AN EDUCATIONAL TOBACCO INTERVENTION: IMPACT OF THE HEALTH BELIEF MODEL ON COLLEGE STUDENTS

by

Kelley E. Rhoads

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This thesis was prepared under the direction of the candidate's thesis advisor, Dr. Tina M. Penhollow, Department of Exercise Science and Health Promotion, and has been approved by the members of her supervisory committee. It was submitted to the faculty of the College of Education and was accepted in partial fulfillment of the requirements for the degree of Master of Science.

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Many thanks go out to all of the students who participated in the study because without them, I would not have a study. Additionally, I would like to thank all of the wonderful individuals, especially Sharon Valley, at Suwannee River Area Health Education Center who inspired my passion for tobacco research. Lastly, I would like to thank my family for their support during all of my educational and professional endeavors.
ABSTRACT

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The purpose of this study was to determine whether an educational tobacco intervention impacted college students’ perceptions relative to tobacco, self-efficacy, and perceived stress levels. The Health Belief Model (HBM) provided a theoretical framework to distinguish differences relative to tobacco between groups. Both the control (N = 155) and intervention (N = 184) group consisted of a convenience sample of students from a 2000-level health course. A pre- and post-test questionnaire was administered to both groups which included questions regarding demographics, tobacco use, HBM, self-efficacy, and perceived stress. Data analysis included frequency counts, confirmatory factor analysis, Cronbach’s alpha, and two-way ANOVA. Two-way ANOVA results indicated statistically significant differences for the Health Belief Model questions (p = 0.002) and self-efficacy items (p = 0.03). No statistical significance was
found regarding perceived stress. These findings provide evidence an educational tobacco intervention administered at the college level can have a significant impact on students.
AN EDUCATIONAL TOBACCO INTERVENTION: IMPACT OF THE HEALTH BELIEF MODEL ON COLLEGE STUDENTS

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The World Health Organization (WHO) stated empirical research has produced unequivocal conclusions connecting tobacco use and tobacco smoke exposure to premature death and disease. The WHO acknowledged the tobacco epidemic as a serious threat to public health (WHO, 2003). Tobacco use is the number one cause of preventable death and infirmity in the United States (Mokdad, Marks, Stroup, & Gerberding, 2004). Each year, tobacco is responsible for 435,000 deaths, including 50,000 deaths resulting from secondhand smoke exposure (Mokdad et al., 2004).

**Cigarette Use**

The 2010 Surgeon General’s report indicated no safe level of tobacco smoke exposure has been established (USDHHS, 2010). Inhalation of the carcinogens present in cigarettes and cigars has been linked to negative health outcomes such as cardiovascular disease, insulin resistance, cancer, and pulmonary disease. Low levels of tobacco smoke exposure, which include incidences of social smoking and secondhand smoke exposure, can lead to an increase in endothelial dysfunction and inflammation in coronary and peripheral arteries. Smoking increases the risk of thrombosis (intravascular clotting), which is a major contributor to smoking-induced cardiovascular disease. Tobacco smoke exposure has also been known to produce insulin resistance which can cause multiple cardiovascular and renal complications. The carcinogens present in tobacco smoke cause
DNA damage which can facilitate the development of cancer(s). Chronic obstructive pulmonary disease (COPD) has been linked to tobacco smoke exposure because COPD causes oxidative stress in the lungs resulting in the disease processes of chronic bronchitis or emphysema (USDHHS, 2010).

**Smokeless Tobacco**

Smokeless tobacco includes chewing tobacco and snuff. The 1986 Surgeon General’s report on smokeless tobacco stated there is no safe use of tobacco (USDHHS, 1986). Smokeless tobacco use has been associated with gum recession, gum disease, leukoplakia, and cancer(s). Gum recession can occur in the areas where the tobacco is placed inside the gum (USDHHS, 1994). The WHO defined leukoplakia as a soft tissue lesion characterized by a white patch or plaque (Kramer, Pindborg, Bezroukov, & Sardo Infirri, 1980). Consequently, leukoplakia lesions cannot be scrapped off of the gum; however, if smokeless tobacco cessation occurs, the lesions can resolve completely. While oral cancer is most commonly associated with smokeless tobacco use, the exposure to tobacco juices can also produce cancers of the esophagus, pharynx, larynx, stomach, and pancreas. Smokeless tobacco users are at an exponentially higher risk for developing these cancers which can form in as little as five years of regular smokeless tobacco use (Hatsukami & Severson, 1999).

**Hookah Smoking**

Hookah smoking is a traditional form of smoking tobacco, which has been traced back 400 years to Persia and India, and, consequently, gained popularity in the United States (Noonan & Kulbok, 2009; American Lung Association, 2007). An estimated 200-300 hookah bars or cafes have opened in the United States since 2000 (Forno, 2006). A
common misconception, relative to hookah smoking, is the degree of safety in comparison to other tobacco products. The WHO indicated the volume of smoke inhaled during a typical, one hour session of hookah smoking is 100-200 times more than a single cigarette (WHO, 2005). In a meta-analysis published by the International Journal of Epidemiology, researchers reviewed medical literature regarding the health outcomes associated with hookah smoking. Researchers found hookah smoking was found to be significantly associated with lung cancer, respiratory illness, low birth-weight in newborns, and periodontal disease (Akl et al., 2010). In addition to the toxic smoke produced by a hookah pipe, substances which compose the hookah tobacco have been known to cause clogged arteries (American Lung Association, 2007). During a social hookah smoking session, commonly, people share a mouthpiece; therefore, people increase their risk of contracting tuberculosis, herpes, hepatitis, and other infectious diseases (Knishkowy & Amitai, 2005).

Since the infamous court case of Lawton Chiles V. The American Tobacco Company in 1997, much attention and resources have been allocated to the efforts of tobacco control and prevention (LeBel, 1998). To further the efforts of tobacco prevention, the purpose of this study is: to examine the implications of an educational tobacco intervention on college students’ perceptions relative to tobacco, self-efficacy, and perceived stress levels.

*Null hypothesis:* Implementing an educational tobacco intervention will produce no significant change in college students’ perceptions relative to tobacco, self-efficacy, or perceived stress levels.
In 1995, the Centers for Disease Control and Prevention (CDC) conducted the National College Health Risk Behavior Survey (NCHRBS). The NCHRBS was a self-report survey intended to measure health risk behaviors, such as tobacco use, unhealthy dietary habits, inadequate physical activity, alcohol consumption, and sexual behaviors, of college students. According to the self-reported survey results, 29% of the study participants (N = 4,609) reported smoking cigarettes more than once during the 30 days prior to administration of the survey. Additionally, 5.4% of the study participants indicated using smokeless tobacco more than once during the 30 days prior to the survey (CDC, 1997).

In a more recent research study, the tobacco use of college athletes and non-athletes was examined. The researchers gathered four groups to complete the comparison: male, non-athlete college students (n = 185), male, athlete college students (n = 233), female, non-athlete college students (n = 317), and female, athlete college students (n = 158). Based upon self-report surveys, the prevalence of lifetime cigarette usage (ever smoking a cigarette) was higher among male (49.7%) and female non-athletes (53.4%) as compared to male (39.9%) and female college athletes (35.4%). However, the prevalence of smokeless tobacco use within the past year was higher among male (41.4%) and female athletes (8.9%) as compared to the male (16.9%) and female non-athletes (5.6%)
The researchers further analyzed the male and female athletes’ behavior by comparing the differences in substance use during in season and off season. Male athletes used cigarettes and smokeless tobacco more during off season (9.9%; 29.7%) than during in season (6.9%; 25.7%). However, female athletes used cigarettes more during in season (8.2%) compared to off season (7.0%), and smokeless tobacco use was the same for both in and off seasons (3.2%) (Yusko, Buckman, White, & Pandina, 2008).

Another comparative research study examined the prevalence of hookah smoking and cigarette usage among college athletes and non-athletes. The study included club sports athletes and intramural athletes, in addition, to varsity athletes and non-athletes. The study sampled 8,728 college students from eight college campuses. The demographics were as follow: 5.2% \((n = 447)\) were varsity athletes, 11.9% \((n = 1,023)\) were club sports athletes, and 24.9% \((n = 2,142)\) were intramural athletes, and 58.6% \((n = 5,116)\) were non-athletes. The researchers obtained their data through self-report surveys. Of the entire sample, 29.5% \((n = 2,576)\) of participants reported lifetime hookah pipe usage (ever smoking a hookah pipe) and 7.2% \((n = 631)\) indicated hookah pipe usage in the last 30 days. Additionally, researchers found club sports athletes and intramural athletes to have significantly higher rates of lifetime hookah pipe usage compared to non-athlete participants \((p < 0.001\) for both). Varsity athletes did not have any statistically different rates of lifetime hookah pipe usage compared to non-athlete participants \((p < 0.36)\). Overall, 34.1% \((n = 2,979)\) of the entire sample indicated ever smoking a cigarette, and 16.4% \((n = 1,433)\) reported cigarette usage in the past 30 days. In comparison to non-athlete participants, varsity athletes, club sports athletes, and intramural athletes had significantly lower prevalence of lifetime cigarette usage \((p < 0.001; p < 0.006; p < 0.02)\)
(Primack, Fertman, Rice, Adachi-Mejia, & Fine, 2010). Alternatively, according to these data, students who participated in athletics had higher prevalence rates of hookah pipe usage; whereas, students who did not participate in athletics had higher prevalence rates of cigarette usage.

Hookah smoking causes elevated levels of carbon monoxide within the body, more so than cigarette smoking. Carbon monoxide has the ability to take on the role of oxygen which is dangerous to the body. Carbon monoxide can attach to red blood cells and travel through the bloodstream just as oxygen would. Consequently, the body needs oxygen, not carbon monoxide, to be carried by the red blood cells to nourish the tissues in the body, such as the heart, brain, and lungs. Having an extreme level of carbon monoxide in the bloodstream can lead to carbon monoxide poisoning within the body (CDC, 2006). A scientific study was conducted using carbon monoxide readings to illustrate the immediate physiological effects of hookah smoking within the body. For the study, the participants were required to abstain from tobacco use for the 24 hours prior to the experimental hookah smoking session. The study participants (N= 32) had an average baseline carbon monoxide reading of 4.5 ppm. After participating in a 60 minute session of hookah smoking, the participants had an average post-session carbon monoxide reading of 38 ppm. The study found an average difference of 32 ppm of carbon monoxide exhaled between the before and after carbon monoxide readings (El Nachef & Hammond, 2008).

While the vast majority of research focuses on early, educational tobacco interventions, mainly for middle and high school students, Arria and colleagues provided research which indicated educational tobacco interventions should continue through
In 2004, Arria and colleagues commenced work on a longitudinal study which focused on the drug use and drug exposure patterns of college students. The researchers recruited study participants during their college orientation prior to beginning freshmen year. After offering monetary incentives and making multiple contact attempts, researchers were able to recruit 1,253 participants for the longitudinal study. Based upon self-reported baseline measurements, 50% ($n = 626$) of the study participants indicated having been exposed to tobacco products by 15 years of age. As part of the study design, participants were required to participate in annual, face-to-face interviews and semi-annual, web-based surveys. According to the annual, face-to-face interview during the study participants’ sophomore year, almost 10% ($n = 125$) of the study participants indicated having been initially exposed to tobacco products between the ages of 18 and 21. These results suggest a continued need for educational tobacco interventions on the college level.

*The Health Belief Model*

The Health Belief Model (HBM) was created in the 1950s in an attempt to understand why people did not take advantage of disease prevention and screening programs. The HBM has two basic assumptions: (1) people do not want to get sick, and (2) people believe specific health actions will prevent them from getting sick. The constructs of the HBM were built upon people’s perceptions which are strong indicators as to whether or not they will engage in behavior change (Champion, & Skinner, 2008). The key constructs of the HBM are:

Perceived Susceptibility: The perception of vulnerability of contracting an illness or disease.
Perceived Severity: An individual’s perception of the seriousness of an illness, if they do not engage in preventative actions.

Benefits of Taking Action: The perception the preventative actions will protect the person from contracting an illness or disease.

Barriers to Taking Action: An individual’s perception of any negative consequences related to engaging in the preventative action.

Cues to Action: Internal and external motivators which impact an individual’s behaviors.

Self-Efficacy: An individual’s confidence in themselves to successfully create a behavior change resulting in a desired outcome.

Irwin M. Rosenstock, the creator of the HBM, states two conditions must exist for an individual to participate in a preventative behavior or procedure: (1) the individual must be ready to act if a health condition is found, and (2) the individual must perceive the preventative procedure is appropriate for their use (Rosenstock, 1966).

The HBM was specifically chosen as a theoretical model for this research because of the low perception of harm which college students possess regarding tobacco product use. One main finding in the research, related to college student harm assessment of tobacco use, is the belief that hookah smoking is less harmful than other tobacco product use, such as cigarettes or smokeless tobacco (Eissenberg, Ward, Smith-Simone, & Maziak, 2008). In a recent qualitative study which utilized college students as participants, the college students indicated hookah smoking as a comfortable experience. Furthermore, the researchers recorded the college students thought hookah smoking was safe because they believed they did not inhale tobacco smoke during the activity (Roskin
& Aveyard, 2009). The lack of knowledge and low risk assessment may be facilitated by
the myths associated with hookah smoking due to an overall lack in tobacco education.

The HBM was a key theory utilized in a computer-assisted, tobacco cessation
program for community college students. The computerized questionnaire addressed the
participants’ perceived susceptibility to smoking facilitated disease, perceived severity of
smoking facilitated diseases, and perceived barriers which inhibit smoking cessation. The
researchers found the majority of the college students believed they had no symptoms or
disease resulting from smoking (79%). However, almost all of the students reported their
health had been affected by smoking (93%). This paradox can be explained by optimism
bias, a belief of invincibility experienced by teenagers and young adults. Additionally,
53% of these participants scored higher values on the pros of smoking scale than the cons
of smoking scale which indicated the overall belief the perceived barriers of cessation are
greater than the benefits of cessation (Prokhorov et al., 2007). While this particular study
used the HBM to implement cessation software, the study also exemplified the HBM’s
ability to identify key variables which impact an individual’s decision making relative to
health behaviors.

Self-Efficacy

While self-efficacy is a construct of the HBM, it is a powerful measure
independent of the HBM. Self-efficacy was defined by Bandura (1977, p. 193) as “the
conviction that one can successfully execute the behavior required to produce the
outcomes.” In other words, self-efficacy encompasses a person’s confidence in their own
ability to participate in a certain behavior.
Self-efficacy is an integral concept when assessing an individual’s ability to commit to behavior change. In 2008, researchers examined self-efficacy as a mediator for a web-based smokeless tobacco cessation program (Danaher, Smolkowski, Seeley, & Severson, 2008). Self-efficacy was measured at baseline and at three and six month intervals after the participant’s baseline measure. Researchers found change in self-efficacy to have a significant effect on abstinence ($p = 0.002$) which indicated self-efficacy as a simple mediator. In addition, change in self-efficacy was also identified as a multiple mediator of abstinence (Danaher et al., 2008). The study results confirm the importance of addressing self-efficacy during any tobacco educational or cessation interventions to maximize the success of the intervention.

**Stress**

Stress is defined as a perceived threat, whether it is real or imagined, to an individual’s mind, body, spirit, or emotions (Seaward, 2012). Stress is found in two forms: acute stress or chronic stress. Acute stress results from recent past experiences or anticipated near-future events, whereas, chronic stress results from stressors which occur over a long period of time, such as poverty, occupational stress, etc. (Miller & Smith, 1993). A common misconception relating to stress and tobacco use is the belief that tobacco use facilitates coping with stress. However, nicotine, the addictive drug found in tobacco products, is actually a stimulant which creates physiological stress within the human body (The Cleveland Clinic Foundation, 2008).

In 2008, a research study concerned with the perceived stress and health risk behaviors of college students was conducted (Nelson, Lust, Story, & Ehlinger, 2008). The researchers found 24.8% of the study participants ($n = 3,206$) indicated tobacco use
during the 30 days prior to completing the self-report survey. Additionally, while the researchers found high perceived stress levels to be an inconsistent indicator of tobacco use, poor stress management was the highest indicator of tobacco use (Nelson et al., 2008). In a comparative research study, researchers examined the stress levels of smoking and non-smoking female, college students (Kelley, Thomas, & Friedmann, 2003). Even with a small-sized sample (N = 41), researchers reported smokers possessed higher emotional stress scores, on a self-report survey, than non-smokers (Kelley et al., 2003).

**Summary**

The research clearly indicated tobacco use is prevalent among college students. The research also demonstrated the apparent need for more tobacco prevention interventions or education programs on the college level to inform students about the risks of using tobacco products. Additionally, tobacco prevention interventions should target social or occasional tobacco users as the research illustrated these tobacco users constitute a large portion of the college student population (Rhoads & Penhollow, 2011).
CHAPTER 3
Methods

Participants

The present study was concerned with examining the implications of an educational tobacco intervention on college students’ perceptions relative to tobacco (Health Belief Model variables), self-efficacy, and perceived stress levels. The intervention group consisted of a convenience sample of college students enrolled in 2000-level health courses. Additionally, a convenience sample of college students enrolled in the same 2000-level health courses (different sections) served as the control group. The participants were informed of the study goals and procedures in order to provide informed consent. As stated on the cover page of the pre- and post-test surveys, consent was considered implied if the study participant completed the survey.

Study Design

The Florida Atlantic University (FAU) IRB approved this study prior to beginning data collection. All surveys and learning sessions of the educational tobacco intervention were administered on the university campus. The educational tobacco intervention contained three learning sessions which were administered to the intervention group. The learning sessions were 20 to 30 minutes in duration. The session schedule conformed to the predetermined course schedule.

Each session was conducted in a lecture format using PowerPoint presentations (refer to Appendix B). The PowerPoint presentations utilized during the present study...
were created specifically for the purpose of this study. The presentations were both created and implemented by the thesis student. At the beginning of each PowerPoint presentation, the objectives for the session were presented within the PowerPoint. After the material of the session had been presented, summary slides concluded the presentation. These summary slides were meant to reiterate the key points of the presentation.

During the first learning session, information was presented about smoking and the negative health outcomes of cigarette usage, whereas, the second learning session was comprised of material related to smokeless tobacco. Finally, hookah smoking was the topic discussed in the third learning session. The material for the presentations was compiled from various government and peer-reviewed sources (references provide in Appendix B). Reference slides included all of the sources used for the presentation material, and were at the end of each PowerPoint.

Instrumentation

Study participants in the intervention group were required to complete a pre-test questionnaire at the beginning of the first learning session. The questionnaire included basic demographic information, questions related to tobacco use, questions based upon HBM constructs, self-efficacy items, and perceived stress questions. Most of the items on the questionnaire followed the format of a Likert-type scale. The survey items related to tobacco use were adapted from a previous study which analyzed health behaviors of college students, including tobacco use (Donnelly, Young, Pearson, Penhollow, & Hernandez, 2008). The questions related to self-efficacy were adapted from the General Self-Efficacy Scale (GSE) (Schwarzer & Jerusalem, 1995). The GSE has been tested
internationally in 23 nations, which resulted in Cronbach’s alphas ranging between 0.76 and 0.90. The 10-item, English language version of the GSE was utilized within the questionnaire. To measure perceived stress, questions were adapted from the Perceived Stress Scale (PSS) (Cohen, & Williamson, 1988). High scores on the PSS have been correlated with failure among diabetics to control blood sugar levels, greater vulnerability to stressful life-event-elicited depressive symptoms, and contracting more colds, in addition to, failure to quit smoking. Following the completion of the pre-test questionnaire, the educational materials were presented for the first learning session. At the completion of the third learning session, the study participants were required to complete the post-test questionnaire. The same questionnaire was used for the pre- and post-test survey for the control group participants. The control group participants completed the pre- and post-test surveys on the same days as the participants in the intervention group. The cover page of the survey served as the “script” for this study in order to provide both the intervention and control group participants with the same instructions relative to completing the survey correctly (refer to Appendix A).

Data Analysis

Upon completion of the educational intervention, data analysis was conducted. The pre- and post-test questionnaire results were coded and analyzed using Statistical Analysis Systems (SAS) v. 9.2. The data were analyzed using frequency counts (descriptive statistics), confirmatory factor analysis, Cronbach’s alpha, and multiple two-way analysis of variance (group by time). The descriptive statistics provided an overall summary of the study participants. The confirmatory factor analyses were performed on subscales within the questionnaire to identify which items of the subscales work together
as constructs to determine construct validity. Cronbach’s alphas measured the test-retest reliability subscales in the questionnaire. The two-way ANOVAs analyzed whether a statistically significant difference was present between the pre- and post-test survey responses of both groups. The level of significance for all data analysis was $p < 0.05$. 
CHAPTER 4
Results

Participant Demographics

Three hundred and thirty-nine students across 12 sections of a 2000-level health course began as participants in this study. One hundred and fifty-five students, 81 female (52%) and 74 male (48%), completed the pre-test questionnaire for the control group. One hundred and eighty-four students, 107 female (58%) and 77 male (42%), completed the pre-test questionnaire for the intervention group. However, due to participant dropout (29 participants), 136 participants ($n = 73$ female; $n = 63$ male) completed the post-test questionnaire for the control group, and 174 participants ($n = 97$ female; $n = 77$ male) completed the post-test questionnaire for the intervention group.

The majority of participants in the control and intervention groups were White (55%; 49%). Blacks accounted for 16% of the control group and 21% of the intervention group. Hispanics comprised 20% of the control group and 17% of the intervention group. For the control group, the remaining 9% was comprised of Asian/Pacific Islanders, American Indians, and other ethnicities. Additionally, the remaining 13% of the intervention group was comprised of Asian/Pacific Islanders, American Indians, and other ethnicities. Freshmen and sophomores accounted for the majority of participants in the control ($n = 91; 60\%$) and intervention ($n = 127; 69\%$) groups. Lastly, the majority of participants fell between the ages of 18 and 21 for both groups (control $= 78\%$;
intervention = 83%). Table 1 provides the frequency counts for gender, class/grade, race, and age for both control and intervention groups. The participant demographics for each group were representative of the university’s student population: nearly 60% female and 40% male and more than 50% White, 17% Black, 20% Hispanic, 5% Asian, less than 1% Native American, and 3% other (Florida Atlantic University, 2011).

Table 1. Frequency Counts of Participant Demographics

<table>
<thead>
<tr>
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<th>Control</th>
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<th>Intervention</th>
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<td>Female</td>
<td>81</td>
<td>52%</td>
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</tr>
<tr>
<td>Male</td>
<td>74</td>
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<tr>
<td><strong>Class/Grade</strong></td>
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<tr>
<td>Freshmen</td>
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</tr>
<tr>
<td>Sophomore</td>
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<td>Junior</td>
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<td>6%</td>
</tr>
</tbody>
</table>

**Participant Tobacco Education and Tobacco Use**

As denoted in Table 2, the majority of participants in both control and intervention groups received tobacco education previously in elementary, middle, or high school. However, the majority of participants in both the control (n = 84; 54%) and
intervention \((n = 109; 59\%)\) groups had not received tobacco education at the college level prior to the administration of the intervention.

Regardless of receiving previous tobacco education, the control group responses indicated more than half of the participants had smoked a cigarette \((n = 80; 52\%)\). Additionally, a little less than half of the intervention group indicated previous cigarette use \((n = 89; 48\%)\). Smaller portions of the control \((n = 25; 16\%)\) and intervention \((n = 36; 20\%)\) groups responded as previously using smokeless tobacco. Additionally, the amount of participants who reported past hookah smoking was higher than any other tobacco product use for both control \((n = 93; 60\%)\) and intervention \((n = 97; 53\%)\) groups.

Table 2. Frequency Counts of Participant Tobacco Education and Tobacco Use

<table>
<thead>
<tr>
<th>Elementary School Tobacco Education</th>
<th>Control</th>
<th></th>
<th>Intervention</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug Education Course</td>
<td>116</td>
<td>75%</td>
<td>145</td>
<td>79%</td>
</tr>
<tr>
<td>Health Course</td>
<td>22</td>
<td>14%</td>
<td>20</td>
<td>11%</td>
</tr>
<tr>
<td>No Tobacco Education</td>
<td>17</td>
<td>11%</td>
<td>19</td>
<td>10%</td>
</tr>
<tr>
<td>Middle School Tobacco Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug Education Course</td>
<td>65</td>
<td>42%</td>
<td>72</td>
<td>39%</td>
</tr>
<tr>
<td>Health Course</td>
<td>65</td>
<td>42%</td>
<td>92</td>
<td>50%</td>
</tr>
<tr>
<td>No Tobacco Education</td>
<td>25</td>
<td>16%</td>
<td>20</td>
<td>11%</td>
</tr>
<tr>
<td>High School Tobacco Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug Education Course</td>
<td>18</td>
<td>11%</td>
<td>27</td>
<td>15%</td>
</tr>
<tr>
<td>Health Course</td>
<td>94</td>
<td>61%</td>
<td>118</td>
<td>64%</td>
</tr>
<tr>
<td>No Tobacco Education</td>
<td>43</td>
<td>28%</td>
<td>39</td>
<td>21%</td>
</tr>
<tr>
<td>College Tobacco Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug Education Presentation</td>
<td>46</td>
<td>30%</td>
<td>43</td>
<td>23%</td>
</tr>
<tr>
<td>Health Course</td>
<td>25</td>
<td>16%</td>
<td>32</td>
<td>18%</td>
</tr>
<tr>
<td>No Tobacco Education</td>
<td>84</td>
<td>54%</td>
<td>109</td>
<td>59%</td>
</tr>
<tr>
<td>Lifetime Cigarette Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>80</td>
<td>52%</td>
<td>89</td>
<td>48%</td>
</tr>
<tr>
<td>No</td>
<td>75</td>
<td>48%</td>
<td>95</td>
<td>52%</td>
</tr>
<tr>
<td>Current Cigarette Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoke Every Day</td>
<td>10</td>
<td>6%</td>
<td>5</td>
<td>3%</td>
</tr>
<tr>
<td>Smoke Almost Every Day</td>
<td>3</td>
<td>2%</td>
<td>4</td>
<td>2%</td>
</tr>
<tr>
<td>Smoke Once in a While</td>
<td>9</td>
<td>6%</td>
<td>12</td>
<td>6%</td>
</tr>
<tr>
<td>Used to Smoke Every Day</td>
<td>6</td>
<td>4%</td>
<td>7</td>
<td>4%</td>
</tr>
<tr>
<td>Used to Smoke Once in a While</td>
<td>52</td>
<td>34%</td>
<td>58</td>
<td>32%</td>
</tr>
<tr>
<td>Never Smoked</td>
<td>75</td>
<td>48%</td>
<td>98</td>
<td>53%</td>
</tr>
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</table>

(continued on next page)
### Future Cigarette Use

<table>
<thead>
<tr>
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<th>3%</th>
<th>0</th>
<th>0%</th>
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<tbody>
<tr>
<td></td>
<td>No</td>
<td>97%</td>
<td>184</td>
<td>100%</td>
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</tbody>
</table>

### Lifetime Smokeless Tobacco Use

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>16%</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>84%</td>
<td>80%</td>
</tr>
</tbody>
</table>

### Current Smokeless Tobacco Use

<table>
<thead>
<tr>
<th></th>
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<th>3%</th>
<th>3%</th>
<th>3%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>97%</td>
<td>97%</td>
<td>98%</td>
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</tbody>
</table>

### Future Smokeless Tobacco Use

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<th>2%</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>97%</td>
<td>98%</td>
</tr>
</tbody>
</table>

### Lifetime Hookah Use

<table>
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<tbody>
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<td>No</td>
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<td>47%</td>
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</table>

### Current Hookah Use

<table>
<thead>
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<th>1%</th>
<th>1%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>23%</td>
<td>2%</td>
</tr>
</tbody>
</table>

### Future Hookah Use

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>15%</th>
<th>18%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>85%</td>
<td>82%</td>
</tr>
</tbody>
</table>

### Factor Analyses

Confirmatory principle components factor analysis using varimax rotation were performed on three scales within the questionnaire: Health Belief Model (HBM) scale relating to tobacco, General Self-Efficacy Scale (GSE), and Perceived Stress Scale (PSS).

The factor analysis confirmed six subscales within the Health Belief Model scale relating to tobacco which paralleled the six constructs of the model: (1) perceived susceptibility; (2) perceived severity; (3) benefits of taking action; (4) barriers to taking action; (5) cues to action; (6) self-efficacy. The factor loadings for the subscales in the Health Belief Model scale ranged between 0.69 and 0.87, which indicated strong factor loadings (>
0.60) among these items. The factor analyses also confirmed strong factor loadings for both the 10-item GSE (0.62 – 0.86) and the 10-item PSS (0.62 – 0.79). Table 3 illustrates the results of the factor analyses.

Table 3. Confirmatory Factor Analyses

<table>
<thead>
<tr>
<th>Health Belief Model (HBM) scale</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceived Susceptibility</strong></td>
<td></td>
</tr>
<tr>
<td>Diseases caused by tobacco use (like heart disease and cancer) are serious, causing over 400,000 people in the U.S. to die each year.</td>
<td>.77</td>
</tr>
<tr>
<td>Tobacco smoke contains 4,000 toxic chemicals known to be cancer-causing agents.</td>
<td>.79</td>
</tr>
<tr>
<td>Tobacco products (cigarettes, cigars, chew, and dip) contain nicotine, a substance known to cause addiction to the products.</td>
<td>.73</td>
</tr>
<tr>
<td><strong>Perceived Severity</strong></td>
<td></td>
</tr>
<tr>
<td>If I smoke cigarettes it is likely that I will get a serious disease like lung cancer or heart disease and possibly die from it.</td>
<td>.85</td>
</tr>
<tr>
<td>If I use smokeless tobacco it is likely that I will get a serious disease like oral cancer and possibly die from it.</td>
<td>.85</td>
</tr>
<tr>
<td>If I smoke tobacco using a hookah pipe it is likely that I will get a serious disease like lung cancer or heart disease and possibly die from it.</td>
<td>.83</td>
</tr>
<tr>
<td><strong>Benefits of Taking Action</strong></td>
<td></td>
</tr>
<tr>
<td>The benefits of not smoking cigarettes clearly outweigh any benefits that might be attributed to smoking.</td>
<td>.69</td>
</tr>
<tr>
<td>The benefits of not using smokeless tobacco clearly outweigh any benefits that might be attributed to using smokeless tobacco.</td>
<td>.86</td>
</tr>
<tr>
<td>The benefits of not smoking tobacco with a hookah pipe clearly outweigh any benefits that might be attributed to smoking with a hookah pipe.</td>
<td>.81</td>
</tr>
<tr>
<td><strong>Barriers to Taking Action</strong></td>
<td></td>
</tr>
<tr>
<td>If my friends pressured me to smoke cigarettes with them I would probably go along and smoke with them.</td>
<td>.83</td>
</tr>
<tr>
<td>If my friends pressured me to use smokeless tobacco with them I would probably go along and use it with them.</td>
<td>.79</td>
</tr>
<tr>
<td>If my friends pressured me to smoke tobacco with a hookah pipe with them I would probably go along and smoke it with them.</td>
<td>.84</td>
</tr>
<tr>
<td><strong>Cues to Action</strong></td>
<td></td>
</tr>
<tr>
<td>Most people my age smoke cigarettes.</td>
<td>.80</td>
</tr>
<tr>
<td>Most people my age use smokeless tobacco.</td>
<td>.78</td>
</tr>
<tr>
<td>Most people my age smoke tobacco using a hookah pipe.</td>
<td>.78</td>
</tr>
<tr>
<td><strong>Self-Efficacy</strong></td>
<td></td>
</tr>
<tr>
<td>I believe I can say &quot;no&quot; to smoking, even if my friends pressure me to smoke.</td>
<td>.84</td>
</tr>
</tbody>
</table>

(continued on next page)
I believe I can say “no” to smokeless tobacco, even if my friends pressure me to chew/dip.
I believe I can say “no” to smoking tobacco with a hookah pipe, even if my friends pressure me to smoke.

**General Self-Efficacy (GSE) scale**
- I can always manage to solve difficult problems if I try hard enough. .70
- If someone opposes me, I can find the means and ways to get what I want. .62
- It is easy for me to stick to my aims and accomplish my goals. .74
- I am confident that I could deal efficiently with unexpected events. .83
- Thanks to my resourcefulness, I know how to handle unforeseen situations. .85
- I can solve most problems if I invest the necessary effort. .86
- I can remain calm when facing difficulties because I can rely on my coping abilities. .78
- When I am confronted with a problem, I can usually find several solutions. .85
- If I am in trouble, I can usually think of a solution. .84
- I can usually handle whatever comes my way. .86

**Perceived Stress Scale (PSS)**
- In the last month, how often have you been upset because of something that happened unexpectedly? .77
- In the last month, how often have you felt that you were unable to control the important things in your life? .74
- In the last month, how often have you felt nervous and “stressed”? .78
- In the last month, how often have you felt confident about your ability to handle your personal problems? .79
- In the last month, how often have you felt that things were going your way? .78
- In the last month, how often have you found that you could not cope with all the things that you had to do? .62
- In the last month, how often have you been able to control irritations in your life? .74
- In the last month, how often have you felt that you were on top of things? .78
- In the last month, how often have you been angered because of things that were outside of your control? .76
- In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? .77

---

**Cronbach's Alpha**

Cronbach’s alpha scores were computed for the Health Belief Model scale, General Self-Efficacy Scale (GSE), and Perceived Stress Scale (PSS). The Health Belief Model scale consisted of 18 items, and produced a Cronbach’s alpha of 0.60, which is less reliable than the ideal alpha (> 0.70) as reported by Nunnally and Bernstein (1994).
However, both the 10-item GSE and PSS were found to be more reliable. The Cronbach’s alphas for the GSE and PSS were 0.90 and 0.72, respectively.

Two-Way ANOVA

Separate two-way analysis of variance (ANOVA) were performed to analyze the factors which emerged from the confirmatory factor analyses. Group (control vs. intervention) and time (pre-test vs. post-test) served as the independent variables for each two-way ANOVA. The results of the two-way ANOVA for the Health Belief Model (Table 4) indicated no statistically significant difference between groups \([F(1,641) = 0.62, p = 0.43]\); however, there was a statistically significant difference for time \([F(1,641) = 9.07, p = 0.002]\). Multiple pairwise comparisons were performed using Tukey’s HSD which identified a statistically significant difference between the pre-test and post-test questionnaire responses in the intervention group \((p = 0.01)\). Overall, there was no statistically significant interaction between group and time relative to the Health Belief Model \([F(1,641) = 1.39, p = 0.23]\).

**Table 4. Two-Way ANOVA for Health Belief Model**

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>13.1234083</td>
<td>1</td>
<td>13.1234083</td>
<td>0.62</td>
<td>0.4324</td>
</tr>
<tr>
<td>Time</td>
<td>192.9402459</td>
<td>1</td>
<td>192.9402459</td>
<td>9.07</td>
<td>0.0027*</td>
</tr>
<tr>
<td>Group x Time</td>
<td>29.5893857</td>
<td>1</td>
<td>29.5893857</td>
<td>1.39</td>
<td>0.2386</td>
</tr>
<tr>
<td>Error</td>
<td>13631.40743</td>
<td>641</td>
<td>17545761.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>13867.06047</td>
<td>644</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Statistically significant at \(p<0.05\)

Two-way ANOVAs were performed on all six of the Health Belief Model factors (Table 5) which emerged from the factor analysis: (1) perceived susceptibility; (2)
perceived severity; (3) benefits of taking action; (4) barriers to taking action; (5) cues to action; (6) self-efficacy. The results of the two-way ANOVA relative to perceived susceptibility indicated no statistically significant difference for group \(F(1,645) = 0.01, p = 0.92\) or time \(F(1,645) = 0.70, p = 0.40\). However, the interaction between group and time was statistically significant \(F(1,645) = 4.24, p = 0.04\).

The two-way ANOVA conducted using the perceived severity questionnaire items indicated no statistically significant difference between groups \(F(1,645) = 0.02, p = 0.88\); however, statistical significance was found for time \(F(1,645) = 22.45, p < 0.001\). Tukey’s HSD revealed a statistically significant difference between the pre-test and post-test responses for the intervention group \((p < 0.001)\). Despite the robust statistical significance for time, the interaction between group and time was not statistically significant \(F(1,645) = 2.40, p = 0.12\).

Benefits of taking action was statistically significant between groups \(F(1,644) = 4.06, p = 0.04\), but not statistically significant for time \(F(1,644) = 1.73, p = 0.18\) or the interaction between group and time \(F(1,644) = 3.38, p = 0.06\). Multiple pairwise comparisons (Tukey’s HSD) indicated the statistically significant difference for group was between the control group post-test responses and the intervention group post-test responses \((p = 0.03)\).

The results of the two-way ANOVA completed on barriers to taking action produced no statistically significant findings for group \(F(1,642) = 0.03, p = 0.87\), time \(F(1,642) = 1.08, p = 0.29\), or interaction \(F(1,642) = 2.32, p = 0.12\).

Cues to action items were not statistically significant between groups \(F(1,645) = 0.27, p = 0.60\); however, a statistical difference was found for time \(F(1,645) = 7.60, p =
Regardless, the group and time interaction was not statistically significant \( F(1,645) = 0.14, p = 0.71 \).

Lastly, the items relative to the Health Belief Model construct of self-efficacy did not produce any statistical significance for group \( F(1,644) = 0.14, p = 0.70 \), time \( F(1,644) = 1.44, p = 0.23 \), or group and time interaction \( F(1,644) = 0.19, p = 0.66 \). Table 5 provides a summary of all six two-way ANOVA results for the HBM constructs.

The two-way ANOVA performed on the General Self-Efficacy Scale (Table 6) items revealed a statistically significant difference between groups \( F(1,632) = 4.41, p = 0.03 \); however, there was no statistically significant difference for time \( F(1,632) = 0.99, p = 0.32 \) or group and time interaction \( F(1,632) = 0.21, p = 0.64 \).

The results of the two-way ANOVA conducted on the Perceived Stress Scale items did not indicate any statistical significance for group \( F(1,600) = 0.33, p = 0.56 \), time \( F(1,600) = 0.46, p = 0.49 \), or group and time interaction \( F(1,600) = 0.00, p = 0.99 \). Table 7 provides a summary of the findings.
Table 5. Two-Way ANOVAs for Health Belief Model Constructs

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceived Susceptibility</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>0.01476081</td>
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<td>0.01476081</td>
<td>0.01</td>
<td>0.9218</td>
</tr>
<tr>
<td>Time</td>
<td>1.06710631</td>
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<td>1.06710631</td>
<td>0.70</td>
<td>0.4043</td>
</tr>
<tr>
<td>Group x Time</td>
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<td>6.49183602</td>
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<td>0.0400*</td>
</tr>
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<td>645</td>
<td>1.5323005</td>
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</tr>
<tr>
<td>Total</td>
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<td></td>
<td></td>
</tr>
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<td><strong>Perceived Severity</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Group</td>
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<td>&lt;.0001*</td>
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<td>3.914940</td>
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<tr>
<td>Total</td>
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<td></td>
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</tr>
<tr>
<td><strong>Benefits</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
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<td>10.84351748</td>
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<td>0.0443*</td>
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<tr>
<td>Time</td>
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<td>4.60898136</td>
<td>1.73</td>
<td>0.1894</td>
</tr>
<tr>
<td>Group x Time</td>
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<td>1</td>
<td>9.03624066</td>
<td>3.38</td>
<td>0.0663</td>
</tr>
<tr>
<td>Error</td>
<td>1719.455705</td>
<td>644</td>
<td>2.669962</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1743.944444</td>
<td>647</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Barriers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>0.11638090</td>
<td>0.03</td>
<td>0.8714</td>
</tr>
<tr>
<td>Time</td>
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<td>4.81526446</td>
<td>1.08</td>
<td>0.2980</td>
</tr>
<tr>
<td>Group x Time</td>
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<td>10.28059392</td>
<td>2.32</td>
<td>0.1285</td>
</tr>
<tr>
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<td>642</td>
<td>4.38543</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>645</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cues to Action</strong></td>
<td></td>
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* Statistically significant at $p<0.05$
Table 6. Two-Way ANOVA for Self-Efficacy

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* Statistically significant at $p<0.05$

Table 7. Two-Way ANOVA for Perceived Stress

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* Statistically significant at $p<0.05$
The purpose of the present study was to determine whether an educational tobacco intervention impacted college student’s perceptions relative to tobacco (Health Belief Model variables), self-efficacy, and perceived stress levels. The current study contributes to past research regarding college student tobacco use by examining the results of an educational tobacco intervention on college students’ perceptions regarding cigarette smoking, smokeless tobacco use, and hookah smoking, in addition to, self-efficacy and perceived stress. The Health Belief Model (HBM) constructs of perceived susceptibility, perceived severity, benefits of taking action, barriers to taking action, cues to action, and self-efficacy were used to distinguish differences between groups and pre- and post-test questionnaire responses (time) regarding tobacco. Most studies conducted with college students related to tobacco are, typically, single-step surveys which do not incorporate an experimental design (CDC 1997; Yusko et al., 2008; Primack et al., 2010; Prokhorov et al., 2007; Nelson et al., 2008; Kelley et al., 2003).

The major finding of this study was an educational tobacco intervention had a statistically significant impact on college students’ perceptions relative to tobacco. College students’ perceptions, as measured by the HBM constructs, for the intervention group were significantly different for the pre- and post-test questionnaire responses. In other words, providing tobacco education changed the participants’ perceptions regarding
the use of tobacco products. Additionally, when each HBM construct was analyzed, perceived susceptibility of developing a tobacco-related disease presented a statistically significant interaction between group and time. Perceived severity of tobacco-facilitated diseases was statistically significant between the pre- and post-test response of the intervention group. The benefits of tobacco abstinence were statistically significant between the post-test responses of the control and intervention groups. Furthermore, cues to action were statistically significant for the main effect of time. There were no statistically significant findings relevant to barriers to taking action and self-efficacy related to tobacco.

Based upon these findings, the null hypothesis was rejected for college student’s perceptions relative to tobacco since differences were distinguished using the HBM and relative constructs. Providing college students with an educational tobacco intervention can reiterate the susceptibility and severity of tobacco-related diseases and the benefits of abstaining from tobacco product use.

Regarding general self-efficacy, the current investigation found a statistically significant difference in self-efficacy between the control and intervention groups. Thus, the null hypothesis was rejected for college students’ self-efficacy since a difference was found for one of the main effects. Consequently, no significant findings were identified regarding perceived stress levels. Therefore, the present study failed to reject the null hypothesis relating to college students’ perceived stress levels. Considering this finding, it appears providing students with an educational tobacco intervention is not necessarily a good strategy for decreasing college students’ perceived stress levels.
Limitations

There are limitations for the present study. Study participants for both control and intervention groups were composed of a convenience sample from 12 sections of a 2000-level health course; however, as previously addressed, both groups were representative of the university’s student population.

Data collection was conducted using self-reported questionnaire responses. Although the survey responses were anonymous, participants could have reported socially desirable responses in lieu of truthful responses which can introduce bias to the data. Additionally, participants were provided with scantrons to record their responses. Due to the in-class data collection procedure, participants who felt pressured to finish the questionnaires quick, may have also reported false responses in order to finish the questionnaire. Furthermore, since the same questionnaire was administered for the pre- and post-test measures, participants in the intervention group may have been inclined to report the same responses for the pre- and post-test regardless of the educational intervention in order to quickly finish the post-test questionnaire.

Conclusion

The study findings indicate continuing tobacco education at the college level produces a significant impact on students relative to their perceptions of vulnerability and severity to tobacco-facilitated diseases. Since this study focused on basic education and not tobacco cessation, the intervention was appropriate for both tobacco and non-tobacco users. Future researchers should address whether the differences produced by an educational intervention are significant enough to produce cessation or continued tobacco abstinence.
APPENDIX A

2011

FLORIDA ATLANTIC UNIVERSITY

TOBACCO USE SURVEY

DO NOT WRITE ON THIS BOOKLET

Research regarding various health issues is important because it gives us insight into human health behavior and factors that may influence health behavior. You are invited to participate in this study of tobacco and health behavior. The study examines prevalence, knowledge, and attitudes related to tobacco. Completion of this survey will only take a few minutes of your time. A possible benefit to participants may be personal insight regarding their own health behaviors and motivation.

Your responses to the questionnaire will be totally anonymous. Your name will not be part of a data file. Your name cannot be linked to your responses. Please answer all questions honestly. We hope that you will choose to participate and that you will answer all of our questions. We assume that if you complete the survey, you have given your consent to participate in the study. If you would like a copy of the results of the study, e-mail Kelley Rhoads (krhoads2@fau.edu) and they will be provided to you as soon as they are available.

Do not put your name anywhere on this questionnaire or on the answer sheet. Use the electronically scored answer sheet to record all of your answers. Please use a regular pencil to record your responses. Remember your answers are anonymous; your name will not be associated with the study, linked to your answers, nor used in any type of report related to this study. Make sure to read the directions at the bottom of this page prior to starting the survey.

The results of this questionnaire may be submitted for presentation at professional meetings or publication in professional journals. If you experience problems or have questions regarding your rights as a research subject, contact the Florida Atlantic University Division of Research at (561) 297-0777. If you have questions concerning this study, feel free to contact Kelley Rhoads, Florida Atlantic University, Department of Exercise Science and Health Promotion, Boca Raton, FL, krhoads2@fau.edu.

Directions:
Please complete the survey in its entirety. Indicate your answers to each question by bubbling in the corresponding letter or letters on the electronically scored sheet. Examples: If your answer choice is "a" please bubble in the "a" bubble. If your answer choice is "ab" please bubble in both the "a" and "b" bubbles for the corresponding question number.
Background Information

1. Gender – Please indicate your gender.
   a. Male
   b. Female

2. Class/Grade – Please indicate your class in school.
   a. Freshman
   b. Sophomore
   c. Junior
   d. Senior
   e. Graduate student

3. Race – Please indicate your ethnicity.
   a. Caucasian (White)
   b. African-American (Black)
   c. Hispanic
   d. Asian/Pacific Islander
   e. American Indian
   ab. Other

4. Age – Please indicate how old you are.
   a. Under 18
   b. 18
   c. 19
   d. 20
   e. 21
   ab. 22
   ac. 23
   ad. 24
   ae. Over 24

5. Athletic Involvement – Please indicate your athletic involvement on a sports team.
   a. I am a current NCAA athlete for Florida Atlantic University.
   b. I am an active participant on a Florida Atlantic University club sports team.
   c. I am an active participant on a Florida Atlantic University intramural sports team.
   d. I am an active participant on a non-Florida Atlantic University affiliated sports team.
   e. I am not a participant of a sports team.

6. GPA – Please indicate your cumulative college GPA.
   a. below 2.0
   b. 2.0 - 2.5
   c. 2.5 - 3.0
   d. 3.0 - 3.5
   e. 3.5 - 4.0
   ab. 4.0
7. Employment – Please indicate your employment status.  
   a. Employed full-time (40+ hours)  
   b. Employed part-time (30 hours or less)  
   c. Not employed  

8. Living situation – Please indicate your current living situation  
   a. on campus (resident hall or dorm)  
   b. fraternity or sorority house  
   c. living with a parent  
   d. living independently  

9. Elementary School Tobacco Education – Please indicate the tobacco education you received in Elementary School.  
   a. In Elementary School, I received a drug education course, such as D.A.R.E or the Red Ribbon Campaign, which included tobacco.  
   b. In Elementary School, I received tobacco education in a health or physical education class.  
   c. In Elementary School, I did not receive any tobacco education.  

10. Middle School Tobacco Education – Please indicate the type of tobacco education you received in Middle School.  
    a. In Middle School, I received a drug education course, such as D.A.R.E or the Red Ribbon Campaign, which included tobacco.  
    b. In Middle School, I received tobacco education in a health or physical education class.  
    c. In Middle School, I did not receive any tobacco education.  

11. High School Tobacco Education – Please indicate the tobacco education you received in High School.  
    a. In High School, I received a drug education course, such as D.A.R.E or the Red Ribbon Campaign, which included tobacco.  
    b. In High School, I received tobacco education in a health or physical education class.  
    c. In High School, I did not receive any tobacco education.  

12. College Tobacco Education – Please indicate the tobacco education you have received in College so far.  
    a. In College, I received a drug education presentation, such as a Today and Beyond Wellness presentation, which included tobacco.  
    b. In College, I received tobacco education in a health or physical education class.  
    c. In College, I have not received any tobacco education so far.  

**Tobacco Use**  
13. Have you ever smoked a cigarette?  
    a. Yes  
    b. No
14. How often do you smoke cigarettes?  
   a. I smoke cigarettes every day.  
   b. I usually smoke cigarettes just about every day.  
   c. I smoke cigarettes once in a while but not every day.  
   d. I used to smoke cigarettes every day, but I don't smoke them now.  
   e. I have smoked cigarettes a few times, but I don't smoke them now.  
   ab. I have never smoked cigarettes.  

15. Do you expect to smoke cigarettes when you are older?  
   a. Yes  
   b. No  

16. Have you ever tried smokeless tobacco (dipping or chewing tobacco)?  
   a. Yes  
   b. No  

17. How often do you use smokeless tobacco now?  
   a. I dip or chew every day.  
   b. I usually dip or chew just about every day.  
   c. I dip or chew once in a while, but not every day.  
   d. I used to dip or chew every day, but I don't do it now.  
   e. I have tried it a few times but I don't do it now.  
   ab. I have never dipped or chewed tobacco.  

18. Do you expect to use smokeless tobacco when you are older?  
   a. Yes  
   b. No  

19. Have you ever smoked tobacco using a hookah pipe?  
   a. Yes  
   b. No  

20. How often do you smoke tobacco using a hookah pipe?  
   a. I smoke a hookah pipe every day.  
   b. I usually smoke a hookah pipe just about every day.  
   c. I smoke a hookah pipe once in a while but not every day.  
   d. I used to smoke a hookah pipe every day, but I don't smoke it now.  
   e. I have smoked a hookah pipe a few times, but I don't smoke it now.  
   ab. I have never smoked tobacco using a hookah pipe.  

21. Do you expect to smoke tobacco using a hookah pipe when you are older?  
   a. Yes  
   b. No
Health Belief Model and Tobacco Use
For the following statements (22-39) indicate on your answer sheet if you:
A = Strongly Agree, B = Agree, C = Disagree, D = Strongly Disagree

22. Most people my age smoke cigarettes.
23. Most people my age use smokeless tobacco.
24. Most people my age smoke tobacco using a hookah pipe.
25. Diseases caused by tobacco use (like heart disease and cancer) are serious, causing over 400,000 people in the U.S. to die each year.
26. Tobacco smoke contains 4,000 toxic chemicals known to be cancer-causing agents.
27. Tobacco products (cigarettes, cigars, chew, and dip) contain nicotine, a substance known to cause addiction to the products.
28. If I smoke cigarettes it is likely that I will get a serious disease like lung cancer or heart disease and possibly die from it.
29. If I use smokeless tobacco it is likely that I will get a serious disease like oral cancer and possibly die from it.
30. If I smoke tobacco using a hookah pipe it is likely that I will get a serious disease like lung cancer or heart disease and possibly die from it.
31. The benefits of not smoking cigarettes clearly outweigh any benefits that might be attributed to smoking.
32. The benefits of not using smokeless tobacco clearly outweigh any benefits that might be attributed to using smokeless tobacco.
33. The benefits of not smoking tobacco with a hookah pipe clearly outweigh any benefits that might be attributed to smoking with a hookah pipe.
34. If my friends pressured me to smoke cigarettes with them I would probably go along and smoke with them.
35. If my friends pressured me to use smokeless tobacco with them I would probably go along and use it with them.
36. If my friends pressured me to smoke tobacco with a hookah pipe with them I would probably go along and smoke it with them.
37. I believe I can say "no" to smoking, even if my friends pressure me to smoke.
38. I believe I can say "no" to smokeless tobacco, even if my friends pressure me to chew/dip.
39. I believe I can say "no" to smoking tobacco with a hookah pipe, even if my friends pressure me to smoke.
Self-Efficacy
For the following statements (40-49) indicate on your answer sheet if the statement is:
A = Not at all True, B = Hardly True, C = Moderately True, D = Exactly True

40. I can always manage to solve difficult problems if I try hard enough.
41. If someone opposes me, I can find the means and ways to get what I want.
42. It is easy for me to stick to my aims and accomplish my goals.
43. I am confident that I could deal efficiently with unexpected events.
44. Thanks to my resourcefulness, I know how to handle unforeseen situations.
45. I can solve most problems if I invest the necessary effort.
46. I can remain calm when facing difficulties because I can rely on my coping abilities.
47. When I am confronted with a problem, I can usually find several solutions.
48. If I am in trouble, I can usually think of a solution.
49. I can usually handle whatever comes my way.

Perceived Stress
For the following statements (50-59) indicate how often you felt or thought a certain way:
A = Never, B = Almost Never, C = Sometimes, D = Fairly Often, E = Very Often

50. In the last month, how often have you been upset because of something that happened unexpectedly?
51. In the last month, how often have you felt that you were unable to control the important things in your life?
52. In the last month, how often have you felt nervous and “stressed”?
53. In the last month, how often have you felt confident about your ability to handle your personal problems?
54. In the last month, how often have you felt that things were going your way?
55. In the last month, how often have you found that you could not cope with all the things that you had to do?
56. In the last month, how often have you been able to control irritations in your life?
57. In the last month, how often have you felt that you were on top of things?
58. In the last month, how often have you been angered because of things that were outside of your control?
59. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
APPENDIX B

Learning session 1: tobacco 101
Kelley Rhodes, MS Candidate, CHES
Florida Atlantic University
Boca Raton, FL

Session Learning Objectives
- Participants will be able to describe the state of cigarette usage in the United States.
- Participants will be able to state at least 3 adverse health effects associated with using cigarettes.
- Participants will be able to comprehend the mechanisms which cause people to continue cigarette usage.
- Participants will be able to state at least 3 health benefits associated with cigarette cessation.

Tobacco Use
- Leading cause of preventable death
- 435,000 smoking attributable deaths each year (2001)
- 8.6 million serious illnesses each year (2000)
- According to the Surgeon General 2004 report, 50,000 deaths are attributed to secondhand smoke exposure each year.
- Tobacco contains a known 4,000 chemicals

Chemicals Found in Tobacco

Cigarette Smoking in the U.S. 2007

Cigarette Smoking Among Adults 18 and Over

Percent

Race

White

Black

Hispanic

Other

Sex

Male

Female

Age-adjusted percent

20-24

25-44

45-64

65+
Cigarette Smoking by Gender in the U.S.

Health Effects of Cigarette Smoking
- Compared with nonsmokers, smoking is estimated to increase the risk of
  - coronary heart disease by 2 to 4 times
  - stroke by 2 to 4 times
  - men developing lung cancer by 23 times
  - women developing lung cancer by 13 times
  - dying from chronic obstructive lung diseases (such as chronic bronchitis and emphysema) by 12 to 13 times

Cardiovascular Disease
- Smoking causes coronary heart disease, the leading cause of death in the United States.
- Cigarette smoking causes reduced circulation by narrowing the blood vessels (arteries) and puts smokers at risk of developing peripheral vascular disease.
- Smoking causes abdominal aortic aneurysm which is a swelling or weakening of the main artery of the body—the aorta—where it runs through the abdomen.

Respiratory Illnesses
- Smoking causes lung cancer.
- Smoking causes lung diseases such as:
  - Emphysema
  - Bronchitis
  - chronic airway obstruction
  - by damaging the walls of the lungs.

Cancer(s)
- Smoking causes the following cancers:
  - Leukemia
  - Bladder cancer
  - Cervical cancer
  - Esophageal cancer
  - Kidney cancer
  - Cancer of the larynx (voice box)
  - Lung cancer
  - Cancer of the oral cavity (mouth)
  - Cancer of the pharynx (throat)
  - Stomach cancer
  - Uterine cancer

Why Do People Smoke?
- Nicotine, the addictive chemical found in tobacco, enters the bloodstream from the lungs upon smoking, then rapidly (~30 secs) reaches the brain.
- Nicotine acts as a Central Nervous System stimulant, leading to autonomic arousal.
- Nicotine dependence causes:
  - Withdrawal (decreased mood, appetite increase, sleep disturbance, irritability, anxiety, difficulty concentrating, CRAWLING)
  - Substances used more, or longer, than intended
  - Persistent desire, or unsuccessful efforts, to cut down or stop
**Benefits of Quitting Smoking**

- **Within 20 Minutes:**
  - Carbon monoxide levels in the blood return to normal
  - Heart rate and blood pressure return to normal
  - Oxygen levels in the blood increase
- **Within 8 Hours:**
  - Carbon monoxide levels in the blood return to normal
  - Oxygen levels in the blood increase
  - Smoker's breath disappears
- **Within 24 Hours:**
  - Yearning to smoke decreases
  - Yearning to smoke decreases
  - Yearning to smoke decreases
- **Within 48 Hours:**
  - Yearning to smoke decreases
  - Yearning to smoke decreases
  - Yearning to smoke decreases
- **Within 1 Week:**
  - Yearning to smoke decreases
  - Yearning to smoke decreases
  - Yearning to smoke decreases
- **Within 1 Month:**
  - Lung function increases
  - Oxygen levels in the blood increase
  - Risk of heart disease, stroke, and cancer decreases
- **Within 1 Year:**
  - Coughing, phlegm production, and shortness of breath decrease
  - Energy and mood increase
  - Risk of stroke decreases
  - Risk of heart attack decreases
- **Within 5 Years:**
  - Lung cancer death rate for former smokers is lower than for current smokers
  - Risk of heart disease, stroke, and cancer decreases
- **Long-Term:**
  - Risk of heart disease, stroke, and cancer decreases

**Benefits (Continued)**

**In Summary**

- Tobacco use is the number one preventable cause of death.
- More than 20% of Americans use cigarettes.
- Cigarette smoking is a known cause of many adverse health outcomes such as heart disease, stroke, respiratory diseases, and cancer(s).
- People continue to smoke cigarettes because of nicotine dependence.
- People can feel the benefits of quitting smoking within 20 minutes of cessation.

**References**

- CDC Tobacco Information and Prevention Source (TIPS).
- Centers for Disease Control and Prevention. Health, United States, Hyattsville (MD): Centers for Disease Control and Prevention, National Center for Health Statistics.
Images Sources

Learning Session 2: Smokeless Tobacco

Kellay Rhoads, MS Candidate, CHES
Florida Atlantic University
Boca Raton, FL

Session Learning Objectives
- Participants will be able to describe the state of smokeless tobacco usage in the United States.
- Participants will be able to indicate the addictive nature of smokeless tobacco relative to that of cigarettes.
- Participant will be able to state at least 3 adverse health effects associated with using smokeless tobacco.

What Is Smokeless Tobacco?
- A product consisting of tobacco or a tobacco blend that is chewed, inhaled, or sucked on rather than smoked.
- Chewing Tobacco
  - Loose leaf
  - Processed, cigar-type tobacco loosely packed in small strips
  - Plug
  - Small rolling blends of American with tobacco
  - Pint tobacco held in the gingival/buccal recess
- Snuff
  - Moist (used by dipping)
  - Dry
  - Placed in and slowly snuffed through the nose

Smokeless Tobacco

Smokeless Tobacco Use in the U.S.
- Percentage of Adults Who Were Current Smokeless Tobacco Users in 2009
  - 9.5% of all adults (aged 18 years and older)
  - 7.0% of men
  - 0.3% of women
  - 1.0% of African Americans
  - 5.7% of American Indian/Alaska Natives
  - 0.5% of Asian Americans
  - 1.1% of Hispanics
  - 4.5% of whites
Addiction
• U.S. Surgeon General (1986):
  - "Given the nicotine content of smokeless tobacco, its
    ability to produce high and sustained blood levels of
    nicotine, and the well-established data implicating
    nicotine as an addictive substance, one may deduce
    that smokeless tobacco is capable of producing
    addiction in users."
• High doses of nicotine
  - One can of snuff gives you as much nicotine as 60
    cigarettes!
  - If you chew 8-10 times a day, you are exposed to the
    same amount of nicotine as people who smoke 30-40
    cigarettes a day.

Health Effects of Smokeless Tobacco Use
• The most obvious of these problems is an increased risk of oral
  cancer.
• Your body actually absorbs 38 cancer-causing substances in
  smokeless tobacco:
  — Arsenic
  — Formaldehyde
• Most common forms of oral cancer caused from tobacco use
  include:
  — Lips
  — Tongue
  — Throat
  — Nose and
  — Larynx (voice box)

Health Effects (Continued)
• Oral Health and Smokeless Tobacco
  - Teeth and Tissue Discoloration
  - Gingivitis

Cardiovascular Disease
• Smokeless tobacco causes similar effects as those
  seen in smoking:
  — Increase in heart rate (30% higher)
  — Increase in blood pressure
  — Less cardiovascular risk than smoking possibly due to
    lack of carbon monoxide and related compounds
• Smokeless tobacco users have 2.5 times higher
  level of cholesterol than non-users.
• High blood pressure can be an effect of
  smokeless tobacco use because it has high levels
  of sodium and nicotine.

Oral Health (Continued)
• Oral Leukoplakia
  - Papillary Squamous Cell Carcinoma of lower
    gingiva
Learning Objectives

Participants will be able to describe what a hookah is and how it works. Participants will also be able to identify the health effects of hookah smoking. Participants will then be able to evaluate the role of tobacco industry in hookah marketing.

References (Continued)

What is a Hookah?
- Originated in ancient Persia & India ~ 400 years ago
- Used to smoke specially made tobacco
- Also called Waterpipe, Nargile, Hubble-bubble
- An estimated 300 hookah cafes in 2006

Anatomy of a Hookah Pipe

Hookah Smoking Sessions
- While many hookah smokers may consider this practice less harmful than smoking cigarettes, hookah smoking carries many of the same health risks as cigarettes.
- Due to the mode of smoking, including frequency of puffing, depth of inhalation, and length of the smoking session, hookah smokers may absorb higher concentrations of the toxins found in cigarette smoke.
- A typical 1-hour long hookah smoking session involves inhaling 100-200 times the volume of smoke inhaled from a single cigarette.

Hookah Smoking vs. Cigarette Smoking in College Students
- Primack et al. (2006) found lifetime rates for waterpipe as common as cigarettes among college students:
  - 30.5% current use
  - 42.6% yearly use
  - 41.8% ever use
- Of those who had used in past year, 35.4% reported never having smoked a cigarette.
- Hookah use increases as college years increase, whereas cigarette use showed the opposite pattern.

Health Outcomes of Hookah Smoking
- Hookah smokers are at risk for the same kinds of diseases as are caused by cigarette smoking, including oral cancer, lung cancer, stomach cancer, cancer of the esophagus, reduced lung function, and decreased fertility.
- Sharing a hookah may increase the risk of transmitting tuberculosis, viruses such as herpes or hepatitis, and other illnesses.
- Hookah tobacco and smoke contain numerous toxic substances known to cause clogged arteries and heart disease.

Hookah Smoking and Cancer
- The charcoal used to heat tobacco in the hookah increases the health risks by producing high levels of carbon monoxide, metals, and cancer-causing chemicals.
- Hookah tobacco and smoke contain numerous toxic substances known to cause lung, bladder, and oral cancers.
- Irritation from exposure to tobacco juices increases the risk of developing oral cancers.
Hookah and Secondhand Smoke

- Using a hookah to smoke tobacco poses a serious potential health hazard to smokers and others exposed to the smoke emitted.
- Secondhand smoke from hookahs poses a serious risk for non-smokers, particularly because it contains smoke not only from the tobacco but also from the charcoal used in the hookah.

In Summary

- Hookah smoking is not a safe alternative to smoking cigarettes.
- During one session of hookah smoking, an individual inhales 100-200 times more smoke than a cigarette.
- Hookah smoking is just as prevalent (if not more) as cigarette smoking among the college student population.
- The same negative health outcomes associated with cigarette smoking are also associated with hookah smoking. However, hookah smoking is more closely related to the spread of infectious diseases than cigarette smoking.

References


References (Continued)


Images Sources

REFERENCES


