: Social Concern and Instrumentality (Table 1). Social Concern refers to the non-use of tobacco products in different social contexts or in relation to self-presentation. Instrumentality indicated a range of reasons for tobacco abstinence including the effect on the body (e.g., bad for health, smells bad, bad for performance in various activities, causes wrinkles or yellowing of the teeth or skin) and the price. These two factors accounted for 68.8% of the variance; Social Concern (eigenvalue=5.71) accounted for 57.1% of the variance, and Instrumentality (eigenvalue=1.17) accounted for 11.7% of the variance. The two factors were correlated (r=.62). Cronbach's alpha for the overall Reasons for Tobacco Abstinence Scale was .91, with a mean score of 49.46 (SD=11.26). Cronbach's alpha for Social Concern was .84, with a mean score of 22.96 (SD=4.93), and Cronbach's alpha for Instrumentality was .90, with a mean score of 22.96 (SD=7.27).

Participant Characteristics

Selected participant characteristics are presented in Table 2. The average age of participants was 20.48 years (SD=1.94). Participants were more likely to be female (66.8%), heterosexual (92.5%), non-Hispanic (92.2%), and White (66.7%). Participants were also more

likely to have a parent with at least a bachelor's degree (54.1%), to attend a private college/university (46.3%), and to have no parental tobacco use (76.1%). At Wave 6, the majority of participants did not use any tobacco products (90.3%) in the past 4 months.

Convergent and Discriminant Validity

Data regarding convergent and discriminant validity are presented in Table 2. Social Concern subscale scores were associated with younger age (p=.001); being female (p<.001); being heterosexual (p<.001); lower self-reported likelihood of next year use for cigarettes (p=.041), LCCs (p<.001), e-cigarettes (p=.005), and hookah (p<.001); greater perceived addictiveness (p<.001); greater perceived harm to health (p<.001); lower perceived social acceptability (p<.001); parental tobacco use (p<.001); and Wave 6 tobacco use across all products (all p's<.05). Instrumentality subscale scores were associated with being female (p<.001); being heterosexual (p=.027); being White (p=.007); not attending an HBCU (p=.001); lower self-reported likelihood of next year use for cigarettes (p=<.001), LCCs (p<.001), SLT (p=.001), e-cigarettes (p=<.001), and hookah (p=.002); greater perceived addictiveness (p<.001); greater perceived harm to health (p<.001); and Wave 6 tobacco use across all products (all p's<.05).

While Social Concern subscale scores were associated with all psychosocial factors as anticipated, Instrumentality subscale scores were neither associated with perceived social acceptability of product use nor with parental tobacco use. Other differences included that Instrumentality was also associated with race and school type. Ethnicity and parental education were not significantly associated with either of the subscale scores.

Predictors of Wave 6 Tobacco Use for Various Products

Multivariable logistic regression was then used to examine the extent to which the Social Concern and Instrumentality subscale scores of the Reasons for Tobacco Abstinence Scale predicted Wave 6 tobacco use (Table 3). Lower Social Concern subscale scores were predictive of any Wave 6 tobacco use (p=.027) and were marginally predictive of Wave 6 hookah use

(p=.094). Lower Instrumentality subscale scores were associated with Wave 6 e-cigarette use (p=.037) and were marginally associated with Wave 6 SLT use (p=.067). Neither Social Concern nor Instrumentality subscale scores predicted cigarette use or LCC use at Wave 6. However, adding the Reasons for Tobacco Abstinence subscale scores to each model significantly increased Nagelkerke R-squares.

In terms of other findings, binary logistic regression indicated that attending an HBCU (vs. private; p=.042) predicted cigarette use at Wave 6. Not being heterosexual (vs. heterosexual; p=.006) predicted Wave 6 LCC use. Predictors of being an SLT user at Wave 6 included being younger (p=.004) and being male (vs. female; p=.029). Predictors of e-cigarette use at Wave 6 included attending a public university or community/technical college (vs. private; p=.035 and p=.023, respectively), and lower perceived harm to health (p=.049). Predictors of Wave 6 hookah use included not being heterosexual (vs. heterosexual; p=.010), attending an HBCU (vs. private; p=.029), and parental tobacco use (p=.021). Lastly, predictors of using any tobacco products at Wave 6 included being male (vs. female; p=.001), not being heterosexual (vs. heterosexual; p=.003), and higher perceived social acceptability (p=.016).

DISCUSSION

The current study is one of the few studies that has used a quantitative approach to examine reasons for tobacco abstinence in young adults. The two factors that emerged from the Reasons for Tobacco Abstinence scale reflected Social Concern and Instrumentality. These factors are consistent with previous research that found that reasons for abstaining from tobacco use are often social, such as the fear of negative implications for self-confidence and social disapproval, as well as instrumental, such as the fear of portraying a bad appearance (8, 32). The addition of the Social Concern and Instrumentality subscales significantly increased the variability explained by the models. The resulting tobacco abstinence scale may be useful in

understanding why many young adults choose to abstain from tobacco, as well as why other young adults do not.

Convergent and discriminant validity were demonstrated across subscales and correlates of interest. As expected, Social Concern subscale scores were associated with all psychosocial factors, including parental tobacco use. Specifically, higher scores on the Social Concern subscale were positively correlated with perceived addictiveness, perceived harm to health, and were negatively correlated with perceived social acceptability. These findings are consistent with previous research, which has indicated that tobacco abstinence and tobacco cessation often results from the fear of social disapproval and the fear of long-term health consequences (8, 25-29, 32). Social Concern scores were also negatively correlated with self-reported likelihood of next year tobacco use for all products except SLT; however, bivariate analyses indicated that higher Social Concern scores predicted less likelihood of using SLT at Wave 6. Social Concern scores were also associated with younger age, being female, being heterosexual, and parental tobacco use.

Instrumentality subscale scores were positively correlated with perceived addictiveness and perceived harm to health. This is consistent with the literature, which has indicated that negative outcome expectancies, such as perceived health risks or potential for addiction, may be driving factors in tobacco abstinence (8, 32). In addition, instrumentality scores were negatively correlated with self-reported likelihood of next year tobacco use for all products, and were associated with being female, being heterosexual, being White, and not attending an HBCU. Instrumentality subscale scores, however, were not associated several factors, including perceived social acceptability and parental tobacco use. This makes sense, as we would expect subjective norms and environment to play more of a social role in the decision to abstain from tobacco products.

In bivariate analyses, both Social Concern and Instrumentality subscale scores were associated with Wave 6 tobacco use across all products, meaning those with higher tobacco

abstinence scores were less likely to use any of the tobacco products in the next year. The multivariate analyses examining these associations demonstrated different findings. Results indicated that lower Social Concern subscale scores were predictive of any Wave 6 tobacco use and were marginally predictive of Wave 6 hookah use. Lower Instrumentality subscale scores were associated with Wave 6 e-cigarette use and were marginally associated with Wave 6 SLT use. Neither Social Concern nor Instrumentality subscale scores predicted cigarette use or LCC use. It is important to note that these analyses involved, in several cases, very small numbers of individual product users at Wave 6 (i.e., range of n = 18 for SLT to n = 70 for cigarettes). The model predicting any tobacco product use included a total of 101 users. As such, bivariate analyses are critical to note given these limitations.

Sociodemographic predictors of Wave 6 tobacco use for any tobacco product included being male, not being heterosexual, attending a community/technical college or HBCU, and perceived social acceptability. These predictors reflect findings similar to those of previous studies that found sociodemographic factors to be predictive of future tobacco use (10-12). Similar sociodemographic predictors were identified for some of the tobacco products individually.

Implications

Results of this study have implications for research and practice. Future research could distinguish the reasons for tobacco abstinence among the various tobacco products. These studies could also target reasons for tobacco abstinence in non-college young adult populations; these populations typically have less education and are at greater risk for substance use (1). Future studies should have larger sample sizes in order to better detect the predictive validity of this measure of future tobacco use for the various products. In practice, health educators should be aware of these reasons for tobacco abstinence to effectively identify young adults at risk for

tobacco initiation. Awareness and understanding of these reasons will also be effective in developing tobacco prevention or cessation interventions and programs for young adults.

Limitations

The current study has some limitations. First, the study sample was drawn from Georgia colleges/universities, which limits the generalizability of the study. Second, the sample sizes for some of the subgroups were relatively small to detect statistical significance. Third, the scope of our scale items may not be inclusive of all potentially important reasons for tobacco abstinence; however, the items included here were drawn from the literature related to tobacco abstinence in this population. Lastly, the overall response rate was relatively low (22.9%), and the data was self-reported, thus subject to recall bias and social desirability.

Conclusions

The current study addressed a gap in the literature, specifically regarding how to quantitatively assess and characterize reasons for tobacco abstinence. The Reasons for Tobacco Abstinence scale identified two factors indicating reasons for abstinence: Social Concern and Instrumentality. Each of these factors demonstrated convergent and discriminant validity. Results indicated that the Social Concern and Instrumentality subscale scores were predictive of Wave 6 tobacco use. Specifically, lower Social Concern subscale scores were predictive of any tobacco use and were marginally predictive of hookah use. Lower Instrumentality subscale scores were predictive of SLT use and were marginally predictive of e-cigarette use. The use of this scale to characterize reasons for tobacco abstinence among young adults may help inform and target interventions aimed at preventing the initiation of smoking and the cessation of established smoking among young adults.

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TABLES

Table 1. Tobacco Use Abstinence Motivation Scale

Item	Social Concerns	Instrumental Concerns	M (SD)
Social Concern			
I am worried that others would not respect me if they saw me using tobacco.	.97	-.12	4.37 (1.77)
Using tobacco would project a bad image of me.	.69	.23	4.96 (1.52)
Using tobacco might hinder my chances of getting the job I want.	.84	-.04	4.32 (1.86)
Using tobacco would damage my reputation.	.98	-.09	4.48 (1.74)
Using tobacco might turn off potential dating partners.	.65	.18	4.83 (1.66)
Instrumentality			
Using tobacco is bad for my health.	-.18	.97	5.69 (0.92)
Using tobacco makes people smell bad.	.00	.84	5.35 (1.19)
Using tobacco is bad for my performance in activities I enjoy, such as sports, dancing, or singing.	.00	.78	5.23 (1.36)
I'm worried about how using tobacco might harm my appearance, such as causing wrinkles or yellowing of teeth or skin.	.35	.54	5.16 (1.35)
Using tobacco is expensive.	.26	.53	5.07 (1.42)

Table 2. Correlations Between Factors, Sociodemographics, Psychosocial Factors, and Wave 6 Tobacco Use

Variable	Total N (%) or M (SD)	Social Concern M (SD) or r	p	Instrumentality M (SD) or r	p
Sociodemographics					
Age	20.48 (1.94)	-.07	.001	.00	.891
Gender			<.001		<.001
Male	695 (33.2)	22.06 (7.36)		25.78 (5.19)	
Female	1399 (66.8)	23.40 (7.19)		26.87 (4.76)	
Sexual Orientation			<.001		.027
Heterosexual	1918 (92.5)	23.15 (7.17)		26.58 (4.84)	
Other	156 (7.5)	20.68 (7.93)		25.67 (5.93)	
Ethnicity			.438		.691
Non-Hispanic	1921 (92.2)	23.00 (7.30)		26.49 (4.98)	
Hispanic	162 (7.8)	22.54 (6.86)		26.65 (4.27)	
Race			.170		.007
White	1377 (66.7)	23.13 (6.99)		26.77 (4.31)	
Black	428 (20.4)	22.67 (8.04)		25.95 (6.21)	
Asian	143 (6.8)	23.35 (6.90)		26.04 (5.53)	
Other	118 (5.7)	21.77 (8.00)		26.03 (5.29)	
Parental Education			.153		.495
Less than BA	950 (45.9)	22.70 (7.67)		26.58 (5.20)	
BA or more	1120 (54.1)	23.16 (6.89)		26.43 (4.71)	
School Type			1.000		.001
Private	970 (46.3)	22.95 (6.84)		26.20 (4.58)	
Public	566 (27.0)	22.94 (7.13)		27.01 (4.53)	
Tech	344 (16.4)	22.97 (7.87)		26.95 (5.19)	
HBCU	214 (10.2)	22.99 (8.50)		25.88 (6.63)	
Psychosocial Factors					
Likelihood of next year use:					
Cigarettes	1.07 (0.46)	-.05	.041	-.08	<.001
LCCs	1.12 (0.58)	-.09	<.001	-.10	<.001
SLT	1.06 (0.46)	-.03	.212	-.07	.001
E-cigarettes	1.13 (0.69)	-.06	.005	-.09	<.001
Hookah	1.09 (1.08)	-.09	<.001	-.07	.002
Perceived addictiveness	3.34 (1.73)	.23	<.001	.29	<.001
Perceived harm to health	5.93 (1.28)	.29	<.001	.38	<.001
Perceived social acceptability	3.34 (1.73)	-.14	<.001	.01	.805
Parental tobacco use	500 (23.9)	21.56 (7.63)	<.001	26.42 (4.58)	.660
vs. no	1594 (76.1)	23.40 (7.10)		26.53 (5.04)	
W6 Past 4-Month Tobacco Use					
Cigarettes	70 (3.8)	20.11 (7.57)	.001	24.77 (6.05)	.003
vs. no	1773 (96.2)	23.07 (7.27)		26.59 (4.89)	
LCCs	48 (2.6)	18.88 (8.23)	<.001	23.60 (7.75)	<.001
vs. no	1795 (97.4)	23.07 (7.25)		26.59 (4.84)	
SLT	18 (1.0)	18.33 (9.88)	.007	20.94 (9.01)	<.001
vs. no	1825 (99.0)	23.01 (7.26)		26.57 (4.87)	
E-cigarettes	37 (2.0)	20.59 (7.58)	.047	24.05 (6.81)	.002
vs. no	1806 (98.0)	23.01 (7.29)		26.57 (4.90)	
Hookah	50 (2.7)	19.16 (8.31)	<.001	23.90 (6.99)	<.001
vs. no	1793 (97.3)	23.07 (7.25)		26.59 (4.87)	
Any tobacco	178 (9.7)	19.99 (7.89)	<.001	24.72 (6.45)	<.001
vs. no	1665 (90.3)	23.28 (7.17)		26.71 (4.73)	

Abbreviations: HBCU = historically black college/university; LCC = little cigars and cigarillos; SLT = smokeless tobacco; E-cigarette = electronic cigarette

Table 3. Binary Logistic Regressions Examining Predictors of Wave 6 Past 4-Month Tobacco Use

	Cigarettes, n=70			LCCs, n=48			SLT, n=18		
Variable	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**
Age	0.94	0.82, 1.08	.369	1.00	0.85, 1.18	.973	0.57	0.39, 0.84	.004
Gender									
Female	Ref	--	--	Ref	--	--	Ref	--	--
Male	1.37	0.81, 2.33	.244	1.27	0.64, 2.52	.502	3.43	1.14, 10.32	.029
Sexual Orientation									
Heterosexual	Ref	--	--	Ref	--	--	Ref	--	--
Other	1.38	0.63, 3.04	.422	2.81	1.35, 5.86	.006	0.47	0.06, 3.96	.490
Ethnicity									
Non-Hispanic	Ref	--	--	Ref	--	--	Ref	--	--
Hispanic	0.89	0.31, 2.55	.835	1.90	0.64, 5.68	.249	0.72	0.07, 7.45	.782
Race									
White	Ref	--	--	Ref	--	--	Ref	--	--
Black	1.88	0.93, 3.79	.077	2.06	0.90, 4.74	.088	0.94	0.18, 4.80	.937
Asian	1.32	0.52, 3.36	.557	--	--	--	1.25	0.22, 7.23	.803
Other	1.57	0.55, 4.51	.400	1.01	0.26, 3.97	.986	1.45	0.14, 15.62	.758
Parental Education									
Less than BA	Ref	--	--	Ref	--	--	Ref	--	--
BA or more	1.06	0.60, 1.88	.851	1.41	0.69, 2.87	.348	0.59	0.18, 1.93	.384
School Type									
Private	Ref	--	--	Ref	--	--	Ref	--	--
Public	0.80	0.41, 1.56	.508	0.96	0.39, 2.35	.931	2.15	0.64, 7.22	.215
Tech	1.49	0.71, 3.14	.297	2.17	0.86, 5.48	.103	3.62	0.67, 19.61	.135
HBCU	0.24	0.06, 0.95	.042	1.58	0.50, 5.00	.433	2.92	0.28, 30.94	.373
Psychosocial Factors									
Perceived addictiveness	0.89	0.75, 1.04	.146	1.07	0.87, 1.31	.545	1.28	0.83, 1.96	.265
Perceived harm to health	0.93	0.75, 1.14	.474	0.91	0.71, 1.17	.454	0.70	0.44, 1.12	.138
Perceived social acceptability	1.14	0.99, 1.32	.072	1.10	0.92, 1.31	.287	0.99	0.73, 1.34	.944
Parental tobacco use	1.03	0.58, 1.84	.920	0.95	0.47, 1.94	.886	1.12	0.34, 3.69	.858
Reasons for Abstinence									
Social Concern	0.97	0.93, 1.02	.229	0.97	0.92, 1.02	.261	1.00	0.90, 1.12	.937
Instrumentality	0.99	0.93, 1.04	.786	0.96	0.90, 1.03	.234	0.90	0.80, 1.01	.067
Nagelkerke R-squared		.065			.126			.191	
Nagelkerke R-squared from prior model*		.029			.106			.148	

Abbreviations: HBCU = historically black college/university; LCC = little cigars and cigarillos; SLT = smokeless tobacco

*Prior model included all factors except *Reasons for Abstinence;* P-value for change in Nagelkerke R-squared: Cigarettes: p=.015; LCCs: p=.019; SLT=.016.

Table 3 (Cont). Binary Logistic Regressions Examining Predictors of Wave 6 Past 4-Month Tobacco Use

	E-cigarettes, n=37			Hookah, n=50			Any Tobacco, n=178		
Variable	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**
Age	0.97	0.81, 1.17	.758	1.04	0.88, 1.23	.651	0.99	0.91, 1.08	.810
Gender									
Female	Ref	--	--	Ref	--	--	Ref	--	--
Male	1.78	0.87, 3.62	.115	1.38	0.70, 2.72	.347	1.87	1.31, 2.66	.001
Sexual Orientation									
Heterosexual	Ref	--	--	Ref	--	--	Ref	--	--
Other	1.12	0.37, 3.36	.838	2.75	1.27, 5.96	.010	2.06	1.28, 3.32	.003
Ethnicity									
Non-Hispanic	Ref	--	--	Ref	--	--	Ref	--	--
Hispanic	2.17	0.74, 6.34	.156	1.77	0.60, 5.20	.297	1.56	0.85, 2.87	.154
Race									
White	Ref	--	--	Ref	--	--	Ref	--	--
Black	0.39	0.11, 1.44	.158	1.92	0.76, 4.88	.170	1.56	0.95, 2.59	.082
Asian	0.43	0.05, 3.42	.422	0.65	0.08, 5.08	.681	0.90	0.41, 1.97	.799
Other	1.77	0.56, 5.64	.334	2.20	0.67, 7.20	.191	1.82	0.94, 3.52	.075
Parental Education									
Less than BA	Ref	--	--	Ref	--	--	Ref	--	--
BA or more	0.91	0.43, 1.92	.801	1.36	0.70, 2.66	.368	1.04	0.72, 1.51	.823
School Type									
Private	Ref	--	--	Ref	--	--	Ref	--	--
Public	2.45	1.06, 5.64	.035	1.91	0.86, 4.27	.115	1.45	0.95, 2.22	.083
Tech	3.40	1.19, 9.75	.023	0.40	0.08, 1.95	.258	1.46	0.84, 2.53	.180
HBCU	3.30	0.57, 19.18	.184	3.61	1.14, 11.37	.029	1.97	0.99, 3.93	.054
Psychosocial Factors									
Perceived addictiveness	1.29	0.96, 1.73	.096	1.05	0.86, 1.27	.648	1.02	0.91, 1.14	.714
Perceived harm to health	0.70	0.50, 1.00	.049	1.01	0.79, 1.29	.970	0.93	0.80, 1.08	.331
Perceived social acceptability	1.10	0.90, 1.34	.339	1.06	0.88, 1.27	.557	1.13	1.02, 1.24	.016
Parental tobacco use	1.05	0.49, 2.28	.896	0.32	0.12, 0.84	.021	0.80	0.53, 1.19	.264
Reasons for Abstinence									
Social Concern	1.02	0.95, 1.09	.582	0.96	0.91, 1.01	.094	0.97	0.94, 1.00	.027
Instrumentality	0.92	0.84, 1.00	.037	0.98	0.91, 1.05	.489	0.98	0.94, 1.02	.312
Nagelkerke R-squared		.088			.156			.095	
Nagelkerke R-squared from prior model*		.076			.135			.077	

Abbreviations: HBCU = historically black college/university; E-cigarette = electronic cigarette

*Prior model included all factors except *Reasons for Abstinence;* P-value for change in Nagelkerke R-squared: E-cigarettes: p=.056; Hookah: p=.015; Any: p<.001