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Racial /ethnic differences in susceptibility and intention to smoke on smoking behavior among adolescents

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ABSTRACT

Racial/Ethnic Differences in Susceptibility and Intention to Smoke on
Smoking Behavior Among Adolescents

By

Kafilat Tolani Jimba

Dissertation Submitted in Partial Fulfillments
of the Requirements for the Degree of
Doctor of Philosophy
Public Health

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May 2010

ABSTRACT

Every year, more than 400,000 Americans die prematurely because of tobacco use, and most users began smoking during their teen years. Adolescent tobacco use remains the nation's most preventable threat to life and health. A better understanding of the relationships between susceptibility to smoking and intention to smoke on smoking behavior by ethnicity, age, and gender is useful for program planners and health educators in designing ethnic, age, and gender specific strategies for tobacco control and prevention initiatives. The purpose of this study was to test the relationships between susceptibility to smoking and intention to smoke on smoking behavior among adolescents by ethnicity, age, and gender. The theory of reasoned action by Ajzen and Fishbein formed the basis of this study and supports the findings and conclusions. To get good representation of the study populations, the study utilized secondary data from the 2007 National Survey on Drug Use and Health. The study population includes person ages 12-17 years old, smokers and nonsmokers, who represent White, African American, Hispanic, Asian, Multi-Racial, American Indian, and Native Hawaiian race/ethnicities. Data were analyzed with Kruskal-Wallis test, analysis of variance (ANOVA), multiple regression analysis, and bivariate Spearman correlation. A statistically significant positive relationship was found between participants' susceptibility to smoking and their intentions to smoke ($r = .57$, $p < .01$). More specifically, a significant difference was found among ethnic groups on smoking intentions and among age groups on susceptibility to smoking. Positive social change can occur through improved efforts geared toward primary, secondary, and tertiary interventions. This can result in empowerment programs and enhanced decision making, useful for adolescents of different ethnic groups to resist social and environmental pressures.

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DEDICATION

I dedicate this dissertation to my family for their support over the years. To my father,

thank you for believing in me and being there for the duration of my studies. To Hamid

and Haseeb Bidmus, thank you for your support and I love you infinity. Finally, to my

mother, sisters, uncles, aunties, cousins, and friends, this could not have been done

without your individual love, support, and encouragement.

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CHAPTER 1:

INTRODUCTION TO THE STUDY

Background

According to the Centers for Disease Control and Prevention ([CDC], n.d.),

smoking and tobacco use remains the leading preventable cause of premature death and a

leading cause of illness and mortality in the United States. As shown in Figure 1,

438,000 annual deaths are attributable to cigarette smoking in United States, from 1997

to 2001.
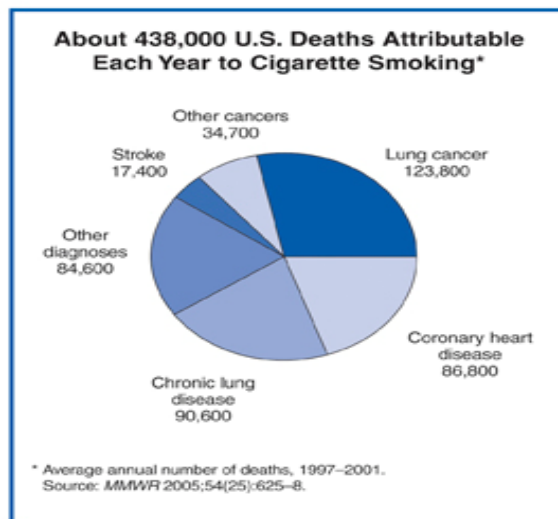
Figure 1. Deaths attributable to cigarette smoking in the U.S.

Source: CDC. Annual smoking-attributable mortality, years of potential life lost,
and productivity losses—United States—1997–2001. *MMWR* 2005, *54*(25), 625–
628. Public domain

Smoking and tobacco use has gained immeasurable attention and resources from

the United States and public health officials. In addition, two major public health

objectives are (a) to prevent the use of tobacco products among the United States citizens; and (b) to assist those who smoke or use tobacco products to quit (Healthy People 2010, 2001). The need for effective youth tobacco cessation programs has been recognized by many organizations, including the CDC, the American Medical Association, the office of the Surgeon General of the United States, the Public Health Service, and the U.S. Department of Education (Adelman, Duggan, Hauptman & Joffe, 2001). Further, the U.S. Department of Health and Human Services [USDHHS], 1994 Surgeon General's report showed considerable evidence that the health problems associated with smoking are a function of the duration (years) and the intensity (amount) of use.

Social factors, cultural factors, and individual behavior play significant roles in smoking and tobacco use and there are various health promotion programs that aim to prevent and control these unhealthy behaviors and lifestyles. The motivation to smoke has been linked to personal, peer, family, and sociodemographic characteristics among others (Kandel et al., 2004; McCormick, Crawford, Allen, Spigner & Ureda, 2002). The CDC (2004a) reported that despite significant improvements over the past two decades in the overall health status of the population in the nation, disparities in health status and the burden of illness and death continue to exist, particularly in racial and ethnic minority populations. The proposed investigation will test the relationships between susceptibility to smoking and intention to smoke on smoking behavior by gender, age, and ethnicity. The objective is to evaluate how well susceptibility to smoking, smoking intention, ethnicity, age, and gender predict smoking behavior among a diverse group of 12-17 year olds living in the U.S. who completed the National Survey on Drug Use and Health in

2007. This information will be useful for policy makers in formulating smoking policies in schools and public health educators in understanding ways to prevent cigarette initiation thereby effecting positive social change. A more detailed discussion of the research literature is provided in chapter 2.

Problem Statement

Yearly, over 400,000 Americans die from the use of tobacco products and most users start smoking during their teenage years (Jacobson et al., 2001). Adolescent tobacco use remains the nation's most preventable threat to life and health (CDC, n.d.). The CDC (2004a) reported that despite significant improvements over the past two decades in the overall health status of the population in the nation, disparities in health status and the burden of illness and death continue to exist, particularly in the minority populations. In addition, the U.S. Office of Minority Health (n.d.) stated that there are important but poorly understood differences in health behaviors within and among various racial and ethnic groups. Therefore, testing the relationships between susceptibility to smoking and intention to smoke on smoking behavior by gender, age, and across racial/ethnic groups could contribute to more focused efforts at tailored and early intervention.

Purpose of the Study

Previous studies have investigated the predictors of adolescents' smoking behavior across race/ethnicity, focusing especially on personal, peer, family, and sociodemographic characteristics, with results indicating that smoking among peers is considered to be one the factors that predict adolescent smoking initiation and persistence (Kandel et al., 2004). Yet, most of these investigations have not fully detailed racial

differences (Wallace & Bachman, 1991). The purpose of this investigation is to examine whether there are significant differences in susceptibility and intention to smoke in smoking behavior among adolescents as measured by gender, age, and race/ethnicity. Documenting this variability will help public health practitioners to explore factors that might contribute to susceptibility and intention to smoke across ethnic groups. Further, it is intended to call the attention of policy makers, health educators, community, and public health professionals to this issue. This will be done by disseminating the outcomes of this investigation to these individuals, so as to collaborate and develop culturally appropriate programs in schools and in communities.

<div align="center">Nature of the Study</div>

The proposed study utilized quantitative methods to use susceptibility and intention to smoke in predicting smoking behavior among adolescents by age, gender, and across racial/ethnic groups. The study utilized the theory of reasoned action, which posits that attitudes and social norms predict intentions to engage in behavior, which, in turn, predict behavior change**.** (Ajzen & Fishbein, 1975). For this study, reasoned action theory helped in understanding the relationships between susceptibility to smoking and intention to smoke on smoking behavior. The study population included persons agesd 12-17 years old, smokers and non smokers, and are from the following racial/ethnic groups; White, Black/African American, Hispanic or Spanish origin, Asian, Multi-Racial, Native Hawaiian/Pacific Islander, and American Indian/Alaska Native. To get a good representation of the study populations, the proposed investigation conducted secondary analysis of the data from the 2007 National Survey on Drug Use and Health (NSDUH).

NSDUH is an annual household survey that collects information on drug use and abuse from a nationally representative sample of the US civilian, non- institutionalized population over age 12. A more detailed discussion is provided in chapter 3.

Research Questions and Hypotheses

The major research question is: Are there statistically significant relationships between susceptibility to smoking and intention to smoke on smoking behavior among adolescents across racial/ethnicity by gender and age? This question is followed by these subquestions to provide more focus for the research:

Research Question 1. Are there statistically significant differences between the racial/ethnic groups on susceptibility to smoking?

H_0: There are no statistically significant differences between the racial/ethnic groups on susceptibility to smoking.

H_A: There are statistically significant differences between the racial/ethnic groups on susceptibility to smoking.

Research Question 2. Are there statistically significant differences between the racial/ethnic groups on intention to smoke?

H_0: There are no statistically significant differences between the racial/ethnic groups on intention to smoke.

H_A: There are statistically significant differences between the racial/ethnic groups on intention to smoke.

Research Question 3. Are there statistically significant relationships between susceptibility to smoking and intention to smoke?

H_0: There are no statistically significant relationships between susceptibility to smoking and intention to smoke.

H_A: There are statistically significant relationships between susceptibility to smoking and intention to smoke.

Research Question 4. Are there statistically significant relationships between susceptibility to smoking and number of days participants smoked a partial or whole cigarette in the last 30 days?

H_0: There are no statistically significant relationships between susceptibility to smoking and number of days participants smoked a partial or whole cigarette in the last 30 days.

H_A: There are statistically significant relationships between susceptibility to smoking and number of days participants smoked a partial or whole cigarette in the last 30 days.

Research Question 5. Are there statistically significant relationships between intention to smoke and number of days participants smoked a partial or whole cigarette in the last 30 days?

H_0: There are no statistically significant relationships between intention to smoke and number of days participants smoked a partial or whole cigarette in the last 30 days.

H_A: There are statistically significant relationships between intention to smoke and number of days participants smoked a partial or whole cigarette in the last 30 days.

Research Question 6. Are there statistically significant differences between racial/ethnic groups on susceptibility to smoking by age?

H_0: There are no statistically significant differences between racial/ethnic groups on susceptibility to smoking by age.

H_A: There are statistically significant differences between racial/ethnic groups on susceptibility to smoking by age.

Research Question 7. Are there statistically significant differences between males and females of different racial/ethnic groups on susceptibility to smoking?

H_0: There are no statistically significant differences between males and females of different racial/ethnic groups on susceptibility to smoking.

H_A: There are statistically significant differences between males and females of different racial/ethnic groups on susceptibility to smoking.

Research Question 8. Are there statistically significant differences between racial/ethnic groups on intention to smoke by age?

H_0: There are no statistically significant differences between racial/ethnic groups on intention to smoke by age.

H_A: There are statistically significant differences between racial/ethnic groups on intention to smoke by age.

Research Question 9. Are there statistically significant differences between males and females of different racial/ethnic groups on intention to smoke?

H_0: There are no statistically significant differences between males and females of different racial/ethnic groups on intention to smoke.

H_A: There are statistically significant differences between males and females of different racial/ethnic groups on intention to smoke.

Research Question 10. Are there statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days?

H_0: There are no statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days.

H_A: There are statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days.

Research Question 11. Are there statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by age?

H_0: There are no statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by age.

H_A: There are statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by age.

Research Question 12. Are there statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by gender?

H_0: There are no statistically significant differences between the racial/ethnic

groups on the number of days they smoked a partial or whole cigarette in the last

30 days by gender.

H_A: There are statistically significant differences between the racial/ethnic groups

on the number of days they smoked a partial or whole cigarette in the last 30 days

by gender.

Research Question 13. Are participants' age, gender, and ethnicity (African

American, Asian, Caucasian, Hispanic, Other) significant predictors of the number of

days they smoked a partial or whole cigarette in the last 30 days?

H_0: Participant's susceptibility, intention to smoke, age, gender, and ethnicity are

not statistically significant predictors of the number of days they smoked a partial

or whole cigarette in the last 30 days.

H_A: Participant's susceptibility, intention to smoke, age, gender and ethnicity are

statistically significant predictors of the number of days they smoked a partial or

whole cigarette in the last 30 days.

A more detailed discussion of the research questions and hypotheses as well as how they

are measured is provided in chapter 3.

Theoretical Perspectives

The theory of reasoned action (TRA) looks at behavioral intentions rather than

attitudes as the main predictors of behavior. According to this theory, attitudes toward a

behavior and subjective norms are the major predictors of behavioral intention (Ajzen &

Fishbein, 1975). In addition, the theory of reasoned action emphasized a central role for

social cognitions in the form of subjective norms (the individual's beliefs about their social world) and included both beliefs and evaluations of these beliefs (both factors constituting the individual's attitudes) (Ajzen & Fishbein, 1975). Theory of reasoned action posits that attitudes and social norms predict intentions to engage in behavior, which, in turn, predicts behavior change (Ajzen & Fishbein, 1975). Thus, a person's attitude in addition to subjective norms forms the individual behavioral intention.

According to the theory of reasoned action, *subjective norms* formed by normative beliefs, refers to perception of the social pressure to perform the behavior. *Susceptibility to smoking* is defined by Pierce, Farkas, Evans, and Gilpin (1995) as the cognitive predisposition to smoke. For this study, the TRA variables include *behavior intention* and *subjective normative belief* of participants. However, the variable 'susceptibility' was utilized as the measure of 'subjective norms' because of the similar interpretation of the variables in this study and that the same measures could be used to define the variables (e.g. "if one of your best friends offered you a cigarette, would you smoke it?"). This question could be used to measure subjective norms of participants on smoking and susceptibility to smoking. Applying the theory of reasoned action (TRA), subjective norms could help indirectly predict smoking behavior of participants. Participants' susceptibility to smoking and behavior intent could help predict smoking behavior. Susceptibility to smoking has been considered to be a useful construct to identify teens at risk of taking up smoking and to target smoking prevention efforts (Filice, Hannan, Lando & Joseph, 2003). The theory of reasoned action indicates that subjective norms are used to predict behavioral intentions and intentions predict the

behavior. The use of 'susceptibility' as a measure of 'subjective norms' of the theory of

reasoned helped in understanding the tendency of participants' to smoke due to social

factors (such as pressure from referent) across the ethnic groups, by age, and gender. A

more detailed discussion on the theory and the application is provided in chapter 2.

Operational Definitions

Study variables

     Susceptibility to smoking. Cognitive predisposition to smoke as defined by Pierce,

Farkas, Evans and Gilpin (1995). This was measured using a self reported item from the

National Survey on Drug Use and Health (NSDUH) which asks respondents: If one of

your best friends offered you a cigarette, would you smoke it?

     Intention to smoke. Subjective estimation of adolescents' smoking in the future

(NSDUH, 2008). It was measured using a self reported item from the NSDUH which

asks respondents: At any time during the next 12 months do you think you will smoke a

cigarette?

     Smoking behavior. Participants' smoking and tobacco use activities in the last 30

days (NSDUH, 2008). It was measured using a self reported item from the NSDUH

which asks respondents: During the past 30 days, how many days did you smoke part or

all of a cigarette?

     Age. Current age of participants. For the purpose of this study, it was measured by

responses to this question from NSDUH "What is your current age?"

     Racial/ethnic groups. Self identification of racial/ethnic groups (NSDUH, 2008).

For the purpose of this proposed investigation, the target individuals will be from any of

the self-identified racial/ethnic groups: White, Black/African American, Hispanic or Spanish origin, Asian, Multi-Racial, American Indian/Alaska Native, and Native Hawaiian/ Pacific Islander.

Theory of reasoned action constructs

Attitudes. Refers to the sum of beliefs about a particular behavior weighted by evaluations of these beliefs (Miller, 2005).

Subjective norm. It is the perceived social pressure to engage or not to engage in a behavior (Ajzen, 1991).

Intention. It is an indication of a person's readiness to perform a given behavior, and it is considered to be the immediate antecedent of behavior (Ajzen, 1991).

Behavior. It is the manifest, observable response in a given situation with respect to a given target (Ajzen, 1991).

NSDUH. National Survey on Drug Use and Health

USDHHS. United States Department of Health and Human Services

SAMHSA. Substance Abuse and Mental Health Services Administration

A more detailed discussion on the study variables is provided in chapter 3.

<center>Assumptions</center>

One of the primary goals of Healthy People 2010 (2001) is eliminating health disparities among different segments of the population. The conventional assumptions about racial/ethnic disparities in health behaviors (such as smoking and tobacco use) inferred that populations of color have less healthy behavior than white populations, and that racial/ethnic groups are internally homogeneous (Winkleby & Cubbin, 2004).

Although these facts are assumed to be true, they have not been verified or supported

(Winkleby & Cubbin). The proposed investigation could verify that, for any health

behavior (in this case smoking and tobacco use), racial/ethnic groups are or are not

necessarily internally homogeneous. That is, the use/pattern of cigarette and any tobacco

products may or may not be different across racial/ethnic groups by gender, age, and

other factors. Eder et al. (as cited in Houser, 2007) identified five assumptions that must

be met before it can be assumed that secondary data are valid:

1. The data that are needed are present in the record
2. The data in the record are in the form that can meet the variable definitions
3. The data are accurately recorded
4. If data are recorded in more than one place in the record, the multiple entries will be consistent
5. The data are recorded in a manner that is interpreted in a common way by the reader. (p.247)

Houser indicated that, when data do not meet all the assumptions, error is introduced into

the data collection process. The use of the 2007 data from the National Survey on Drug

Use and Health may or may not meet all the assumptions on valid secondary data as

described above. This might not necessarily indicate that the data is invalid because it has

been utilized to investigate related health issues such as tobacco use and mental health.

Furthermore, the 2007 data is the most current data available and there is no evidence to

suggest that much has changed since the time the data was collected. In other words, the

2007 NSDUH data still fairly well reflects the current conditions.

<p align="center">Delimitations</p>

The proposed investigation was limited to data on person ages 12-17 years old, who

participated in the 2007 NSDUH survey.and represent these racial/ethnic groups; White,

Black/African American, Hispanic or Spanish origin, Asian, Multi-Racial, American Indian/Alaska Native, and Native Hawaiian/Pacific Islander. The study was also limited to analysis of racial/ethnic differences by age and gender in susceptibility and intention to smoke and smoking behavior.

Limitations

NSDUH surveys are conducted only in English and Spanish which might have influenced or affected responses of other target racial/ethnic groups in the proposed investigation. As with any self-administred and/or self-reported survey, there is bound to be recall bias or the issue of honest responses to questions. Also, because NSDUH is a self-reported survey, responses are subject to social-desirability bias. In addition, the NSDUH does not collect data from persons who are homeless but do not stay at shelters, active duty military personnel, and persons housed in jails or hospitals that eliminate certain individuals. All of these limitations may directly or indirectly affect the outcomes of the proposed investigation. For example, the proposed investigation examined individuals (e.g. Asian who speak/understand little or no English or Spanish at all). Responses to questions may be affected because NSDUH does not provide interpreters in all cases.

Significance of the Study

The Health Resources and Services Administration ([HRSA], 2000) stated that the changing demographics and economics of today's increasingly multicultural world, as well as the persistent inequality in the health care of our diverse populace, has challenged healthcare professionals to reflect on cultural competency as an approach to assist in the

elimination of health disparities. While different studies (CDC, 2006a; Faulkner & Merritt, 1998; Kandel, Kiros, Schaffran & Hu 2004) have been done on smoking among youth and racial differences in smoking, most of these investigations have only targeted White and Black participants. For example; Caraballo (2004) indicated that "there is insufficient data or information that shows the trends of tobacco usage among adolescents of different racial and ethnic groups" (¶4). Also, DeCicca, Kenkel, and Mathios (2000) noted that differences in smoking behavior of adolescents from different ethnic groups are often overlooked in debates about prevention policies. It is essential to note that differences in smoking and tobacco use of various racial/ethnic groups among adolescents have not been fully investigated and addressed as indicated in a study conducted by the CDC in 2004a which investigated prevalence of cigarette use among different racial/ethnic populations (14 groups) in the United States using self-reported data collected during 1999-2001 from the National Survey on Drug Use and Health (NSDUH). The study concluded that the implementation of tobacco control and culturally appropriate intervention is essential in curbing the rates of tobacco use products among racial/ethnic populations.

Further, Chen, Bottorff, Johnson, Saewyc, and Zumbo (2008) indicated that being female, being young or being at lower school grades, having positive attitudes toward smoking, and exposure to peer smoking, received highly consistent support as predictors of susceptibility to smoking. In addition, the authors indicated that little is known about the role of ethnicity in predicting the susceptibility to smoking among adolescents. Gritz et al. (2003) conducted a study on predictors of susceptibility to smoking among

adolescents and examined ethnicity as one of the predictor variables. However, the study was limited to White, African American, and Hispanic ethnic groups. The need to understand the differences especially across various racial/ethnic groups is crucial to the development of culturally appropriate and effective prevention programs. Creating policies that can be implemented to prevent young people from initiating smoking or using other tobacco products must be the focus of scholarly attention.

The potential significance of the research is that it will contribute to existing knowledge on this issue by helping to understand the relationships between susceptibility to smoking and intention to smoke on smoking behavior by gender, age, and across race/ethnic groups. This investigation promotes positive social change by providing useful information for tobacco control and prevention initiatives. That is, it is helpful for program planners and health educators to design ethnic, age, and gender specific programs that will increase awareness and knowledge of the issue of tobacco use and help adolescents develop skills needed for self control and self efficacy to prevent smoking and tobacco use.

Summary

According to the Public Health Service (as cited in CDC, 1999b), "recognition of smoking and tobacco use as a health hazard and subsequent public health anti-smoking campaigns has resulted in changes in social norms" (p.243). Public health efforts in combating smoking and use of tobacco has been successful because of its influence on policy, educating the community, advocating for non smoker's rights, and evaluation of cessation programs (Jacobson et al., 2001). This includes and is not limited to preventing

initiation of tobacco use, promoting cessation of use and reducing exposure to environmental tobacco smoke. Despite the successes of public policy on smoking and tobacco use, social and cultural influences continue to be the challenge that public health faces in preventing smoking and tobacco use related diseases (Turnock, 2004). Disparities exit in health status and burden of illness across racial/ethnic groups, however, this study seeks to test the relationships between susceptibility to smoking and intention to smoke on smoking behavior among adolescents across racial/ethnic groups as measured by gender and age so as to develop early prevention programs.

Chapter 2 addresses relevant literature related to the problem statement, research questions, and expands on susceptibility and intention as predictors of future smoking behaviors, substantiates the claim that differences in smoking and tobacco use among adolescents are related to the issue of gender and age all which are heavily influenced by race/ethnic groups. Also, there is a discussion of this study in relation to previous studies and different study methods in the literature were reviewed. Chapter 3 describes the research design and approach, setting and sample as well as sampling method and characteristics of the selected sample. Also, it expands on the instrumentation and materials, data collection process, and analysis, including the measurements of the variables as well as the measures taken to protect participants.

CHAPTER 2:

LITERATURE REVIEW

Introduction

The literature review of the study was based on search of the research database

available at Walden University and Indiana University, specifically Academic Search

Premier, MEDLINE, and PubMed. Additionally, some articles of interest were located

through University of Medicine and Dentistry of New Jersey library system, Centers for

Disease Control and Prevention database/Website, Georgia State University library

system, the National Library of Medicine, as well as Google and MSN search engines.

Terms such as *smoking and youth, smoking, race, and youth, gender, smoking,* and *youth,*

susceptibility to smoking, intention to smoke were used to search related study articles

and/or articles of interest. During the search, it was apparent that few studies focused on

the racial/ethnic groups this study is investigating in terms of smoking and tobacco use

among adolescents. Also, the gap in the literature revealed that there is insufficient

information on racial/ethnic differences in adolescent smoking to facilitate the

development of ethnicity specific cessation programs. This literature review section

provides background information on the issue of smoking and tobacco use, information

on the aspects of theory of reasoned action, studies on tobacco use by ethnicity, age, and

gender, study methods in the literature, literature relating to differing methodologies, and

summary of the chapter. Table 1 shows a summary of some key studies that help in

understanding the literature review section.

Background

The United States has seen an increase in racial and ethnic diversity. In 1992 the US census bureau indicated that 28.7% of the population belonged to an ethnic group other than non-Hispanic White, and the percent of nonwhites is expected to increase to nearly 50% by 2050. Webb, Francis, Hines and Quarles (2007) noted that "health promotion researchers have agreed that cultural specific programs are essential in addressing smoking-related health disparities" (p. 568). Racial/ethnic differences in adolescent smoking rates suggest that different factors could motivate the initiation and maintenance of tobacco use among various racial/ethnic groups (Vidrine, Anderson, Pollak & Wetter, 2005). In addition, Berger (1998) indicated that determinants of health behavior, as well as treatment preferences, motivation to change, and behavior maintenance, usually differ by racial/ ethnic populations. Also, a number of studies (Greene, Smith & Peters, 1995; Marin et al., 1995) concluded that culturally appropriate programs are usually effective and produce long lasting positive effects. These show how important it is to closely study and understand the racial/ethnic differences in susceptibility and intention to smoke, especially among adolescents, so as to intervene in an appropriate fashion. Turnock (2004) asserted "the recognition of tobacco use as a major health hazard was no simple achievement, partly because many factors directly or indirectly influence the level of health outcome in a given population" (p.56). These risk factors (i.e. biological, environment, cultural) are interrelated and can affect individual health or stimulate individual's responses to risk behaviors depending on racial or ethnic groups or background (Turnock, 2004).

Further, Turnock (2004) indicated that "understanding the health effects of biologic, behavioral, and environmental risk factors is straightforward in comparison with understanding the effects of social, economic, and cultural factors on the health of populations"(p.60). It is important to note that, for community intervention to be effective, it has to incorporate environmental and policy measures as well as education, and skills development; most importantly, the intervention must be culturally competent.

Aspects of Theory of Reasoned Action

The traditional epidemiologic model of agent, host, vector, and environment is useful for studying the interplay of various influences on patterns of tobacco use in populations (Orleans & Slade, 1993). Figure 2 shows the interaction between various influences that contribute to smoking and tobacco use in the society. Despite the successes of public policy on smoking and tobacco use, social and cultural influences continue to be the challenge in preventing smoking and tobacco use and their related diseases. The current policies on smoking among adolescents need to be examined by policy makers in order to make decisions for future polices.
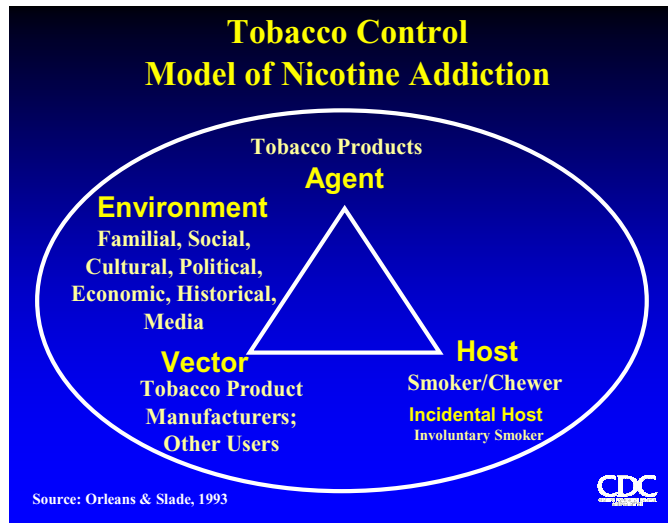
Figure 2. Shows factors (individual, societal) that contribute to smoking and tobacco use.
Source: Orleans & Slade, (1993). *Nicotine addiction: Principles and management* (ed.). New York: Oxford University Press. Adapted with Permission (Appendix A)

In identifying predictors of smoking in China, Guo et al. (2007) examined whether the Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB) predict adolescent smoking in China. The questionnaire was administered to middle and high school students in seven different cities in China to assess the effects of changing economic and social factors on health behaviors including tobacco use. The authors concluded that the theories do predict adolescent smoking in China. The theory of planned behavior is superior to the theory of reasoned action for the prediction and the theory of reasoned action can better predict smoking among students with lower than higher perceived behavioral control. Further, Ma, Lan, Edwards, Shive and Chau (2004) utilized a one-group pretest-posttest design to evaluate the effectiveness of a culturally tailored smoking prevention program aimed at Asian American youth. The authors used questionnaire to gather related information associated with smoking and tobacco use. The

participants are male and female youth of Asian American descendant. The health belief model and theory of reasoned action are the theoretical framework for the investigation. The outcomes showed that there was an association between behavior intention and participants' attitude. Additionally, Hanson (2005) investigated predictors of cigarette smoking intention among African American, Puerto Rican, and non-Hispanic white teenagers aged 13-19 years in the Pennsylvania area. The outcomes showed that ethnic group differences exist, and that smoking intention was mediated by perceived behavioral control for African Americans. For Puerto Rican and non-Hispanic white teenagers, attitudes were the greatest predictor of intention to smoke, and for non-Hispanic white smokers had a stronger intention to smoke than either the African American or Puerto Rican smokers.

Cigarette Use and Nicotine Dependence, by Age: 2003 (National Survey on Drug Use and Health)
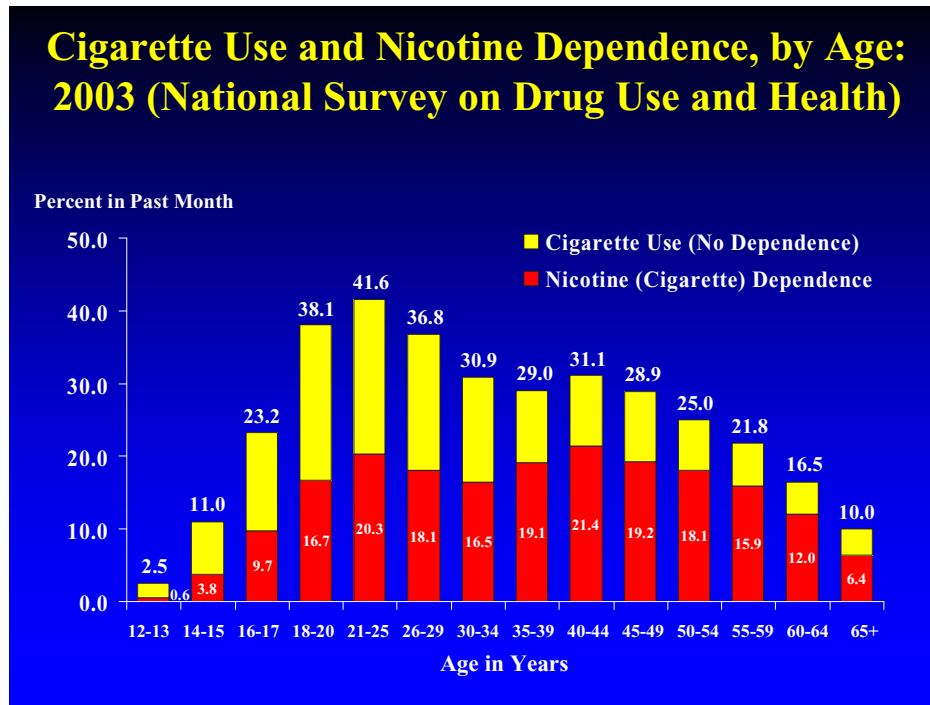
Figure 3. Cigarette use and nicotine dependence by age

Source: Giovino, G.A. (2005). *Epidemiology of Tobacco Use and Cessation.* Retrieved on October 20, 2008, from http://www.consumer-demand.org/12_7/Giovino_Gary_12-7_10-11am.ppt#664,16,Cigarette Use and Nicotine Dependence, by Age: 2003 (National Survey on Drug Use and Health) Public Domain.

Nelson et al. (1995) indicated that "national trends in prevalence of adolescent smoking are important for determining the need for smoking prevention programs, determining the effectiveness of existing prevention efforts, predicting the future burden of tobacco-related disease, and measuring the impact of cigarette … directed toward adolescents" (p.34). Siegel and Doner (2007) argued that "Seeing adults smoke in bars and other places tells teenagers that smoking is a symbol of maturity and autonomy" (p. 49). It appears that family, environment, peers, unemployment, cultural beliefs, and socioeconomic status seem to be main factors that play roles in engaging in smoking and

tobacco use; people smoke to experience relief from stress and to gain acceptance into group. Social and individual factors are often interrelated and may stimulate individual responses that influence the likelihood of tobacco related diseases (Siegel & Doner). The theory of reasoned action conceptualizes smoking as a socially learned, purposeful, and functional behavior resulting from the interplay between social, cultural, and personal factors.

<div align="center">Studies on tobacco use</div>

Tobacco Use

Important differences exist in the capacity and infrastructure of public health and other organizations to address tobacco control and in people's access to prevention and cessation resources and programs. Both the CDC and the Surgeon General's Report have suggested that differences do exist in the use of tobacco products as well as with the health issues that arise from it, but it is important to understand the magnitude of these differences so as to develop appropriate prevention programs that will address these differences across race/ethnic groups thereby closing the gaps.

It is estimated that there are 3.1 million U.S. adolescents, or about 28%, who smoke on a regular basis (CDC, 2005a). In an analysis of cigarette use among teens, (CDC, 2004b), using self-reported data, found that from 1991 to 1999, cigarette use among high school students escalated. Since 2000, smoking among teens has declined; however, the decline is slowing. Current high school smokers (23.4%) were significantly more likely than students who have never smoked cigarettes (10.9%) to think that cigarette smokers have more friends. Also, students who smoke cigarettes (91.2%) were

significantly more likely than students who never smoked cigarettes (27.8%) to report

that one or more of their closest friends smoke cigarettes (Marshall et al., 2006).

Cigarette smoking estimates by age are as follows: 18-24 years (24.4%), 25-44 years

(24.1%), 45-64 years (21.9%), and 65 years or older (8.6%) (CDC, 2006b).
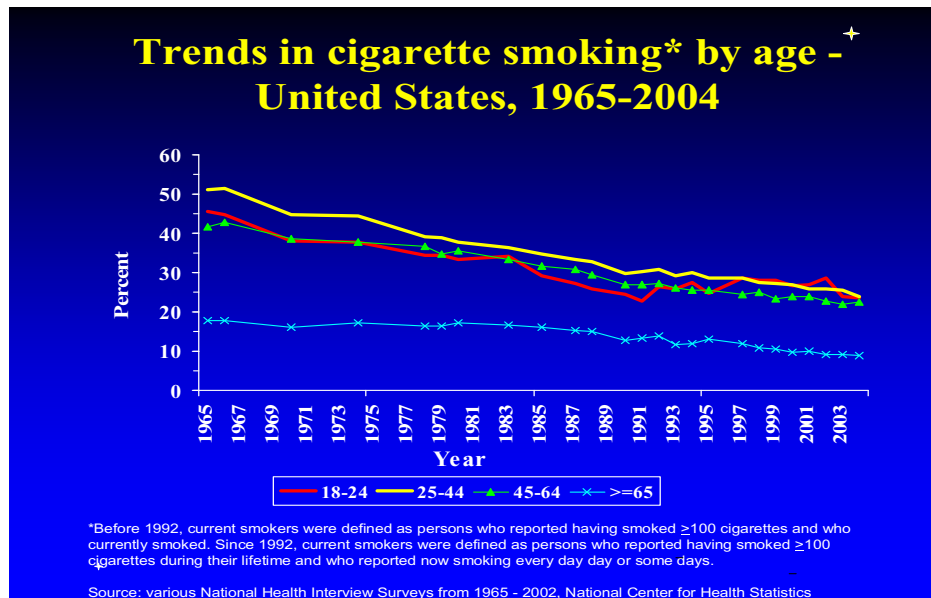
Figure 4. Trends in Cigarette smoking by age.

Source: Giovino, G.A. (2005). *Epidemiology of Tobacco Use and Cessation.* Retrieved
on October 20, 2008, from http://www.consumer-demand.org/12_7/Giovino_Gary_12-
7_10-11am.ppt#687,11,Slide 11. Public Domain

Ethnicity

Prevalence of cigarette smoking is highest among American Indians/Alaska

Natives (32.0%), followed by whites (21.9%), African Americans (21.5%), Hispanics

(16.2%), and Asians [excluding Native Hawaiians and other Pacific Islanders] (13.3%)

(CDC, 2006b). Cigarette smoking estimates are highest for adults with a General

Education Development (GED) diploma (43.2%) or 9–11 years of education (32.6%),

and lowest for adults with an undergraduate college degree (10.7%) or a graduate college

degree (7.1%). Cigarette smoking is more common among adults who live below the

poverty level (29.9%) than among those living at or above the poverty level (20.6%) and

nearly 21% of U.S. adults (45.1 million people) are current smoker (CDC, 2005b).
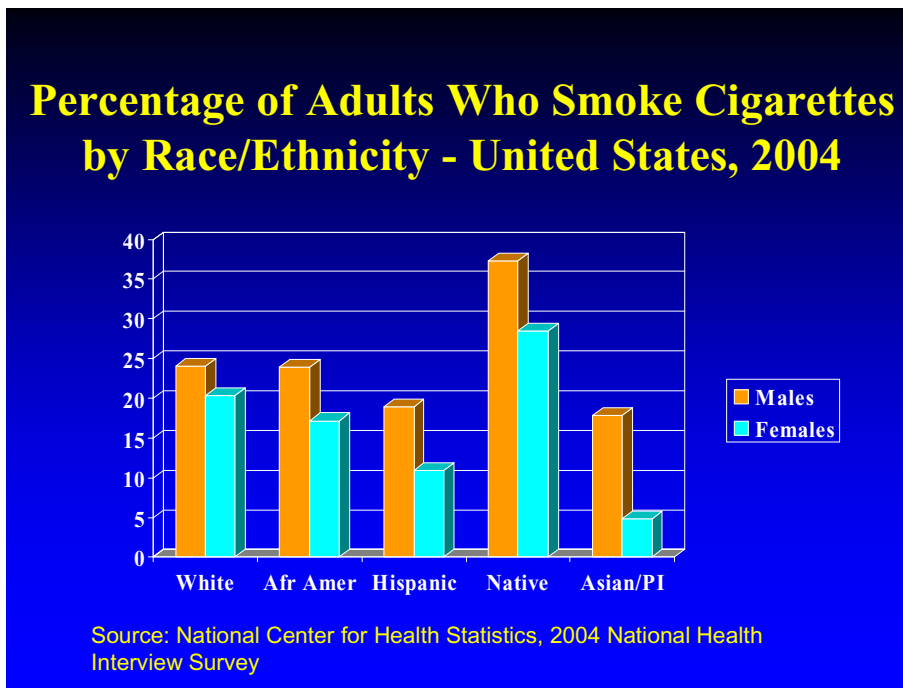
Figure 5. Percentage of U.S. adults who smoke cigarettes by race/ethnicity

Source: Giovino, G.A. (2005). *Epidemiology of Tobacco Use and Cessation.* Retrieved
on October 20, 2008, from http://www.consumer-demand.org/12_7/Giovino_Gary_12-
7_10-11am.ppt#562,15,Percentage of Adults Who Smoke Cigarettes by Race/Ethnicity -
United States, 2004. Public Domain

Age

According to the Substance Abuse and Mental Health Services Administration

(SAMHSA, 2001) and U.S. Surgeon General's Report (USDHHS, 1994), most people try

their first cigarette and become daily smokers as adolescents. In the United States in

1998, 2.92 million persons (7,989 each day) tried a cigarette; 73% of these (5,810 each

day) were people between 12–17 years of age (SAMHSA, 1998). In 1999, 1.36 million

persons (3,737 each day) became daily smokers; 57.4% of these (2145 each day) were

between 12–17 years of age. In 1998, the mean age of first use was 15.4 years; in 1999,

the mean age of becoming a daily smoker was 17.7 years (SAMHSA, 2001). Eighty

percent (80%) of all smokers have their first cigarette before age 18 and 90% of all

smokers begin before age 20 (SAMHSA, 1998). One third of all smokers began before

the age of 14 (Mowery, Brick & Farrelly, 2000). From 1965–1999, the incidence of first

trying a cigarette was higher for those between 12–17 years old than for persons aged

18–25 years; incidence increased substantially for persons aged 12–17 years in the early

1990s, peaking in 1997 and subsequently declining.

Gender

Cigarette smoking is more common among men (23.9%) than women (18.1%) (CDC,

2006b). Among U.S. adolescents in the 1980s, smoking prevalence was generally higher

among females than among males (USDHHS, 1994). More recently, however, smoking

prevalence has been similar among U.S. male and female adolescents (SAMHSA, 2001).

Trends in the incidence of initiation among young people of any cigarette use - United States, 1965-1999.

Source: 1999 and 2000 (combined) National Household Surveys on Drug Abuse (SAMHSA, 2001)
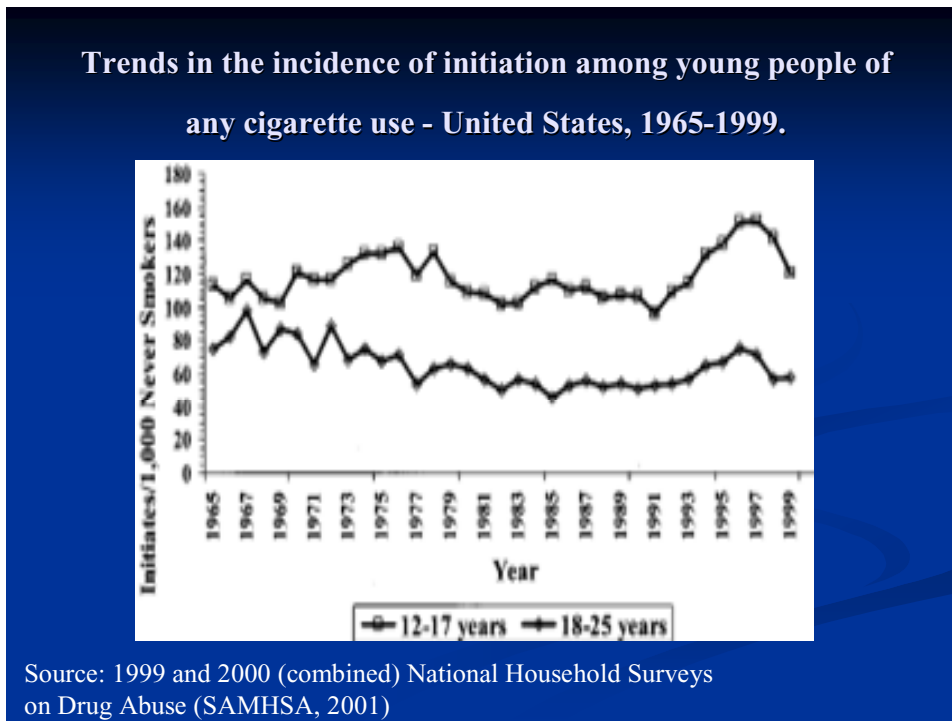
Figure 6. Trends in the incidence of initiation among young people of any cigarette use

Source: 1999 and 2000 (combined) National Household Surveys on Drug Abuse (SAMHSA, 2001). *Summary of findings from the 2000 NHSDA.* Rockville, MD: Department of Health and Human Services, Substance Abuse and Mental Health Services Administration. Public Domain

<center>Study Methods in the Literature</center>

Kandel, Kiros, Schaffran and Hu (2004) conducted a multilevel analysis study that looked into racial/ethnic differences in cigarette smoking initiation and progression to daily smoking. Secondary data was utilized to examine individual and contextual factors on smoking onset among smokers and nonsmokers. The results of this investigation showed that individual factors were good predictor of smoking behaviors in comparison to contextual factors. In order to understand the influences of smoking behavior in Bangladeshi and Pakistani communities in the United Kingdom, Bush, White,

Rankin and Bhopal (2003) conducted a qualitative study using community participatory methods, purposeful sampling, interviews, focus groups, and a grounded approach to data generation and analysis. The participants are smokers and non-smokers aged 18-80 years old. The results showed that gender, age, religion, and tradition had an important influence on smoking attitudes and behavior. Chen, Bottorff, Johnson, Saewyc and Zumbo (2008) conducted a study to document the prevalence of susceptibility to smoking among a sample of White/Caucasian and Chinese Canadian adolescent nonsmokers, and to explore the factors that might explain who is susceptible to smoking. The authors utilized a secondary analysis of data from students participating in the British Columbia Youth Survey on Smoking and Health in 2001/2002. The study population includes Canadian 10th and 11th graders who were nonsmokers with either a White or a Chinese ethnic background. The results revealed that 11th graders were less susceptible than 10th graders and girls were more susceptible than boys.

Investigating the role of lifestyle behaviors and demographic factors, Faulkner and Merritt (1998) looked into race and cigarette smoking among U.S. adolescents. The authors focused on White and African American adolescents using Youth Risk Behavior Survey supplement to the data from the1992 National Health Interview Survey. They found that selected lifestyle behaviors and demographic factors do not account for the race differential in the prevalence of adolescent cigarette smoking. Another study by McCormick, Crawford, Allen, Spigner and Ureda (2002) used focus group conducted with African American, American Indian, Hispanic, Asian/Pacific Islander, and White youth to explore family influences on smoking among ethnically diverse adolescents.

They found that similarities do exist in the content of antismoking messages across the ethnic groups examined. Using data from a statewide sample of 5870 eighth-grade adolescents in California, Unger et al. (2001) investigated ethnic differences in the association between peer influence variables and smoking behavior and susceptibility. The results show that friends' smoking and prevalence estimates of peer smoking were risk factors for past 30-day smoking and susceptibility to smoking across ethnic groups. Also, Ellickson, Orlando, Tucker and Klein (2004) conducted a study on adolescents ages 13-23yrs from 4 racial and ethnic groups (i.e. White, African American, Asian, or Hispanic) to examine racial and ethnic disparities in smoking. The authors did this by comparing trends in smoking among the 4 racial/ethnic groups. The results showed that while African Americans exhibited higher initiation rates than Whites, they exhibited consistently lower rates of regular smoking than both Whites and Hispanics. In addition, Huang, Hollis, Polen, Lapidus and Austin (2005) examined whether combinations of the stages of smoking acquisition, susceptibility, and socio-demographic factors can predict adolescent smoking initiation in a primary care setting. Subjects were adolescents, ages 14–17, who participated in a randomized controlled trial of a computer-based tobacco prevention and cessation intervention. Findings suggest that acquisition stage and susceptibility can independently predict smoking onset.

While different methodologies and approaches have been used to study racial/ethnic differences in smoking and tobacco use and susceptibility to smoke among adolescents, it seems that the quantitative approach seems dominant. Also, the review of the literature shows that quantitatively, most of these studies have only focused on racial

differences among these groups (i.e. White and Black/African American only and sometimes Hispanics). It is important to examine all the racial/ethnic groups in terms of susceptibility and intention to smoke so as to have sufficient information on how to develop ethnic specific strategies for preventing smoking and tobacco use that will help close the gap. While, most studies as described above have documented racial/ethnic differences in smoking and tobacco use especially among African Americans, Whites and Hispanics adolescents but what is missing is a clear understanding of the differences in susceptibility and intention to smoke across all racial/ethnic groups this study is investigating. Sufficient information is needed in regards to the differences so as to develop prevention programs that will teach the skills necessary to refuse cigarettes and/or to tailor prevention programs to specific racial/ethnic groups as needed.

<div align="center">Literature Relating to Differing Methodologies</div>

The methodological approaches that have been employed in previous studies on racial/ethnic differences on adolescents' smoking, susceptibility, and intention to smoke include cross-sectional and longitudinal approach. The Faulkner and Merritt (1998) study and the CDC (2004a) study are some examples of cross sectional studies on the subject matter. Few Studies have used longitudinal approach to examine racial/ethnic differences in smoking. For example, Kiefe et al. (2001) used a longitudinal approach to examine changes in smoking and tobacco use among adolescents. They focused on smoking prevalence, cessation, and initiation rates among African American and white young adults in four U.S. cities and the role of socioeconomic factors in explaining racial differences. The authors used a data by the Coronary Artery Risk Development in Young

Adults (CARDIA) study. After the first examination of participants of their smoking status and the collection of sociodemographic information, they were recontacted annually and reexamined in years 2, 5, 7, and 10. It was concluded that African Americans had markedly higher smoking prevalence rates, than their white counterparts.

In addition, Meijer, Branski and Kerem (2001) used a cross sectional method to determine the prevalence of smoking among Jewish and Arab adolescents in Jerusalem among students in the sixth to 11th grades (11-17years). A questionnaire that consisted of questions on the students' age, gender, smoking status, smoking status of their parents, and knowledge of the adverse health effects of smoking was administered. The outcomes of this study showed that ethnic differences in smoking prevalence among adolescents between the ethnic groups (i.e. the lowest prevalence of smoking was found among Arab female students and the highest among Jewish female students). Another study that used cross-sectional approach examined smoking prevalence and tobacco related psychosocial risk factors among multi-ethnic adolescents in California, as compared with white, African American, Asian American, and Hispanic adolescents (Unger, Palmer, Dent, Rohrbach, & Johnson, 2000). Data were obtained from the independent evaluation of the California Tobacco Control, Prevention, and Education Program. The authors concluded that multiethnic adolescents may be at increased risk for smoking and may have easier access to cigarettes. Longitudinal approach allows measuring changes in individual over time in term of smoking behavior and cross sectional approach to studying ethnic differences in smoking among adolescent allows gathering information on important health-related aspects of adolescents' knowledge, attitudes, and practices of smoking

behavior. For the purpose of the study, a cross sectional approach was employed because it is intended to look at the snapshot of the smoking behavior and not over a period of time. Table 1 shows summary of some the studies discussed above.

Table 1
Summary of some key studies

Study and year	Sample	Design	Findings
"An examination of ethnic differences in cigarette smoking intention among female teenagers" (Hanson, 2005).	Female teenagers (141 African American, 146 Puerto Rican, and 143 non-Hispanic white teenagers), aged 13–19 years, who were patients at family planning clinics in eastern Pennsylvania	Cross-sectional	The outcomes showed that ethnic group differences exist, and that smoking intention was mediated by perceived behavioral control for African Americans. For Puerto Rican and non-Hispanic white teenagers, attitudes were the greatest predictor of intention to smoke, and for non-Hispanic white smokers had a stronger intention to smoke than either the African American or Puerto Rican smokers

Table 1 (continued)

Study and year	Sample	Design	Findings
"Stages of smoking acquisition versus susceptibility as predictors of smoking initiation in adolescents in primary care" (Huang, Hollis, Polen, Lapidus & Austin, 2005).	Adolescents, ages 14–17, who participated in a randomized controlled trial of a computer-based tobacco prevention and cessation intervention	Longitudinal	Findings suggest that acquisition stage and susceptibility can independently predict smoking onset
"Racial/ethnic differences in cigarette smoking initiation and progression to daily smoking: A multilevel analysis" (Kandel, Kiros, Schaffran &Hu, 2004).	Adolescents in grades 7 through 12	Longitudinal	The results of this investigation showed that individual factors were more important predictors of smoking behaviors than were contextual factors
"Ethnic variation in peer influences on adolescent smoking" (Unger et al., 2001).	Eighth-grade adolescents in California who are White, African American, Asian, and Pacific Islander	Cross Sectional	The results showed that friends' smoking and prevalence estimates of peer smoking were risk factors for past 30-day smoking and susceptibility to smoking across ethnic groups.
"From adolescence to young adulthood: Racial/ethnic disparities in smoking" (Ellickson, Orlando, Tucker & Klein, 2004).	Adolescents ages 13-23yrs from 4 racial and ethnic groups (i.e. White, African American, Asian, or Hispanic)	Longitudinal approach	The results showed that while African Americans exhibited higher initiation rates than Whites, they exhibited consistently lower rates of regular smoking than both Whites and Hispanics

Table 1 (continued)

Study and year	Sample	Design	Findings
"Race and cigarette smoking among United States adolescents: The role of lifestyle behaviors and demographic factors" (Faulkner & Merritt, 1998).	African-American and white adolescents (aged 12 to 17 years) who participated in the Youth Risk Behavior Survey supplement to the 1992 National Health Interview Survey	Cross sectional	They found that selected lifestyle behaviors (e.g. health-compromising, intentional injury, or drug use behaviors and demographic factors (e.g. gender, age, education) do not account for the race differential in the prevalence of adolescent cigarette smoking
"Susceptibility to smoking among White and Chinese nonsmoking adolescents in Canada" (Chen, Bottorff, Johnson, Saewyc & Zumbo 2008).	The sample includes 10th and 11th graders who were nonsmokers with either a White or a Chinese ethnic background.	Cross sectional	Multivariate logistic regression analysis revealed that 11th graders were less susceptible than 10th graders and girls were more susceptible than boys
"Are racial differences explained by socioeconomic factors in the CARDIA study?" (Kiefe, Williams, Lewis, Allison, Sekar & Wagenknecht, 2001)	Adults aged 18 to 30 years who participated in the Coronary Artery Risk Development in Young Adults (CARDIA) study	Longitudinal	It was concluded that African Americans had markedly higher smoking prevalence rates, as well as higher 10-year regular smoking initiation rates and lower 10-year cessation rates, than their white counterparts.

Table 1 (continued)

Study and year	Sample	Design	Findings
"Ethnic differences in adolescent smoking prevalence in California: are multi-ethnic youth at higher risk?" (Unger, Palmer, Dent, Rohrbach & Johnson, 2000)	Eighth grade students (age 13-14 years) in California	Cross sectional	Results indicated that multi-ethnic adolescents were at higher risk than single-ethnic adolescents on several variables, including 30 day cigarette smoking prevalence, lifetime smokeless tobacco use, buying cigarettes, receiving cigarette offers, and expected friends' reaction if the respondent smoked
"Race/ethnicity, smoking status, and self-generated expected outcomes from smoking among adolescents" (Vidrine, Anderson, Pollak & Wetter, 2005).	Students in grade 9-12 –White, African American, Hispanics, and Asians	Cross sectional descriptive	Current smoking was highest among Hispanics, whereas African Americans and Asians were least likely to ever smoke. African Americans were most likely to experiment but least likely to smoke currently.

Summary

The literature review examined research on racial/ethnic differences in smoking among adolescents as well as susceptibility and intention to smoke. Also, the sections provide information on factors that have been examined in relation to adolescents' smoking such as socioeconominic and personal factors. The review showed different approaches and methods that have been used to investigate adolescents smoking. The review revealed significant information is needed in regards to differences in susceptibility and intention to smoke across racial/ethnic smoking so as to develop effective prevention programs. The next chapter (chapter 3) provides more information and description of the research design and approach, sample, instruments and materials, and data collection and analysis.

CHAPTER 3: RESEARCH METHOD

Introduction

The proposed investigation utilized a quantitative approach to test the relationships between susceptibility to smoke and intention to smoke on smoking behavior by ethnicity, age, and gender. The study utilized a nationally representative sample of youth ages 12-17 years who participated in the National Survey on Drug Use and Health (NSDUH). The study populations were from the 2007 NSDUH database. This chapter describes the research design, rationale, and approach; setting and sample; selection process, characteristics, and procedures; instrumentation and materials; data collection and analyses; and ethical considerations to protect the participants used in this study.

Research Design and Approach

The study seeks to test the relationships between susceptibility to smoking and intention to smoke on smoking behavior among adolescents of different racial/ethnic groups as measured by gender and age so as to develop appropriate prevention programs. It conducted secondary analysis of the data from the 2007 National Survey on Drug Use and Health (NSDUH). This study utilized a descriptive cross sectional approach to investigate the relationships across the racial//ethnic groups. That is, it used this approach to test the relationships between participants' susceptibility to smoking and intention to smoke on smoking behavior by ethnicity, gender, and age.

The quantitative descriptive cross sectional approach is appropriate for this study because the investigation accesses both outcomes and exposure at a moment in time

(snapshot) and not over a period of time. Also, since this study intends to provide more information on developing culturally appropriate tobacco cessation programs, the descriptive approach helps in identifying areas for further research. In addition, the study is being conducted on representative samples of a population and the descriptive cross sectional approach helps increase our ability to generalize the findings of the study to the general population. The advantages of this approach include; relatively inexpensive and takes up little time to conduct; can estimate prevalence of outcome of interest because sample is usually taken from the whole population; many outcomes and risk factors can be assessed; useful for public health planning, understanding disease etiology and for the generation of hypotheses; and there is no loss to follow-up. The disadvantages include; difficulty in making causal inferences, as it involves only a snapshot; further, the situation may provide differing results if another time-frame had been chosen (Levin, 2006)

Setting and Sample

This section describes the population from which the sample was drawn, the selection process and the procedures that was undertaken in this investigation.

Participants. The NSDUH collects information from residents of households, non-institutional group quarters (e.g., shelters, rooming houses, dormitories), and civilians living on military bases. Persons excluded from the survey include homeless persons who do not use shelters, active-duty military personnel, and residents of institutional group quarters, such as prisons and long-term hospitals. The study utilized a sample from the 2007 NSDUH databases to get good representation of the study

populations, especially of the ethnic groups. The NSDUH sample employs a 50-State

design with an independent, multistage area probability sample for each State and the

District of Columbia. The design also samples youths and young adults, so that each

state's sample is distributed equally among three age groups (12 to 17 years, 18 to 25

years, and 26 years or older). For the purpose of this proposed investigation, the study

population includes persons aged 12-17 years old, smokers and non smokers and are from

these racial/ethnic groups; White, Black/African American, Hispanic or Spanish origin,

Asian, Multi-Racial, American Indian/Alaska Native, and Native Hawaiian/Pacific

Islander.

Selection process. SAMHSA indicated that a scientific random sample of

households is selected across the United States, and a professional Research Triangle

Institute (RTI) field interviewer makes a personal visit to each selected household. Once

a household is chosen, no other household can be substituted for any reason. This practice

is to ensure that the NSDUH data represent the many different types of people in the

United States. Respondents complete computer practice session where field interviewers

show them how to navigate the system. In addition, SAMHSA stated that participants

completed the interview in the privacy of their own home. A professional RTI field

interviewer personally visits each selected person to administer the interview using a

laptop computer. Individuals answer most of the interview questions in private and enter

their responses directly into the computer so that even the interviewer does not know the

answer entered. For some items (e.g. core demographics questions), the interviewer reads

the question and enters the response into the computer. In addition, the interview takes about one hour to complete.

Procedures. The investigation used the entire data set of the 2007 NSDUH to get good representation of the study population. The use of the entire data set allows for large pool of the study population and enough sample size to establish statistically significant difference and relationships between the variables and across the racial/ethnic groups. A power analysis revealed that to detect a medium effect size of (f= .25), with a power of at least .80, tested at α = .05. The 2007 has total sample size of 67, 870 of which 18,314 are aged 12-17years. The National Survey on Drug Use and Health is a public domain data available at Substance Abuse and Mental Health Services Administration Website (www.datafiles.samhsa.gov). To obtain related data, NSDUH allows downloading data to personal computers and flash drives. The Website allows logging in anonymously or with the use of a password provided an individual agrees to terms of use. Related data can then be obtained or analyzed on the site.

Instrumentation and Materials

The investigation conducted secondary analysis of the data from the 2007 National Survey on Drug Use and Health (NSDUH) to get a good representation of the study population. NSDUH is an annual household survey that collects information on drug use and abuse from a nationally representative sample of the US civilian, non-institutionalized population over age 12. According to the 2003 NSDUH report, the National Survey on Drug Use and Health (NSDUH) is sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA). The survey has been conducted

since 1971 and serves as the primary source of information on the prevalence and

incidence of illicit drug, alcohol, and tobacco use in the civilian, non-institutionalized

population aged 12 or older in the United States. Information about substance abuse and

dependence, mental health problems, and receipt of substance abuse and mental health

treatment also is included. Since 1999, about 70,000 interviews are conducted each year

using a computer-assisted interviewing (CAI) methodology. The survey also produces

measures of abuse, dependence, treatment, and mental health problems, generally for the

past year. The measure of tobacco use includes use of cigarettes, chewing tobacco, snuff,

cigars, and pipe tobacco. Data collected is transmitted and stored electronically by

Research Triangle Institute (RTI). Thus, the information collected is stored at RTI, and

the public-use files are then provided to Substance Abuse and Mental Health Data

Archive (SAMHDA) for dissemination.

Validity and Reliability of the instrument

According to Piper, Meyer and Snodgrass (2006), the reliability of survey data is of

particular concern when the data reflect responses to questions that are sensitive in nature

(p.5). J. D. Colliver (personal communication, March 13, 2009) indicated that

> The NSDUH questionnaire is not a psychometric instrument in the sense of scales
> developed using multiple items addressing the same topic with small differences
> intended to obtain inter-item reliability scores. In the context of survey research,
> where a myriad of topics must be covered and interview time must be minimized,
> it is not possible to ask what essentially the same question over and over simply to
> enable inter-item reliability to be studied. Thus, the ordinary measures of
> reliability and validity applied to psychometric instruments do not pertain to the
> NSDUH questionnaire. (¶ 1) (See appendix C)

Recently, SAMHSA conducted an evaluation of test-retest reliability by returning to a

sub-sample of the original households and re-interviewing the participants. An

interview/re-interview method is employed where individuals are interviewed on two occasions, T1 and T2. The reliability of the responses is assessed by comparing the T1 and T2 responses (Feder, 2006). The final report of this study according to SAMHSA is forthcoming (see appendix C). However, for the purpose of this investigation, face and content validity was conducted to examine how well the instrument measures the variables of interest.

The researcher assessed the content validity of the survey used in the study. Content validity is a subjective approach designed to assess the degree to which the instrument successfully measures a concept (Singleton & Straits, 2005). The content validity of the instrument was measured using a quantitative and subjective method developed by Lawshe (1975), whereby raters or judges are polled as to their opinion on the essential nature of an item in the survey. In order to validate the content of the constructs, relevant items related to this study from the National Survey on Drug Use and Health such as 'susceptibility to smoking', 'intention to smoke' and 'smoking behavior' questions were included on the items rated by the experts. Demographic questions were excluded. In addition, three experts (public health professionals) who are engaged in smoking and tobacco research were selected to be part of the panel. They were asked to rate each questions on a three point scale where "1=not necessary", "2=useful but not essential", and "3=essential". If the majority of panelists agree that the question is essential, that question is deemed to have content validity (Lawshe).

Equation 1 shows the formula developed by Lawshe for the content validity ratio:

$$CVR = (n\mathrm{e} - N/2) \; / \; (N/2) \qquad\qquad (1)$$

In Equation 1, CVR is the abbreviation for content validity ratio, n_e the number of panelists listing the question as essential, and N the number of panelists. The value of CVR ranges from 0 to 1 with higher scores indicating greater content validity for the item. Given the small size of the panel, Lawshe (1975) would require a minimum value of 0.99 to value the question as having content validity. All the panelists that rated the items agreed that the questions are essential and according to Lawshe, the questions are have content validity. Below is table 2 showing the data collected.

Table 2
Data collected to assess content validity of NSDUH

Items/questions	n_e	CVR
Susceptibility to smoking;	3	(3-3/2)/(3/2)
"If one of your best friends offered you a cigarette, would you smoke it?"		= 1
Intention to smoke;	3	(3-3/2)/(3/2)
"At any time during the next 12 months do you think you will smoke a cigarette?"		= 1
Smoking behavior	3	(3-3/2)/(3/2)
"During the past 30 days, how many days did you smoke part or all of a cigarette?"		= 1

Further, to establish face validity, the researcher recruited four Walden students from one of the residencies to participate in determining the extent to which the questions measure what they are intended. They were presented with NSDUH questionnaire with particular emphasize on the tobacco portion. They were instructed to indicate whether the

tobacco questions including the items in this study on the surface fit the purpose of the questionnaire, if the directions were clear, and if the overall language and reading level of the survey are comprehendible. Based upon feedbacks from participants, the instrument appears to be measuring what it is intended to measure.

<div align="center">Variables measurement</div>

Upon IRB approval, a sample of self-reported data on smoking and tobacco use of the target population from NSDUH was obtained and analyzed. The tobacco portion of NSDUH questionnaires contains 43 items about the use of cigarettes, chewing tobacco, snuff (i.e., dip), cigars, or pipes. Variables from the proposed inquiry include gender, age, racial/ethnicity, susceptibility, and intention to smoke. From nominal level of measurement- which describes variable whose attributes have only the characteristics of exhaustiveness and mutual exclusiveness (Babbie, 2007, p.136), respondents were asked to specify either 'male or female'. For 'age' respondents were asked to give their exact age in years (ratio level of measurement-which describes a variable with attributes that have all the qualities of nominal, ordinal, and interval measures and are based on a 'true zero' (p.138)) e.g. 12 yrs old, 14 yrs old.

The analyses were based on affirmative responses to several questions asked by NSDUH. For *Susceptibility to smoking*; "If one of your best friends offered you a cigarette, would you smoke it?" (Options include: Definitely yes, probably yes, probably not and definitely not). *Intention to smoke;* "At any time during the next 12 months do you think you will smoke a cigarette?" (Options include: Definitely yes, probably yes, probably not and definitely not). *Smoking behavior* (There is an exclusion question that

eliminates nonsmokers and this question will be used to sort the sample by smokers and nonsmokers*);* "During the past 30 days, how many days did you smoke part or all of a cigarette?" (Options include; 1 or 2 days, 3 to 5 days, 6 to 9 days, 10 to 19 days, 20 to 29 days, and all of 30 days). *Age*; "what is your current age?" Race/ethnicity designation will be based on respondents' self-classification. For Hispanic origin, respondents were asked, "Are you of Hispanic, Latino, or Spanish origin or descent?" Hispanics were also asked to select the specific subgroup (Mexican, Puerto Rican, Central or South American, or Cuban) that best described them. For race, respondents were asked, "Which of these groups' best describes you?" Response selections were White, Black/African American, American Indian or Alaska Native, Native Hawaiian/ Pacific Islander, Asian, Multi-Racial.

<div align="center">Data collection</div>

The data collection method is in-person interviews conducted with a sample of individuals at their place of residence. Prior to 1999, the NSDUH used a paper-and-pencil interviewing (PAPI) methodology. Since 1999, the interview has been carried out with CAI methodology. The survey uses a combination of computer-assisted personal-interviewing (CAPI) conducted by the interviewer for some basic demographic information and audio computer-assisted self-interviewing (ACASI) for most of the questions. ACASI provides a highly private and confidential means of responding to questions to increase the level of honest reporting of illicit drug use and other sensitive behavior. Information is collected continuously from January 1 through December

31. For illicit drug use, alcohol use, and tobacco use, information is presented about use in the lifetime, past year, and past month. Use in the past month also is referred to as "current use." In addition to these, information on demographics such as age, gender, racial/ethnicity, education, employment is collected (NSDUH, 2008).

Analysis of Data

The data was entered into SPSS 15.0. The data analyses proceed in two stages. First, descriptive statistics were calculated on all research variables. Means and standard deviations were calculated for variables on a ratio, ordinal, or interval scale. The second stage of the analyses present the inferential statistics used to test the research hypotheses. All statistical tests were conducted at $\alpha = .05$. The following is a review of the research questions and hypotheses as well as the research analysis procedures.

Research Questions and Hypothesis

The research questions and research hypothesis of this study are listed again for review.

Research Question 1. Are there statistically significant differences between the racial/ethnic groups on susceptibility to smoking?

H_0: There are no statistically significant differences between the racial/ethnic groups on susceptibility to smoking.

H_A: There are statistically significant differences between the racial/ethnic groups on susceptibility to smoking.

Research Question 2. Are there statistically significant differences between the racial/ethnic groups on intention to smoke?

H_0: There are no statistically significant differences between the racial/ethnic groups on intention to smoke.

H_A: There are statistically significant differences between the racial/ethnic groups on intention to smoke.

Research Question 3. Are there statistically significant relationships between susceptibility to smoking and intention to smoke?

H_0: There are no statistically significant relationships between susceptibility to smoking and intention to smoke.

H_A: There are statistically significant relationships between susceptibility to smoking and intention to smoke.

Research Question 4. Are there statistically significant relationships between susceptibility to smoking and number of days participants smoked a partial or whole cigarette in the last 30 days?

H_0: There are no statistically significant relationships between susceptibility to smoking and number of days participants smoked a partial or whole cigarette in the last 30 days.

H_A: There are statistically significant relationships between susceptibility to smoking and number of days participants smoked a partial or whole cigarette in the last 30 days.

Research Question 5. Are there statistically significant relationships between intention to smoke and number of days participants smoked a partial or whole cigarette in the last 30 days?

H_0: There are no statistically significant relationships between intention to smoke and number of days participants smoked a partial or whole cigarette in the last 30 days.

H_A: There are statistically significant relationships between intention to smoke and number of days participants smoked a partial or whole cigarette in the last 30 days.

Research Question 6. Are there statistically significant differences between racial/ethnic groups on susceptibility to smoking by age?

H_0: There are no statistically significant differences between racial/ethnic groups on susceptibility to smoking by age.

H_A: There are statistically significant differences between racial/ethnic groups on susceptibility to smoking by age.

Research Question 7. Are there statistically significant differences between males and females of different racial/ethnic groups on susceptibility to smoking?

H_0: There are no statistically significant differences between males and females of different racial/ethnic groups on susceptibility to smoking.

H_A: There are statistically significant differences between males and females of different racial/ethnic groups on susceptibility to smoking.

Research Question 8. Are there statistically significant differences between racial/ethnic groups on intention to smoke by age?

H_0: There are no statistically significant differences between racial/ethnic groups on intention to smoke by age.

H_A: There are statistically significant differences between racial/ethnic groups on intention to smoke by age.

Research Question 9. Are there statistically significant differences between males and females of different racial/ethnic groups on intention to smoke?

H_0: There are no statistically significant differences between males and females of different racial/ethnic groups on intention to smoke.

H_A: There are statistically significant differences between males and females of different racial/ethnic groups on intention to smoke.

Research Question 10. Are there statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days?

H_0: There are no statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days.

H_A: There are statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days.

Research Question 11. Are there statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by age?

H_0: There are no statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by age.

H_A: There are statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by age.

Research Question 12. Are there statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by gender?

H_0: There are no statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by gender.

H_A: There are statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by gender.

Research Question 13. Are participants' age, gender, and ethnicity (African American, Asian, Caucasian, Hispanic, Other) significant predictors of the number of days they smoked a partial or whole cigarette in the last 30 days?

H_0: Participant's susceptibility, intention to smoke, age, gender, and ethnicity are not statistically significant predictors of the number of days they smoked a partial or whole cigarette in the last 30 days.

H_A: Participant's susceptibility, intention to smoke, age, gender and ethnicity are statistically significant predictors of the number of days they smoked a partial or whole cigarette in the last 30 days.

Data Analysis Procedures

Kruskal-Wallis test was conducted to determine if there are significant differences among the racial/ethnic groups on susceptibility to smoking. Kruskal-Wallis test was conducted to determine the statistically significance difference between the racial/ethnic groups on intention to smoke. A bivariate Spearman correlation was calculated to determine the statistically significant relationships between susceptibility to smoking and intention to smoke. Two-way between-subjects factorial ANOVA was conducted to examine the significant differences between racial/ethnic groups on susceptibility to smoking by age. This test also examined the age main effect, ethnicity main effect, and the age X ethnicity interaction. A Two-way between-subjects factorial ANOVA was conducted to determine statistically significant differences between males and females of different racial/ethnic groups on susceptibility to smoking. Gender main effect, ethnicity main effect, and the gender X ethnicity interaction were examined as well. A Two-way between-subjects factorial ANOVA was conducted to examine statistically significant differences between racial/ethnic groups on intention to smoke by age. A Two-way between-subjects factorial ANOVA was conducted to examine statistically significant differences between males and females of different racial/ethnic groups on intention to smoke. One-way between-subjects ANOVA was conducted to determine statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days. A Two-way between-subjects factorial ANOVA was conducted to determine statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole

cigarette in the last 30 days by age. Two-way between-subjects factorial ANOVA was conducted to examine statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by gender. Multiple regression analysis was conducted to determine if participants' age, gender, and ethnicity are significant predictors of the number of days they smoked a partial or whole cigarette in the last 30 days.

<div align="center">Protection of participants' rights</div>

Both Substance Abuse and Mental Health Services Administration (SAMHSA) and Research Triangle Institute (RTI) indicated that assuring complete confidentiality of responses to the National Survey on Drug Use and Health (NSDUH) is highly important. Therefore, the team focuses on the combination of all responses nationwide, not in any one individual's answers. For that reason, participants' names or associated answers with actual addresses are never recorded. All data that respondents provide are kept completely confidential and are used only when combined with other answers to help understand patterns of tobacco, alcohol and drug use in this country. Additionally, the confidentiality of the answers provided to the questions is protected under federal law. In addition, as part of respondents' right to informed consent, SAMHSA and RTI ensure that all potential respondents were informed about the purposes of the study, procedures that will be followed; that participation is voluntary and approximate length of the interview before the start of interview. The data was utilized and protected in accordance with SAMHSA and RTI policy. That is, it was solely used for dissertation purposes and no commercial gain and data abstracted was stored and analyzed on personal computer

with secured password. A copy of the informed consent for 12-17 age groups can be found in appendix B (consent form for age 12-17).

Summary

This chapter provides detailed information on the instrument (NSDUH) that was utilized, data collection process, research design and approach that was undertaken. Also, the chapter provides detailed description of the study variables as well as the measures taken to protect participants by SAMHSA. Further, the research questions were reiterated for review along with description of related analyses. In addition, validity and reliability of the instrument, sample size, as well as the measure of the study variables was discussed.

CHAPTER 4:

RESULTS

Introduction

The purpose of this investigation was to test the relationships between

susceptibility to smoke and intention to smoke on smoking behavior by ethnicity, age,

and gender. The study utilized a nationally representative sample of youth ages 12-17

years who participated in the 2007 National Survey on Drug Use and Health (NSDUH).

Means and standard deviations were calculated for variables on a ratio and ordinal scale.

The results of this analysis are presented in two sections: descriptive statistics data and

inferential statistics for each research question.

According to Sauro (2004), a t−test and ANOVA can be done on ordinal data.

"The major caveat comes from interpreting the results i.e. if a significant difference is

found, it should only be reported that one group mean is higher or lower than the other—

an ordinal statement" (para. 1). Further, the author indicated that "there are two camps

when it comes to this issue. The more purist camp will argue that one cannot use those

parametric tests with ordinal data. The other camp (most social scientists and

practitioners), will argue that it is fine" (para. 2).

Additionally, arguments continue to be generated on the use of parametric

statistics such as F-test (ANOVA) to analyze ordinal scaled data (Velleman, &

Wilkinson, 1993; Hsu and Feldt, 1969). The authors argued that the F-test, for example,

displays good control with respect to Type I error when applied to ordinally scaled data.

Studies such as that of Scheff, Saucier, and Cain, 2002 also justified the use of parametric

statistics such as ANOVA in analyzing ordinal or rating scale data where appropriate**.**

According to Shah and Madden, 2004 parametric statistical methods can be used successfully for a wide range of data analysis problems. However, certain measurement classes such as the ordinal scaled data may pose serious problems for parametric analyses (2004). Further, the authors noted that researchers in many fields try different approaches when dealing with factorials. Often times, they ignore the problems of ordinal measurement scales and analyze the data using parametric methods (Shah and Madden). This kind of approach, according to Munzel and Bandelow (1998), is common in the field of social sciences where data usually involves rating of behavior or conditions. In addition, Snedecor and Cochran (1989) indicated that for ANOVA to be appropriate for such ordinal data, it must be assumed that the ratings values represent equal gradations on an underlying scale. Howell (2002) indicated that ANOVA is robust in its ability to handle violations of the normality assumption with little effect on the validity of the analysis. Also, according to Howell (1999), the ANOVA is based on other assumptions that must be addressed. The assumption of homogeneity of variance holds that the variance of scores for each population is equal. However, violations of this assumption are not critical as long as; the largest variance is no more than four times larger than the smallest variance.

In the present study the researcher utilized the Kruskal-Wallis test in lieu of ANOVA to evaluate research questions 1 and 2 because of the ordinal nature of the dependent variables. Spearman correlation was used to test research question 3. However, to test the interaction term and the main effects in research questions 6, 7, 8, and 9 with

ordinally scaled dependent variables, the researcher used Factorial ANOVA. Factorial

ANOVA was utilized to test research questions 10, 11, and 12 because the dependent

variable level of measurement is ratio and multiple regression analysis was conducted on

research question 13. It is important to note that research questions 4 and 5 could not be

tested because there were no participants with data for susceptibility, smoking intentions,

and numbers of days smoked variables.

<center>Participant Demographics</center>

A total of 18,314 youth ages 12 – 17 participated in the study. The descriptive

statistics for the participants' demographics are listed in Table 3. Approximately half

9355 (51.1%) of the participants were male. The participants' ethnicity was reported as

follows: 11,113 (60.7%) White, 3,063 (16.7%) Hispanic, 2,593 (14.2%) African

American, 681 (3.7%) Multi-Racial, 518 (2.8%) Asian, 257 (1.4%) Native

American/Alaska Native, and 89 (0.5%) Native Hawaiian/Pacific Islander. The

participants' age was reported as follows: 5,843 (31.9%) 12 – 13 years old, 6,282

(34.3%) 14 – 15 years old and 6,189 (33.8%) 16 – 17 years old.

Table 3

Descriptive Statistics for Participants' Demographics

Variable	n	%
Gender		
Female	8,959	48.9
Male	9,355	51.1
Ethnicity		
White	11,113	60.7
Hispanic	3,063	16.7
African American	2,593	14.2
Multi-Racial	681	3.7
Asian	518	2.8
Native American/Alaska Native	257	1.4
Native Hawaiian/Pacific Islander	89	0.5
Age		
12 – 13 Years	5,843	31.9
14 – 15 Years	6,282	34.3
16 – 17 Years	6,189	33.8

Data from the 2007 National Survey on Drug Use and Health

Research questions and Data Analysis

Research Question 1. Are there statistically significant differences between the

racial/ethnic groups on susceptibility to smoking?

H_0: There are no statistically significant differences between the racial/ethnic

groups on susceptibility to smoking.

The researcher applied a Kruskal-Wallis test to determine if there were significant

differences among the racial/ethnic groups (African American vs. Asian vs. White vs.

Hispanic vs. Multi-Racial vs. Native American/Alaska Native vs. Native

Hawaiian/Pacific Islander) on their susceptibility to smoking. The dependent variable

was operationalized with the following item from the survey: "If your best friend offered

you a cigarette, would you smoke it?" (Options include: 1=definitely yes, 2=probably yes, 3=probably not and 4=definitely not). The Kruskal-Wallis test is the non-parametric equivalent to the one-way between-subjects ANOVA. It is appropriate for dependent ordinal scales or when the assumptions of the parametric test cannot be met. The mean ranks and test statistics are listed in Table 4. The Kruskal-Wallis results failed to reveal a significant difference among the ethnic groups on the susceptibility to smoking, $\chi^2 (6) =$ 7.64, $p > .05$. Bonferroni post hoc tests were not conducted because there were no significant effects.

Table 4

Mean Ranks for Susceptibility to smoking by Ethnicity

Ethnic Group	N	M
African American	2048	6,762.25
Asian	439	6,527.22
White	7958	6,692.81
Hispanic	2236	6,595.17
Multi-Racial	471	6,755.58
Native American/Alaska Native	140	6,656.54
Native Hawaiian/Pacific Islander	74	6,691.36

$\chi^2 (6) = 7.64, p > .05$

Research Question 2. Are there statistically significant differences between the racial/ethnic groups on their intention to smoke?

H_0: There are no statistically significant differences between the racial/ethnic

groups on their intentions to smoke.

Again the researcher applied a Kruskal-Wallis test to determine if there were

significant differences among the racial/ethnic groups (African American vs. Asian vs.

White vs. Hispanic vs. Multi-Racial vs. Native American/Alaska Native vs. Native

Hawaiian/Pacific Islander) on their intentions to smoke. The dependent variable was

operationalized with the following item from the survey: "Do you think you'll smoke a

cigarette in the next 12 months?" (Options include: 1=definitely yes, 2=probably yes,

3=probably not and 4= definitely not). The mean ranks and statistics test are listed in

Table 5. The Kruskal-Wallis results revealed a significant difference among the ethnic

groups on the intentions to smoke, χ^2 (6) = 21.38, p < .01.

Table 5

Mean Ranks for Intentions to smoke by Ethnicity

Ethnic Group	N	M
African American	2048	6607.51
Asian	439	6736.59
White	7958	6748.32
Hispanic	2236	6507.85
Multi-Racial	471	6709.98
Native American/Alaska Native	140	6682.38
Native Hawaiian/Pacific Islander	74	6542.96

χ^2 (6) = 21.38, p < .01

Pairwise Bonferroni post hoc tests (Table 6) were conducted to further examine the

significant ethnicity effect. The Bonferroni post hoc tests revealed that the Whites (M =

6748.32) scored significantly higher than the Hispanics (M = 6507.51) on intentions to

smoke, χ^2 (6) = 21.38, $p < .01$. Given the coding of the intentions variable (i.e., higher

numbers represent less inclination to smoke), this indicates the Hispanics demonstrated a

significantly higher intention to smoke in the next 12 months than the White participants.

The remaining pairwise comparisons were not significant.

Table 6

Bonferroni Post Hoc Tests on Intentions to Smoke by Ethnicity

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
White	African American	0.03	0.01	.124	0.00	0.06
	Native American/Alaska Native	0.01	0.03	1.00	-0.10	0.11
	Native Hawaiian/Pacific Islander	0.04	0.05	1.00	-0.10	0.19
	Asian	0.01	0.02	1.00	-0.05	0.07
	Multi-Racial	0.00	0.02	1.00	-0.06	0.06
	Hispanic	0.04*	0.01	.000	0.01	0.07

*. The mean difference is significant at the .05 level.

Table 6 (continued)

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
African American	White	-0.03	0.01	.124	-0.06	0.00
	Native American/Alaska Native	-0.02	0.04	1.00	-0.13	0.09
	Native Hawaiian/Pacific Islander	0.02	0.05	1.00	-0.13	0.16
	Asian	-0.02	0.02	1.00	-0.09	0.04
	Multi-Racial	-0.03	0.02	1.00	-0.09	0.03
	Hispanic	0.02	0.01	1.00	-0.02	0.05
Native American/Alaska Native	White	-0.01	0.03	1.00	-0.11	0.10
	African American	0.02	0.04	1.00	-0.09	0.13
	Native Hawaiian/Pacific Islander	0.04	0.06	1.00	-0.14	0.21
	Asian	0.00	0.04	1.00	-0.12	0.12
	Multi-Racial	-0.01	0.04	1.00	-0.12	0.11
	Hispanic	0.04	0.04	1.00	-0.07	0.14

*. The mean difference is significant at the .05 level.

Table 6 (continued)

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
Native Hawaiian/Pacific Islander	White	-0.04	0.05	1.00	-0.19	0.10
	African American	-0.02	0.05	1.00	-0.16	0.13
	Native American/Alaska Native	-0.04	0.06	1.00	-0.21	0.14
	Asian	-0.04	0.05	1.00	-0.19	0.11
	Multi-Racial	-0.04	0.05	1.00	-0.20	0.11
	Hispanic	0.00	0.05	1.00	-0.14	0.14
Asian	White	-0.01	0.02	1.00	-0.07	0.05
	African American	0.02	0.02	1.00	-0.04	0.09
	Native American/Alaska Native	0.00	0.04	1.00	-0.12	0.12
	Native Hawaiian/Pacific Islander	0.04	0.05	1.00	-0.11	0.19
	Multi-Racial	-0.01	0.03	1.00	-0.09	0.07
	Hispanic	0.04	0.02	1.00	-0.03	0.10

*. The mean difference is significant at the .05 level.

Table 6 (continued)

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
Multi-Racial	White	0.00	0.02	1.00	-0.06	0.06
	African American	0.03	0.02	1.00	-0.03	0.09
	Native American/Alaska Native	0.01	0.04	1.00	-0.11	0.12
	Native Hawaiian/Pacific Islander	0.04	0.05	1.00	-0.11	0.20
	Asian	0.01	0.03	1.00	-0.07	0.09
	Hispanic	0.04	0.02	.625	-0.02	0.11
Hispanic	White	-0.04*	0.01	.000	-0.07	-0.01
	African American	-0.02	0.01	1.00	-0.05	0.02
	Native American/Alaska Native	-0.04	0.04	1.00	-0.14	0.07
	Native Hawaiian/Pacific Islander	0.00	0.05	1.00	-0.14	0.14
	Asian	-0.04	0.02	1.00	-0.10	0.03
	Multi-Racial	-0.04	0.02	.625	-0.11	0.02

*. The mean difference is significant at the .05 level.

Research Question 3. Is there a statistically significant relationship between the participants' susceptibility to smoking and their intention to smoke?

H_0: There are no statistically significant relationship between the participants' susceptibility to smoking and their intention to smoke.

A bivariate Spearman correlation was calculated to determine if there was a significant relationship between the susceptibility to smoke and the intention to smoke. The correlation revealed a significant positive relationship between the susceptibility to smoking and the intentions to smoke, $r = .57$, $p < .01$. This indicates that the intentions to smoke increase with increasing levels of susceptibility to smoking.

Table 7

Correlation between Susceptibility to smoking and Intentions to smoke

		If best friend offered you smoke cig	Do you think you'll smoke cig in next 12 months
If best friend offered you smoke cig	P. correlation	1.00	.566(**)
	Sig. (2-tailed)		.000
	N	13366	13347
Do you think you'll smoke cig in next 12 months	P. correlation	.566(**)	1.000
	Sig. (2-tailed)	.000	
	N	13347	13365

** Correlation is significant at the 0.01 level (2-tailed).

Research Question 4. Is there a statistically significant relationship between the susceptibility to smoking and the number of days participants smoked a partial or whole cigarette in the last 30 days?

H_0: There will be no statistically significant relationship between the

susceptibility to smoking and the number of days participants smoked a partial or

whole cigarette in the last 30 days.

This research question could not be tested because there were no participants with

data for both the susceptibility and numbers of days smoked variables.

Research Question 5. Is there a statistically significant relationship between the intention

to smoke and the number of days participants smoke a partial or whole cigarette in the

last 30 days?

H_0: There will be no statistically significant relationship between the intention to

smoke and the number of days participants smoke a partial or whole cigarette in

the last 30 days?

This research question could not be tested because there were no participants with

data for both the intentions to smoke and numbers of days smoked variables.

Research Question 6. Are there statistically significant differences between racial/ethnic

groups on susceptibility to smoking by age?

H_0: There are no statistically significant differences between racial/ethnic groups

on susceptibility to smoking by age.

A two-way between-subjects factorial ANOVA (analysis of variance) was

conducted to determine if there were significant differences on susceptibility to smoking

by ethnicity (African American vs. Asian vs. White vs. Hispanic vs. Multi-Racial vs.

Native American/Alaska Native vs. Native Hawaiian/Pacific Islander) and age (12 – 13

years vs. 14 – 15 years vs. 16 – 17 years). The ANOVA was utilized to assess the

ethnicity and age main effects, as well as the ethnicity by age interaction term. The means and standard deviations of susceptibility to smoking by ethnicity and age are listed in Table 8.

The ANOVA (Table 9) failed to reveal a significant ethnicity main effect, F (6, 13345) = 1.16, $p > .05$ ($\eta^2 = .00$, power = .47). This indicates that there were no significant differences among the ethnic groups on the susceptibility to smoking. The ANOVA did reveal a significant age main effect, F (2, 13345) = 6.33, $p < .01$ ($\eta^2 = .00$, power = .90). This indicates that the age groups significantly differed on the susceptibility to smoking. Lastly, the ethnicity X age interaction was not significant, F (12, 13345) = 1.12, $p > .05$ ($\eta^2 = .00$, power = .66). This indicates that the significant difference between the age groups was not a function of the ethnicity variable.

Several Bonferroni post hoc tests (Table 10) were conducted to further examine the age main effect. All of the pairwise comparisons were significant. This indicates that all the age groups significantly differed on the susceptibility to smoking. The 14 – 15 year old group (M = 3.80, SD = 0.45) was significantly more susceptible to smoking than the 12 – 13 year olds (M = 3.87, SD = 0.37) and 16 – 17 year olds (M = 3.82, SD = 0.42). The difference between the 12 – 13 year old group and the 16 – 17 year old group was also significant. Post hoc tests were not conducted on the ethnicity variable because the ANOVA main effect was not significant.

Table 8

Means and Standard Deviations of Susceptibility to Smoking by Ethnicity & Age

Ethnicity	Age	*N*	*M*	*SD*
White	12 – 13	3,173	3.87	0.38
	14 – 15	2,745	3.80	0.43
	16 - 17	2,040	3.83	0.41
	Total	7,958	3.84	0.41
African American	12 – 13	748	3.89	0.35
	14 – 15	705	3.79	0.48
	16 - 17	595	3.85	0.40
	Total	2,048	3.84	0.42
Native American/ Alaska Native	12 – 13	64	3.86	0.39
	14 – 15	46	3.83	0.38
	16 - 17	30	3.80	0.41
	Total	140	3.84	0.39
Native Hawaiian/ Pacific Islander	12 – 13	26	3.88	0.43
	14 – 15	28	3.86	0.36
	16 - 17	20	3.65	0.75
	Total	74	3.81	0.52

Table 8 (continued)

Ethnicity	Age	*N*	*M*	*SD*
Asian	12 – 13	148	3.89	0.32
	14 – 15	154	3.74	0.45
	16 - 17	137	3.80	0.45
	Total	439	3.81	0.43
Multi-Racial	12 – 13	219	3.86	0.38
	14 – 15	132	3.85	0.38
	16 - 17	120	3.84	0.37
	Total	471	3.85	0.37
Hispanic	12 – 13	891	3.86	0.37
	14 – 15	782	3.79	0.46
	16 - 17	563	3.80	0.44
	Total	2,236	3.82	0.42

Table 9

ANOVA on Susceptibility to Smoking by Ethnicity & Age

Source	SS	df	MS	*F*	Sig.	η^2	Power
Ethnicity	1.17	6	0.20	1.16	.322	.00	.47
Age	2.13	2	1.06	6.33	.002	.00	.90
Ethnicity X Age	2.25	12	0.19	1.12	.341	.00	.66
Error	2242.06	13,345	0.17				

Table 10

Bonferroni Post Hoc Tests on Susceptibility to Smoke by Age

(I) Age	(J) Age	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
12-13 Years Old	14-15 Years Old	0.07*	0.01	.000	0.05	0.09
	16-17 Years Old	0.05*	0.01	.000	0.02	0.07
14-15 Years Old	12-13 Years Old	-0.07*	0.01	.000	-0.09	-0.05
	16-17 Years Old	-0.03*	0.01	.016	-0.05	0.00
16-17 Years Old	12-13 Years Old	-0.05*	0.01	.000	-0.07	-0.02
	14-15 Years Old	0.03*	0.01	.016	0.00	0.05

*. The mean difference is significant at the .05 level.

Research Question 7. Are there statistically significant differences between males and females of different racial/ethnic groups on susceptibility to smoking?

H_0: There are no statistically significant differences between males and females of different racial/ethnic groups on susceptibility to smoking.

A two-way between-subjects factorial ANOVA was conducted to determine if there were significant differences on susceptibility to smoking by ethnicity (African American vs. Asian vs. White vs. Hispanic vs. Multi-Racial vs. Native American/Alaska Native vs. Native Hawaiian/Pacific Islander) and gender (female vs. male). The ANOVA was utilized to assess the ethnicity and gender main effects, as well as the ethnicity by gender interaction term. The means and standard deviations of susceptibility to smoking by ethnicity and gender are listed in Table 11.

The ANOVA (Table 12) failed to reveal a significant ethnicity main effect, F (6, 13352) = 1.06, p > .05 (η^2 = .00, power = .43). This indicates that there were no significant differences among the ethnic groups on the susceptibility to smoking. The ANOVA also failed to reveal a significant gender main effect, F (1, 13352) = 0.63, p > .05 (η^2 = .00, power = .13). This indicates that the females and males did not significantly differ on the susceptibility to smoking. Lastly, the ethnicity X gender interaction was not significant, F (6, 13352) = 0.47, p > .05 (η^2 = .00, power = .19). This indicates that the non-significant difference between the ethnic groups was not a function of the gender variable. Post hoc tests were not conducted for the main effects and interaction term because of the lack of significance.

Table 11

Means and Standard Deviations of Susceptibility to Smoking by Ethnicity & Gender

Ethnicity	Gender	*N*	*M*	*SD*
White	Male	4108	3.84	0.40
	Female	3850	3.83	0.42
	Total	7958	3.84	0.41
African American	Male	1037	3.85	0.43
	Female	1011	3.84	0.41
	Total	2048	3.84	0.42
Native American/ Alaska Native	Male	73	3.82	0.39
	Female	67	3.85	0.40
	Total	140	3.84	0.39
Native Hawaiian/ Pacific Islander	Male	40	3.78	0.58
	Female	34	3.85	0.44
	Total	74	3.81	0.52
Asian	Male	250	3.82	0.43
	Female	189	3.79	0.44
	Total	439	3.81	0.43

Table 11 (continued)

Ethnicity	Gender	*N*	*M*	*SD*
Multi-Racial	Male	243	3.84	0.39
	Female	228	3.87	0.35
	Total	471	3.85	0.37
Hispanic	Male	1123	3.82	0.43
	Female	1113	3.82	0.42
	Total	2236	3.82	0.42

Table 12

ANOVA on Susceptibility to Smoking by Ethnicity & Gender

Source	SS	df	MS	*F*	Sig.	η^2	Power
Ethnicity	1.08	6	0.18	1.06	.382	.00	.43
Gender	0.11	1	0.11	0.63	.427	.00	.13
Ethnicity X Gender	0.47	6	0.08	0.47	.834	.00	.19
Error	2,256.39	13,352	0.17				

Research Question 8. Are there statistically significant differences between racial/ethnic groups on intention to smoke by age?

H$_0$: There are no statistically significant differences between racial/ethnic groups on intention to smoke by age.

A two-way between-subjects factorial ANOVA was conducted to determine if there were significant differences on intentions to smoke by ethnicity (African American vs. Asian vs. White vs. Hispanic vs. Multi-Racial vs. Native American/Alaska Native vs. Native Hawaiian/Pacific Islander) and age (12 – 13 years vs. 14 – 15 years vs. 16 – 17 years). The ANOVA was utilized to assess the ethnicity and age main effects, as well as the ethnicity by age interaction term. The means and standard deviations of intentions to smoke by ethnicity and age are listed in Table 13.

The ANOVA (Table 14) revealed a significant ethnicity main effect, F (6, 13344) = 4.33, $p < .01$ (η^2 = .00, power = .98). This indicates that there were significant differences among the ethnic groups on the intentions to smoke. The ANOVA failed to reveal a significant age main effect, F (2, 13344) = 2.43, $p > .05$ (η^2 = .00, power = .49). This indicates that the age groups did not significantly differ on the intentions to smoke. Lastly, the ethnicity X age interaction was not significant, F (12, 13344) = 1.41, $p > .05$ (η^2 = .00, power = .79). This indicates that the difference between the ethnic groups was not a function of the age variable.

Bonferroni post hoc tests (Table 15) were conducted to further examine the ethnicity main effect. The tests indicated that the Whites (M = 3.86, SD = 0.38) scored significantly higher than the Hispanics (M = 3.81, SD = 0.44) on the intentions to smoke. Given the coding of the dependent variable, (i.e., higher numbers represent less inclination to smoke) this indicates that the Hispanics have a greater intention to smoke than the Whites. The remaining pairwise comparisons were not significant.

Table 13

Means and Standard Deviations of Intentions to Smoke by Ethnicity & Age

Ethnicity	Age	*N*	*M*	*SD*
White	12 – 13	3175	3.89	0.33
	14 – 15	2744	3.83	0.42
	16 - 17	2042	3.84	0.40
	Total	7961	3.86	0.38
African American	12 – 13	749	3.87	0.39
	14 – 15	704	3.80	0.46
	16 - 17	596	3.82	0.43
	Total	2049	3.83	0.42
Native American/ Alaska Native	12 – 13	64	3.80	0.44
	14 – 15	45	3.91	0.29
	16 - 17	30	3.87	0.35
	Total	139	3.85	0.38
Native Hawaiian/ Pacific Islander	12 – 13	26	3.85	0.46
	14 – 15	28	3.71	0.54
	16 - 17	20	3.90	0.31
	Total	74	3.81	0.46

Table 13 (continued)

Ethnicity	Age	*N*	*M*	*SD*
Asian	12 – 13	147	3.87	0.41
	14 – 15	154	3.81	0.42
	16 - 17	137	3.87	0.38
	Total	438	3.85	0.41
Multi-Racial	12 – 13	219	3.84	0.38
	14 – 15	132	3.83	0.40
	16 - 17	120	3.91	0.29
	Total	471	3.86	0.36
Hispanic	12 – 13	889	3.85	0.40
	14 – 15	781	3.79	0.47
	16 - 17	563	3.78	0.48
	Total	2233	3.81	0.44

Table 14

ANOVA on Intentions to Smoke by Ethnicity & Age

Source	SS	df	MS	F	Sig.	η^2	Power
Ethnicity	4.15	6	0.69	4.33	.000	.00	.98
Age	0.78	2	0.39	2.43	.088	.00	.49
Ethnicity X Age	2.71	12	0.23	1.41	.152	.00	.79
Error	2,130.80	13,344	0.16				

Table 15

Bonferroni Post Hoc Tests on Intentions to Smoke by Ethnicity

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
White	African American	0.03	0.01	.121	0.00	0.06
	Native American/Alaska Native	0.01	0.03	1.00	-0.10	0.11
	Native Hawaiian/Pacific Islander	0.04	0.05	1.00	-0.10	0.19
	Asian	0.01	0.02	1.00	-0.05	0.07
	Multi-Racial	0.00	0.02	1.00	-0.06	0.06
	Hispanic	0.04*	0.01	.000	0.02	0.07
African American	White	-0.03	0.01	.121	-0.06	0.00
	Native American/Alaska Native	-0.02	0.04	1.00	-0.13	0.09
	Native Hawaiian/Pacific Islander	0.02	0.05	1.00	-0.13	0.16
	Asian	-0.02	0.02	1.00	-0.09	0.04
	Multi-Racial	-0.03	0.02	1.00	-0.09	0.03
	Hispanic	0.02	0.01	1.00	-0.02	0.05

*. The mean difference is significant at the .05 level.

Table 15 (continued)

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
Native American/Alaska Native	White	-0.01	0.03	1.00	-0.11	0.10
	African American	0.02	0.04	1.00	-0.09	0.13
	Native Hawaiian/Pacific Islander	0.04	0.06	1.00	-0.14	0.21
	Asian	0.00	0.04	1.00	-0.12	0.12
	Multi-Racial	-0.01	0.04	1.00	-0.12	0.11
	Hispanic	0.04	0.04	1.00	-0.07	0.14
Native Hawaiian/Pacific Islander	White	-0.04	0.05	1.00	-0.19	0.10
	African American	-0.02	0.05	1.00	-0.16	0.13
	Native American/Alaska Native	-0.04	0.06	1.00	-0.21	0.14
	Asian	-0.04	0.05	1.00	-0.19	0.11
	Multi-Racial	-0.04	0.05	1.00	-0.20	0.11
	Hispanic	0.00	0.05	1.00	-0.14	0.14

*. The mean difference is significant at the .05 level.

Table 15 (Continued)

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
Asian	White	-0.01	0.02	1.00	-0.07	0.05
	African American	0.02	0.02	1.00	-0.04	0.09
	Native American/Alaska Native	0.00	0.04	1.00	-0.12	0.12
	Native Hawaiian/Pacific Islander	0.04	0.05	1.00	-0.11	0.19
	Multi-Racial	-0.01	0.03	1.00	-0.09	0.07
	Hispanic	0.04	0.02	1.00	-0.03	0.10
Multi-Racial	White	0.00	0.02	1.00	-0.06	0.06
	African American	0.03	0.02	1.00	-0.03	0.09
	Native American/Alaska Native	0.01	0.04	1.00	-0.11	0.12
	Native Hawaiian/Pacific Islander	0.04	0.05	1.00	-0.11	0.20
	Asian	0.01	0.03	1.00	-0.07	0.09
	Hispanic	0.04	0.02	.615	-0.02	0.11

*. The mean difference is significant at the .05 level.

Table 15 (continued)

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
Hispanic	White	-0.04*	0.01	.000	-0.07	-0.02
	African American	-0.02	0.01	1.00	-0.05	0.02
	Native American/Alaska Native	-0.04	0.04	1.00	-0.14	0.07
	Native Hawaiian/Pacific Islander	0.00	0.05	1.00	-0.14	0.14
	Asian	-0.04	0.02	1.00	-0.10	0.03
	Multi-Racial	-0.04	0.02	.615	-0.11	0.02

*. The mean difference is significant at the .05 level.

Research Question 9. Are there statistically significant differences between males and

females of different racial/ethnic groups on intention to smoke?

H_0: There are no statistically significant differences between males and females of

different racial/ethnic groups on intention to smoke.

A two-way between-subjects factorial ANOVA was conducted to determine if

there were significant differences on intentions to smoke by ethnicity (African American

vs. Asian vs. White vs. Hispanic vs. Multi-Racial vs. Native American/Alaska Native vs.

Native Hawaiian/Pacific Islander) and gender (female vs. male). The ANOVA was

utilized to assess the ethnicity and gender main effects, as well as the ethnicity by gender

interaction term. The means and standard deviations of intentions to smoke by ethnicity and gender are listed in Table 16.

The ANOVA (Table 17) revealed a significant ethnicity main effect, F (6, 13351) = 4.21, $p < .01$ ($\eta^2 = .00$, power = .98). This indicates that there were significant differences among the ethnic groups on the intentions to smoke. The ANOVA failed to reveal a significant gender main effect, F (1, 13351) = 0.12, $p > .05$ ($\eta^2 = .00$, power = .06). This indicates that the females and males did not significantly differ on the intentions to smoke. Lastly, the ethnicity X gender interaction was not significant, F (6, 13351) = 1.00, $p > .05$ ($\eta^2 = .00$, power = .40). This indicates that the difference between the ethnic groups was not a function of the gender variable.

Bonferroni post hoc tests (Table 18) were conducted to further examine the ethnicity main effect. The tests indicated that the Whites (M = 3.86, SD = 0.38) scored significantly higher than the Hispanics (M = 3.81, SD = 0.44) on the intentions to smoke. Given the coding of the dependent variable, (i.e., higher numbers represent less inclination to smoke) this indicates that the Hispanics have a greater intention to smoke than the Whites. The remaining pairwise comparisons were not significant.

Table 16

Means and Standard Deviations of Intentions to Smoke by Ethnicity & Gender

Ethnicity	Gender	*N*	*M*	*SD*
White	Male	4108	3.86	0.37
	Female	3853	3.85	0.39
	Total	7961	3.86	0.38
African American	Male	1037	3.81	0.44
	Female	1012	3.84	0.41
	Total	2049	3.83	0.42
Native American/ Alaska Native	Male	72	3.85	0.36
	Female	67	3.85	0.40
	Total	139	3.85	0.38
Native Hawaiian/ Pacific Islander	Male	40	3.83	0.45
	Female	34	3.79	0.48
	Total	74	3.81	0.46
Asian	Male	250	3.84	0.43
	Female	188	3.86	0.37
	Total	438	3.85	0.41

Table 16 (continued)

Ethnicity	Gender	*N*	*M*	*SD*
Multi-Racial	Male	243	3.84	0.36
	Female	228	3.87	0.36
	Total	471	3.86	0.36
Hispanic	Male	1124	3.80	0.45
	Female	1109	3.82	0.44
	Total	2233	3.81	0.44

Table 17

ANOVA on Intentions to Smoke by Ethnicity & Gender

Source	SS	df	MS	*F*	Sig.	η^2	Power
Ethnicity	4.05	6	0.68	4.21	.000	.00	.98
Gender	0.02	1	0.02	0.12	.726	.00	.06
Ethnicity X Gender	0.96	6	0.16	1.00	.425	.00	.40
Error	2,143.48	13,351	0.16				

Table 18

Bonferroni Post Hoc Tests on Intentions to Smoke by Ethnicity

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
White	African American	0.03	0.01	.124	0.00	0.06
	Native American/Alaska Native	0.01	0.03	1.00	-0.10	0.11
	Native Hawaiian/Pacific Islander	0.04	0.05	1.00	-0.10	0.19
	Asian	0.01	0.02	1.00	-0.05	0.07
	Multi-Racial	0.00	0.02	1.00	-0.06	0.06
	Hispanic	0.04*	0.01	.000	0.01	0.07
African American	White	-0.03	0.01	.124	-0.06	0.00
	Native American/Alaska Native	-0.02	0.04	1.00	-0.13	0.09
	Native Hawaiian/Pacific Islander	0.02	0.05	1.00	-0.13	0.16
	Asian	-0.02	0.02	1.00	-0.09	0.04
	Multi-Racial	-0.03	0.02	1.00	-0.09	0.03
	Hispanic	0.02	0.01	1.00	-0.02	0.05

*. The mean difference is significant at the .05 level.

Table 18 (continued)

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
Native American/Alaska Native	White	-0.01	0.03	1.00	-0.11	0.10
	African American	0.02	0.04	1.00	-0.09	0.13
	Native Hawaiian/Pacific Islander	0.04	0.06	1.00	-0.14	0.21
	Asian	0.00	0.04	1.00	-0.12	0.12
	Multi-Racial	-0.01	0.04	1.00	-0.12	0.11
	Hispanic	0.04	0.04	1.00	-0.07	0.14
Native Hawaiian/Pacific Islander	White	-0.04	0.05	1.00	-0.19	0.10
	African American	-0.02	0.05	1.00	-0.16	0.13
	Native American/Alaska Native	-0.04	0.06	1.00	-0.21	0.14
	Asian	-0.04	0.05	1.00	-0.19	0.11
	Multi-Racial	-0.04	0.05	1.00	-0.20	0.11
	Hispanic	0.00	0.05	1.00	-0.14	0.14

*. The mean difference is significant at the .05 level.

Table 18 (continued)

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
Asian	White	-0.01	0.02	1.00	-0.07	0.05
	African American	0.02	0.02	1.00	-0.04	0.09
	Native American/Alaska Native	0.00	0.04	1.00	-0.12	0.12
	Native Hawaiian/Pacific Islander	0.04	0.05	1.00	-0.11	0.19
	Multi-Racial	-0.01	0.03	1.00	-0.09	0.07
	Hispanic	0.04	0.02	1.00	-0.03	0.10
Multi-Racial	White	0.00	0.02	1.00	-0.06	0.06
	African American	0.03	0.02	1.00	-0.03	0.09
	Native American/Alaska Native	0.01	0.04	1.00	-0.11	0.12
	Native Hawaiian/Pacific Islander	0.04	0.05	1.00	-0.11	0.20
	Asian	0.01	0.03	1.00	-0.07	0.09
	Hispanic	0.04	0.02	.625	-0.02	0.11

*. The mean difference is significant at the .05 level.

Table 18 (continued)

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
Hispanic	White	-0.04*	0.01	.000	-0.07	-0.01
	African American	-0.02	0.01	1.00	-0.05	0.02
	Native American/Alaska Native	-0.04	0.04	1.00	-0.14	0.07
	Native Hawaiian/Pacific Islander	0.00	0.05	1.00	-0.14	0.14
	Asian	-0.04	0.02	1.00	-0.10	0.03
	Multi-Racial	-0.04	0.02	.625	-0.11	0.02

*. The mean difference is significant at the .05 level.

Research Question 10. Are there statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days?

H$_0$: There will be no statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days.

A one-way between-subjects ANOVA was conducted to determine if there were significant differences among the racial/ethnic groups (African American vs. Asian vs. White vs. Hispanic vs. Multi-Racial vs. Native American/Alaska Native vs. Native Hawaiian/Pacific Islander) on the number of days they smoked a partial or whole

cigarette in the last 30 days. The Native Hawaiian/Pacific Islander group was removed because there were only 4 valid data points among the group. The means and standard deviations of the number of days the participants smoked a partial or whole cigarette by ethnicity are listed in Table 19. The ANOVA (Table 20) revealed a significant difference among the ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days, F (5, 1924) = 11.15, p < .01 (η^2 = .03, power = 1.00).

Bonferroni post hoc tests (Table 21) were conducted to further examine the ethnicity effect. The post hoc tests revealed 5 significant pairwise comparisons. First, the Whites (M = 15.61, SD = 12.28) reported smoking significantly more days than the African Americans (M = 11.92, SD = 10.97) and Hispanics (M = 10.96, SD = 10.71). The Multi-Racial (M = 18.19, SD = 12.12) participants reported significantly more smoking days than the African Americans, Hispanics and Asians (M = 9.50, SD = 10.73). The remaining pairwise comparisons were not significant.

Table 19

Means and Standard Deviations of Days Smoked by Ethnicity

Ethnic Group	*N*	*M*	*SD*
African American	159	11.92	10.97
Asian	28	9.50	10.73
White	1320	15.61	12.28
Hispanic	270	10.96	10.71
Multi-Racial	86	18.19	12.12
Native American/Alaska Native	67	14.48	11.48

Table 20

One-way ANOVA on Days Smoked by Ethnicity

Source	SS	df	Mean Square	*F*	Sig.
Between Groups	7,906.45	5	1,581.30	11.15	.000
Within Groups	272,963.11	1,924	141.87		
Total	694,842.00	1,930			

Table 21

Bonferroni Post Hoc Tests on Days Smoked by Ethnicity

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
White	African American	3.69*	1.00	.003	0.75	6.63
	Native American/Alaska Native	1.14	1.49	1.00	-3.25	5.52
	Asian	6.11	2.28	.109	-0.57	12.80
	Multi-Racial	-2.57	1.33	.788	-6.47	1.32
	Hispanic	4.66*	0.80	.000	2.32	6.99
African American	White	-3.69*	1.00	.003	-6.63	-0.75
	Native American/Alaska Native	-2.55	1.74	1.00	-7.65	2.55
	Asian	2.42	2.44	1.00	-4.75	9.60
	Multi-Racial	-6.26*	1.59	.001	-10.95	-1.58
	Hispanic	0.97	1.19	1.00	-2.53	4.46
Native American/Alaska Native	White	-1.14	1.49	1.00	-5.52	3.25
	African American	2.55	1.74	1.00	-2.55	7.65
	Asian	4.98	2.68	.952	-2.90	12.85
	Multi-Racial	-3.71	1.94	.843	-9.41	2.00
	Hispanic	3.52	1.63	.459	-1.26	8.30

*. The mean difference is significant at the .05 level.

Table 21 (continued)

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
Asian	White	-6.11	2.28	.109	-12.80	0.57
	African American	-2.42	2.44	1.00	-9.60	4.75
	Native American/Alaska Native	-4.98	2.68	.952	-12.85	2.90
	Multi-Racial	-8.69*	2.59	.012	-16.30	-1.07
	Hispanic	-1.46	2.37	1.00	-8.41	5.49
Multi-Racial	White	2.57	1.33	.788	-1.32	6.47
	African American	6.26*	1.59	.001	1.58	10.95
	Native American/Alaska Native	3.71	1.94	.843	-2.00	9.41
	Asian	8.69*	2.59	.012	1.07	16.30
	Hispanic	7.23*	1.48	.000	2.89	11.56
Hispanic	White	-4.66*	0.80	.000	-6.99	-2.32
	African American	-0.97	1.19	1.00	-4.46	2.53
	Native American/Alaska Native	-3.52	1.63	.459	-8.30	1.26
	Asian	1.46	2.37	1.00	-5.49	8.41
	Multi-Racial	-7.23*	1.48	.000	-11.56	-2.89

*. The mean difference is significant at the .05 level.

Research Question 11. Are there statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by age?

H_0: There are no statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by age.

A two-way between-subjects factorial ANOVA was conducted to determine if there were significant differences on the number of days participants smoked a partial or whole cigarette in the last 30 days by ethnicity (African American vs. White vs. Hispanic vs. Multi-Racial vs. Native American/Alaska Native) and age (12 – 15 years vs. 16 – 17 years). The ANOVA was utilized to assess the ethnicity and age main effects, as well as the ethnicity by age interaction term. The age categories were collapsed because of a limited number of smokers by ethnicity in the 12 – 13 year old group. The Native Hawaiian/Pacific Islanders and the Asians were removed from the analysis because both groups had small sample sizes by age despite the recode. The means and standard deviations of the number of days the participants smoked a partial or whole cigarette by ethnicity and age are listed in Table 22.

The ANOVA (Table 23) revealed a significant ethnicity main effect, $F(4, 1892)$ = 11.33, $p < .01$ ($\eta^2 = .02$, power = 1.00). This indicates that there were significant differences among the ethnic groups on the number of days smoked in the last 30 days. The ANOVA also revealed a significant age main effect, $F(1, 1892) = 6.89$, $p < .01$ ($\eta^2 =$ .00, power = .75). The 16 – 17 year olds (M = 15.95, SD = 12.09) reported smoking

significantly more days than the 12 – 15 year olds (M = 12.50, SD = 11.72). Lastly, the

ethnicity X age interaction was not significant, F (4, 1892) = 0.31, p > .05 (η^2 = .00,

power = .12). This indicates that the difference between the ethnic groups was not a

function of the age variable.

Bonferroni post hoc tests (Table 24) were conducted to further examine the

ethnicity main effect. The post hoc tests revealed several significant differences. First,

the Whites (M = 15.61, SD = 12.28) reported smoking more days than the African

Americans (M = 11.92, SD = 10.97) and Hispanics (M = 10.96, SD = 10.71). The Multi-

Racial participants (M = 18.19, SD = 12.12) also smoked significantly more days than the

African Americans and Hispanics. The remaining pairwise comparisons were not

significant.

Table 22

Means and Standard Deviations of Days Smoked by Ethnicity & Age

Ethnicity	Age	N	M	SD
White	12 – 15	477	13.36	11.99
	16 – 17	843	16.89	12.26
	Total	1320	15.61	12.28
African American	12 – 15	54	10.33	11.35
	16 – 17	105	12.74	10.73
	Total	159	11.92	10.97
Native American/ Alaska Native	12 – 15	25	13.68	11.22
	16 – 17	42	14.95	11.74
	Total	67	14.48	11.48

Table 22 (continued)

Ethnicity	Age	*N*	*M*	*SD*
Multi-Racial	12 – 15	20	16.80	12.17
	16 – 17	66	18.61	12.17
	Total	86	18.19	12.12
Hispanic	12 – 15	102	8.46	9.52
	16 – 17	168	12.48	11.13
	Total	270	10.96	10.71

Table 23

ANOVA on Days Smoked by Ethnicity & Age

Source	SS	df	MS	*F*	Sig.	η^2	Power
Ethnicity	6,344.47	4	1,586.12	11.33	.000	.02	1.00
Age	963.83	1	963.83	6.89	.009	.00	.75
Ethnicity X Age	172.89	4	43.22	0.31	.872	.00	.12
Error	264,766.43	1,892	139.94				

Table 24

Bonferroni Post Hoc Tests on Days Smoked by Ethnicity

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
White	African American	3.69*	0.99	.002	0.90	6.48
	Native American/Alaska Native	1.14	1.48	1.00	-3.03	5.30
	Multi-Racial	-2.57	1.32	.509	-6.27	1.13
	Hispanic	4.66*	0.79	.000	2.43	6.88
African American	White	-3.69*	0.99	.002	-6.48	-.90
	Native American/Alaska Native	-2.55	1.72	1.00	-7.40	2.29
	Multi-Racial	-6.26*	1.58	.001	-10.71	-1.81
	Hispanic	0.97	1.18	1.00	-2.36	4.29
Native American/Alaska Native	White	-1.14	1.48	1.00	-5.30	3.03
	African American	2.55	1.72	1.00	-2.29	7.40
	Multi-Racial	-3.71	1.93	.545	-9.13	1.71
	Hispanic	3.52	1.62	.294	-1.02	8.06

*. The mean difference is significant at the .05 level.

Table 24 (continued)

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
Multi-Racial	White	2.57	1.32	.509	-1.13	6.27
	African American	6.26*	1.58	.001	1.81	10.71
	Native American/Alaska Native	3.71	1.93	.545	-1.71	9.13
	Hispanic	7.23*	1.47	.000	3.11	11.34
Hispanic	White	-4.66*	0.79	.000	-6.88	-2.43
	African American	-0.97	1.18	1.00	-4.29	2.36
	Native American/Alaska Native	-3.52	1.62	.294	-8.06	1.02
	Multi-Racial	-7.23*	1.47	.000	-11.34	-3.11

*. The mean difference is significant at the .05 level.

Research Question 12. Are there statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by gender?

H_0: There are no statistically significant differences between the racial/ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days by gender.

A two-way between-subjects factorial ANOVA was conducted to determine if there were significant differences on the number of days participants smoked a partial or

whole cigarette in the last 30 days by ethnicity (African American vs. White vs. Hispanic vs. Multi-Racial vs. Native American/Alaska Native) and gender (female vs. male). The ANOVA was utilized to assess the ethnicity and gender main effects, as well as the ethnicity by gender interaction term. The Native Hawaiian/Pacific Islanders and the Asians were removed from the analysis because both groups had small sample sizes by gender. The means and standard deviations of the number of days the participants smoked a partial or whole cigarette by ethnicity and gender are listed in Table 25.

The ANOVA (Table 26) revealed a significant ethnicity main effect, F (4, 1892) = 12.88, $p < .01$ ($\eta^2 = .03$, power = 1.00). This indicates that there were significant differences among the ethnic groups on the number of days smoked in the last 30 days. The ANOVA failed to reveal a significant gender main effect, F (1, 1892) = 0.85, $p > .05$ ($\eta^2 = .00$, power = .15). This indicates that the females and males did not significantly differ on the number of days smoked. Lastly, the ethnicity X gender interaction was not significant, F (6, 1892) = 0.11, $p > .05$ ($\eta^2 = .00$, power = .07). This indicates that the difference between the ethnic groups was not a function of the gender variable.

Bonferroni post hoc tests (Table 27) were conducted to further examine the ethnicity main effect. The post hoc tests revealed the same pattern that was revealed in the last research question. First, the White participants (M = 15.61, SD = 12.28) reported smoking more days than the African Americans (M = 11.92, SD = 10.97) and Hispanics (M = 10.96, SD = 10.71). The Multi-Racial participants (M = 18.19, SD = 12.12) also smoked significantly more days than the African Americans and Hispanics. The remaining pairwise comparisons were not significant.

Table 25

Means and Standard Deviations of Days Smoked by Ethnicity & Gender

Ethnicity	Gender	*N*	*M*	*SD*
White	Male	645	16.10	12.23
	Female	675	15.15	12.31
	Total	1320	15.61	12.28
African American	Male	86	12.70	10.61
	Female	73	11.01	11.38
	Total	159	11.92	10.97
Native American/ Alaska Native	Male	32	14.34	11.93
	Female	35	14.60	11.22
	Total	67	14.48	11.48
Multi-Racial	Male	33	18.52	12.21
	Female	53	17.98	12.18
	Total	86	18.19	12.12
Hispanic	Male	155	11.55	10.76
	Female	115	10.17	10.64
	Total	270	10.96	10.71

Table 26

ANOVA on Days Smoked by Ethnicity & Gender

Source	SS	df	MS	*F*	Sig.	η^2	Power
Ethnicity	7,334.62	4	1,833.65	12.88	.000	.03	1.00
Gender	121.03	1	121.03	0.85	.357	.00	.15
Ethnicity X Gender	59.68	4	14.92	0.11	.981	.00	.07
Error	269,308.55	1,892	142.34				

Table 27

Bonferroni Post Hoc Tests on Days Smoked by Ethnicity

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
White	African American	3.69*	1.00	.002	0.88	6.50
	Native American/Alaska Native	1.14	1.49	1.00	-3.06	5.34
	Multi-Racial	-2.57	1.33	.529	-6.30	1.16
	Hispanic	4.66*	0.80	.000	2.42	6.89
African American	White	-3.69*	1.00	.002	-6.50	-.88
	Native American/Alaska Native	-2.55	1.74	1.00	-7.44	2.33
	Multi-Racial	-6.26*	1.60	.001	-10.75	-1.77
	Hispanic	0.97	1.19	1.00	-2.39	4.32

*. The mean difference is significant at the .05 level.

Table 27 (continued)

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
					Lower	Upper
Native American/Alaska Native	White	-1.14	1.49	1.00	-5.34	3.06
	African American	2.55	1.74	1.00	-2.33	7.44
	Multi-Racial	-3.71	1.94	.566	-9.17	1.76
	Hispanic	3.52	1.63	.308	-1.06	8.09
Multi-Racial	White	2.57	1.33	.529	-1.16	6.30
	African American	6.26*	1.60	.001	1.77	10.75
	Native American/Alaska Native	3.71	1.94	.566	-1.76	9.17
	Hispanic	7.23*	1.48	.000	3.08	11.38
Hispanic	White	-4.66*	0.80	.000	-6.89	-2.42
	African American	-0.97	1.19	1.00	-4.32	2.39
	Native American/Alaska Native	-3.52	1.63	.308	-8.09	1.06
	Multi-Racial	-7.23*	1.48	.000	-11.38	-3.08

*. The mean difference is significant at the .05 level.

Research Question 13. Are the participants' age, gender and ethnicity significant predictors of the number of days they smoked a partial or whole cigarette in the last 30 days?

H_0: The participants' age, gender and ethnicity are not statistically significant predictors of the number of days they smoked a partial or whole cigarette in the last 30 days.

A multiple regression was conducted to determine if age (16 – 17 vs. others), gender (female vs. male) and ethnicity (White vs. Others) were statistically significant predictors of the number of days they smoked a partial or whole cigarette in the last 30 days. The nominal and ordinal scaled predictor variables were 'dummy coded' for entry in the regression model. The following coding scheme was utilized: gender (0 = female, 1 = male), age group (0 = 12 – 15, 1 = 16 -17) and ethnicity group (0 = other, 1 = White). The descriptive statistics for the criterion are listed in Table 28. The standardized residuals indicated that there were no outliers in the data. Review of the variance inflation factors and tolerance levels did not reveal evidence of multicollinearity. A plot of standardized residuals did not reveal heteroscedasticity. $\chi^2 (6) = 21.38, p < .01$

The omnibus model was a significant predictor of the number of days smoked, $F (3, 1930) = 22.13, p < .01, R^2 = .03$. This indicates that together the predictors accounted for a significant amount of variation in the criterion. The regression coefficients are listed in Table 29. Ethnicity was a significant positive predictor of the number of days smoked, $\beta = 0.12, p < .01$. Given the coding of the predictor (White = 1, Other = 0), this indicates that the White participants were smoking more days than the other ethnic

groups. Age was also a significant positive predictor of the number of days smoked in the last 30 days, $\beta = 0.14$, $p < .01$. This indicates that the oldest group (i.e., the 16 – 17 years old youth) smoked more than their younger counterparts. Gender was not a significant predictor of the number of the days smoked within this model.

Table 28

Descriptive Statistics for Regression Criterion

Variable	N	M	SD
Number of Days Smoked	1,934	14.65	12.07

Table 29

Regression Coefficients for Research Question 13

Predictor	B	SE	β	t	Sig.
White Dummy Code	3.14	0.58	0.12*	5.40	.000
16 – 17 Year Old Dummy	3.44	0.57	0.14*	6.06	.000
Gender	0.44	0.54	0.02	0.81	.421

Regression is significant at the 0.01 level.

Summary

The study conducted secondary analysis of the data from the 2007 National Survey on Drug Use and Health (NSDUH). The eleven research questions were answered through two levels of analysis. The study utilized quantitative descriptive cross sectional approach to access both outcomes and exposure at a moment in time. Descriptive statistics as well as means and standard deviations were calculated on the research variables.The second stage of the analyses presented the inferential statistics used to test the research hypotheses. All statistical tests was conducted at $\alpha = .05$. The data were then analyzed statistically using Kruskal-Wallis test and analysis of variance (ANOVA) to test diifference among variables, Spearman correlation was used to test the relationships between susceptibility to smoking and intention to smoke, and multiple regression analysis tested for predictor of smoking behavior.

In summary, the results showed the following on each research question; (RQ1) there is no significant difference among the ethnic groups on the susceptibility to smoking, (RQ2) there is a significant difference among the ethnic groups on the intentions to smoke, (RQ3) there was a positive correlation (i.e. relationships) between participants' susceptibility to smoking and intention to smoke, (RQ4) and (RQ5) could not be tested because there were no participants with data for susceptibility, smoking intentions, and numbers of days smoked variables, (RQ6) the age groups significantly differed on the susceptibility to smoking and the ethnicity X age interaction was not significant, (RQ7) Females and males did not significantly differ on the susceptibility to smoking and the ethnicity X gender interaction was not significant, (RQ8) the age groups

did not significantly differ on the intentions to smoke, (RQ9) females and males did not

significantly differ on the intentions to smoke with Hispanic participants having a

significantly greater intention to smoke than their White counterparts, (RQ10) there was a

significant difference among the ethnic groups on the number of days they smoked a

partial or whole cigarette in the last 30 days with White participants reported smoking

significantly more days than the African Americans and Hispanics and Multi-Racial

participants reported significantly more smoking days than the African Americans,

Hispanics and Asians, (RQ11) The 16 – 17 year olds reported smoking significantly more

days than the 12 – 15 year olds, (RQ12) females and males did not significantly differ on

the number of days smoked, and (RQ13) Ethnicity and age were both positive predictors

of the number of days participants smoked in the last 30 days and not gender.

The final chapter of the study presents a summary of how the study was conducted and

conclusions based on the results. The chapter and study conclude with recommendations

for future studies and implications for practice.

CHAPTER 5:

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

Six variables were identified in this study to test the relationships between susceptibility to smoke and intention to smoke on smoking behavior by ethnicity, age, and gender. The six variables in this study include susceptibility to smoking, intention to smoke, smoking behavior, gender, age, and ethnicity. Thirteen research questions were developed in order to examine these variables.

The study utilized a nationally representative sample of youth ages 12-17 years who participated in the 2007 National Survey on Drug Use and Health (NSDUH). A total of 18,314 youth ages 12 – 17 participated in the study. Approximately half (9355, 51.1%) of the participants were male. The participants' ethnicity was reported as follows: 11,113 (60.7%) White, 3,063 (16.7%) Hispanic, 2,593 (14.2%) African American, 681 (3.7%) Multi-Racial, 518 (2.8%) Asian, 257 (1.4%) Native American/Alaska Native, and 89 (0.5%) Native Hawaiian/Pacific Islander. The participants' age was reported as follows: 5,843 (31.9%) 12 – 13 years old, 6,282 (34.3%) 14 – 15 years old and 6,189 (33.8%) 16 – 17 years old. The data were analyzed statistically through the use of Kruskal-Wallis test, analysis of variance (ANOVA), multiple regression analysis, and bivariate Spearman correlation.

The results of the data analysis found no significant difference among the ethnic groups on the susceptibility to smoking, results revealed a significant difference among the ethnic groups on the intentions to smoke, the correlation revealed a significant

positive relationships between the susceptibility to smoking and the intentions to smoke which supports the theory of reasoned action. In addition, the results revealed that the 14 – 15 year old group were significantly more susceptible to smoking than the 12 – 13 year olds and 16 – 17 year olds, the age groups did not significantly differ on the intentions to smoke, and there was a significant difference among the ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days with White participants reported smoking significantly more days than the African Americans and Hispanics and Multi-Racial participants reported significantly more smoking days than the African Americans, Hispanics and Asians. Furthermore, the 16 – 17 year olds reported smoking significantly more days than the 12 – 15 year olds, ethnicity and age were both positive predictors of the number of days participants smoked in the last 30 days, and there was no significant difference between males and females on all the variables tested.

<div align="center">Conclusions</div>

Research Question 1

The results of this study contradict the findings of earlier studies that supported the significant differences between the racial/ethnic groups on susceptibility to smoking such as Caraballo, Yee, Pechacek, Henson, and Gfroerer (2006). Past studies revealed that differences do exist among racial/ethnic groups and subgroups on susceptibility to smoking (Caraballo, Yee, Pechacek, Henson & Gfroerer, 2006; Vidrine, Anderson, Pollak & Wetter, 2005). The different instruments used in the present study in comparison with previous study mentioned might be the reason for the differences of the outcomes. In other words, previous results showed that disparities do exist among

different ethnic and subgroups especially among never smokers (non smokers) on susceptibility to smoking. For example, Hispanic adolescents who are non smokers are least susceptible to smoking compare to African Americans who were much more susceptible (Vidrine, Anderson, Pollak & Wetter, 2005). The implication of this previous research is that factors that contribute to susceptibility to smoking do vary across ethnic groups and might be complex, affecting adolescents at different age.

Research Question 2

Kruskal-Wallis test revealed a significant difference among the ethnic groups on the intentions to smoke. The results support a study conducted by (Hanson, 2005) which suggested ethnic differences in cigarette smoking intention among female teenagers. Further, Bonferroni post hoc tests revealed the Hispanics were significantly more likely to intend to smoke in the next 12 months than the White participants. The remaining pairwise comparisons were not significant. In a study by Nezami et al. (2005), the authors examined the influence of depressive symptoms on experimental smoking and intention to smoke in a diverse youth sample and they found that Latinos/Hispanics were the most likely to intend to smoke in the next year and were the most likely to have started experimenting with cigarette smoking. This is consistent with the present study which showed Hispanics were more likely to intend to smoke in the next 12 months in comparison to their White counterparts. However, it was not clear why there were no significant differences among the remaining ethnic groups.

Research Question 3

A bivariate Spearman correlation revealed a significant positive relationship between the susceptibility to smoking and the intentions to smoke, indicating that susceptibility to smoking increase with increasing levels of the intentions to smoke. The result is consistent with the theory of reasoned action, which indicates that subjective norms are used to predict behavioral intentions and intentions predict the behavior (Ajzen & Fishbein, 1975). It is important to note that, for the purpose of this investigation, the variable "susceptibility" was utilized as the measure of "subjective norms" because of the similar interpretation of the variables in this study and the use of the same measures to define the variables (e.g. "if one of your best friends offered you a cigarette, would you smoke it?"). A study (Smith, Bean, Mitchell, Speizer & Fries, 2007) examined the role of psychosocial factors in accounting for adolescents' smoking intentions; the authors surveyed high schoolers to assess smoking-related characteristics and behaviors as part of a statewide evaluation of tobacco prevention programming. The outcomes showed attitudes, subjective norms and other normative factors were all associated with non-smokers' intentions to smoke.

Research Question 4.

The relationship between the susceptibility to smoking and the number of days participants smoked a partial or whole cigarette in the last 30 days could not be tested because there were no participants with data for both the susceptibility and numbers of days smoked variables.

Research Question 5.

The relationship between the intention to smoke and the number of days participants smoked a partial or whole cigarette in the last 30 days could not be tested because there were no participants with data for both the susceptibility and numbers of days smoked variables.

Research Question 6.

A two-way between-subjects factorial ANOVA (analysis of variance) was conducted and showed that that there were no significant differences among the ethnic groups on the susceptibility to smoking. Also, the results revealed that the age groups significantly differed on the susceptibility to smoking. Thus, the significant difference between the age groups was not a function of the ethnicity variable. In addition, the 14 – 15 year old group was significantly more susceptible to smoking than the 12 – 13 year old group and 16 – 17 year group. For this study, the susceptibility to smoking of the 14- 15year old group could be explained by the fact that this age group is more 'self conscious' and can self identify with others compare to the 12-13years old. Therefore, making this group responds strongly to peer pressure thus trying to have that 'bad' boy or girl image. For example, Jones and Carroll (1998) indicated that ages between 11 and 15 is usually when an individual initiate smoking behavior.

Although most previous studies have only focused on White, African American, and Hispanics when investigating smoking related behavior among adolescents, the results of this study contradict previous studies that showed ethnic differences on adolescents' susceptibility to smoking (Gritz et al. 1998; Unger, Palmer, Dent, Rohrbach

& Johnson, 2000). Few studies were found that have the same age group breakdown as in the current study because most studies examined adolescents age 12-17 years on their susceptibility to smoking. The Centers for Disease Control and Prevention (2006a) revealed that approximately one in five nonsmokers aged 12--17 years is susceptible to start smoking. Another study showed that younger adolescents whose age were less than 18 years old tended to be more susceptible to smoking and that one third of all smokers began before the age of 14 (Mowery, Brick & Farrelly, 2000).

Research Question 7.

The ANOVA failed to reveal a significant ethnicity main effect and that male and females did not significantly differ on the susceptibility to smoking. Some studies in the literature support this finding (Centers for Disease Control and Prevention, 2006a; Chen, Huang & Chao, 2009 and others found gender differences on susceptibility to smoking (Chen, Bottorff, Johnson, Saewyc & Zumbo 2008; Guindon, Georgiades & Boyle 2008). The reason might be that these studies examined different ethnic groups (i.e. most examined White, Hispanic, and African American and others examined Hispanics only and Asians only).

Research Question 8.

A factorial ANOVA analysis showed that there were significant differences among the ethnic groups on the intentions to smoke. However, ANOVA revealed that the age groups did not significantly differ on the intentions to smoke. A study that examined the influence of age, sex, demographic and socio-economic variables, and the role of smoking models of family members and friends on intention to smoke among high

students revealed that intention to smoke increases with age (Gaeta, Del Castello, Cuomo, Effuso, Pirera & Boccalatte 1998). Thus, as participants get older, they are more inclined to have intentions to smoke. In addition, the present result contradicts another study in the literature that examined adolescents' intentions to smoke as a predictor of smoking and the authors indicated that for interaction between 'intention' and 'age'; that even among those subjects who did not intend to smoke the odds of smoking are greater between the ages of 12 and 19 (Stanton, Barnett & Silva, 2005).This indicates that intention to smoke does differ by age, however, the current result did not support these previous findings. The differences in the outcomes of the present study and previous studies might be due to the fact that variables like socio-economic, family, life style, and peer influences were considered in previous studies which were not in this study.

Research Question 9.

The ANOVA analysis revealed a significant ethnicity main effect but females and males did not significantly differ on the intentions to smoke. This finding support **(**Markham, Aveyard, Thomas, Charlton, Lopez & De Vries, 2004) and failed to support (Mao, Li, Stanton, Wang, Hong, Zhang & Chen, 2009) previous studies that showed variation by ethnicity and gender respectively. This might be due to the fact that different ethnic groups were considered in these studies. For example, the current study examined six different racial/ethnic groups and other studies in the literature mostly limit the racial/ethnic groups to African American, White, and Hispanics.

Research Question 10.

The ANOVA revealed a significant difference among the ethnic groups on the number of days they smoked a partial or whole cigarette in the last 30 days. This finding support previous study conducted and published by the Substance Abuse and Mental Health Services Administration (SAMHSA, 2006). SAMHSA found difference in ethnic groups on the number of days participants smoked a cigarette in the last 30 days with White and Multi-Racial participants averaged more days in the past month compared to the rest of the groups. In addition, the CDC (2006b) stated that prevalence of cigarette smoking is highest among American Indians/Alaska Natives (32.0%), followed by whites (21.9%), African Americans (21.5%), Hispanics (16.2%), and Asians [excluding Native Hawaiians and other Pacific Islanders] (13.3%). For the current study, the outcome showed that the Whites reported smoking significantly more days than the African Americans and Hispanics. The Multi-Racial participants reported significantly more smoking days than the African Americans, Hispanics and Asians. It is unclear why this is, however, cultural differences and different lifestyle might explain the differences in the number of days smoked among the ethnic groups.

Research Question 11.

The ANOVA analysis revealed a significant ethnicity main effect as well as significant age main effect. For this analysis, the age categories were collapsed because of a limited number of smokers by ethnicity in the 12 – 13 year old group. The 16 – 17 year olds reported smoking significantly more days than the 12 – 15 year olds. This could be due to the fact that at this age (16-17 years) peer influence might be factor to smoking more

days for this age group when compared to 12-15 years age group. In the examination of Saskatchewan Rural Youth Healthy Lifestyles and Risk Behavior data, Martz and Wagner (2008) concluded that there is significant difference (p<0.01) among the age groups (12-17 years) in the number of days they reported smoking during the past 30 days with older youth (16-17years) smoking more regularly than younger youth. The result of this study is consistent with the previous study discussed above. The 16-17 years olds are less susceptible to smoking, but smoke more because this age group is capable of forming attitude base on likely outcomes of the behavior and evaluation of the gains (Jones and Carroll, 1998). In addition, this age group is likely to have more access to tobacco products through parents, peers, and local stores compare to other age groups in this study.

Research Question 12.

The ANOVA revealed that there were significant differences among the ethnic groups on the number of days smoked in the last 30 days. Also, the result showed that the females and males did not significantly differ on the number of days smoked. Thus, no significant gender main effect was found. This finding supports a previous study that found no significant difference between current male and female smokers in the number of days they smoked in the past 30 days (Substance Abuse and Mental Health Services Administration, 2003).

Research Question 13.

A multiple regression analysis was conducted and revealed that ethnicity was a significant positive predictor of the number of days smoked. Age was also a significant

positive predictor of the number of days smoked in the last 30 days. However, gender was not a significant predictor of the number of days smoked within this model. This finding is consistent with a study in the literature that revealed that individual factors such as ethnicity and age are good predictors of adolescent progression to daily smoking (Kandel, Kiros, Schaffran & Hu, 2004). Furthermore, the authors indicated that older age (i.e. older participants 15-18 years) predicted smoking behavior among adolescents. Together these regression results are consistent with the ethnicity and age effects revealed in the factorial ANOVA models presented previously.

<center>Recommendations for Future Study</center>

The current study identified six variables that tested the relationships between participants' susceptibility to smoking and intention to smoke on smoking behavior by age, gender, and racial/ethnic groups. One area for further study is to explore why Kruskal-Wallis test revealed no ethnic differences on susceptibility to smoking through the use of different research methodology such as qualitative or mixed methods. Studies like CDC, 2006a; Faulkner & Merritt, (1998) and Kandel, Kiros, Schaffran & Hu (2004) have examined ethnic differences in smoking but have mostly focused on White and Black participants but the current study examined seven ethnic groups to document variability.

A second factor that merits attention is a close attention to Multi-Racial groups who reported significantly more smoking days than the African Americans, Hispanics and Asians in the current study. There is little to no evidence in the literature that showed that this particular group has been examined or explored thoroughly on tobacco related

issues. A third area of study that can be pursued includes a study that targets 16 – 17 year olds since according to the current study this particular age group reported smoking significantly more days than the 12 – 15 year olds. Such a study might shed light as to why this age group reported smoking more days, factors that contribute to such smoking behavior, and help in understanding strategies to be used when developing interventions.

Recommendations for Practice

Based upon the analysis of the data, a significant positive relationship was found between the susceptibility to smoking and the intention to smoke. Also, some variability in smoking behavior, susceptibility to smoking, and smoking intentions do exist across ethnic groups and age groups. Specifically, participants' subjective norm predicts their smoking intentions. Thus indicating that participant' intentions to smoke increases with increasing levels of their susceptibility to smoking. Theory of Reasoned Action works most successfully when applied to behaviors that are under a person's volitional control. The health-education implications of this theory allow one to identify how and where to target strategies for changing behavior. The theory of reasoned action could be used to identify the culturally appropriate beliefs of ethnic groups on smoking behavior that might be targeted in an anti-smoking campaign. The outcomes of this current study could be used by health educators and program planners in designing age-specific programs targeting participants' ages 12-17 years especially the 16-17 years age group. In addition, this result could be used to develop materials useful in educating the age groups in this study especially the 12-15 years old on how to; prevent risk behavior such as tobacco use, understand consequences of experimenting risk behavior, establish refusal skills and

decision making skills, and establish positive relationships with trusted adults. Also, the results of the current study should enlighten policy makers, health educators, school officials, and program planners in allocating resources appropriate to different ethnic groups so as to develop anti-smoking campaigns and tobacco prevention programs that will reach all the ethnic groups in appropriate manner. In addition, efforts should be geared toward addressing smoking intentions, susceptibility to smoking, social influences to smoke, particularly those from peers; promote changes in attitudes and beliefs toward smoking; and provide development of skills young people need to resist social and environmental pressures to smoke so as to reach community at large. Strict control and enforcement measures are needed to completely eliminate the sale of cigarettes to minors.

<div align="center">Implications for Social Change</div>

This investigation promotes positive social change by providing useful information for tobacco control and prevention initiatives. Public health represents different disciplines and the core principles strive to improve the health and well-being of the population. The importance of this study is that it provides useful information for tobacco control and prevention initiatives beneficial to health educators, program planners, and the community. Also, the study stresses on the major public health objectives by showing variability and relationships among the variables reinforcing the urgent need for tobacco control programs especially ethnic and age specific programs targeted at adolescents. It has been noted that differences in smoking behavior of adolescents from different ethnic groups are often overlooked in debates about prevention policies (DeCicca, Kenkel, and Mathios 2000). The results of the current study

contributes to existing data on tobacco related issues and like previous studies on ethnic differences on tobacco use among adolescent, it is sending signals and calling the attention of the community, policy makers and public health officials to different ethnic groups especially Multi-Racial groups when developing tobacco prevention policies.

Health education programs such as smoking and tobacco prevention programs in schools and in the community designed to target different ethnic groups and age groups as well as empowerment programs will help adolescents develop skills needed to resist social and environmental pressures. In addition, such programs will prevent adolescents to develop smoking intentions and protect them from being susceptible to smoking. Also, programs that will help parents and care takers understand the magnitude of the problem of tobacco related issues among youth is equally important to further prevent this epidemic. These are minor actions that with a multidisciplinary from community agencies, public health educators, program planners, and other health officials will result in prevention of tobacco use and reduction in prevalence of smoking among adolescents.

Concluding Statement

According to the World Health Organization (2009), the risk of chronic diseases starts early in childhood and such behavior continues into adulthood. The downward trend of adolescent smoking rates recently stalled with current rates well above the healthy People 2010 objective. Tobacco use among 10th and 12th graders has slightly increased, from 21.9 to 23.0 % from 2003 and 2005 (CDC, 2006c). Based on this current study and previous studies on smoking behavior and intentions among adolescent, ethnic differences do exist. In addition, with 16-17 years age group reported smoking

significantly more days than other age groups in this study, health educators and program planners should target and design specific programs that focus on this group so as to help reduce smoking days among those who already smoke and teach the non smokers of this age group how to resist social pressure. Further, different preventive marketing strategies and campaign should be developed for different ethnic groups that target 12-13 years, 14-15 years, and 16-17 years and address the use of tobacco among each age group. It is time for public health officials with community gatekeepers to work together to prevent and address the adolescent smoking epidemic in various communities.

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Appendix A

Email Correspondence between Dr. Orleans and me on the use of the Nicotine Addiction
Model.

RE: Tobacco Control: Model of Nicotine Addiction

From:
Orleans, Tracy (TORLEAN@rwjf.org)
Sent: Sun 12/07/08 9:43 AM
To: 'Kafilat Jimba' (kafilat@hotmail.com)
By all means you can use this, Kafilat. John Slade would be esp. pleased to know you
found this helpful. Best, tracy

From: Kafilat Jimba [mailto:kafilat@hotmail.com]
Sent: Saturday, December 06, 2008 4:45 PM
To: Orleans, Tracy
Subject: Tobacco Control: Model of Nicotine Addiction

Dr. Orleans:

My name is Kafilat Jimba and am a PhD-Public Health student at Walden University. I
am working on my Dissertation and am interested in using the 'model of nicotine
addiction figure' in my paper. I am not sure, if the figure is public domain or not. Either
way, I am writing to get permission to use this diagram in my paper.

Please see attached for the figure.

Thank you,
Kafilat Jimba,MPH

Appendix B

INTRODUCTION AND INFORMED CONSENT FOR
INTERVIEW RESPONDENTS AGE 12-17

FIRST, OBTAIN PERMISSION FROM THE PARENT
AND READ THE BOXED INFORMATION BELOW

Your (AGE) year-old child has been selected to participate. This selection is the result of scientific sampling procedures and the answers your child provides will represent approximately 1,000 other youths who are similar. Participation is voluntary, but no one can be substituted if your child does not participate. The study collects information about tobacco, alcohol, and drug use; knowledge and attitudes about drugs; mental health; and other health related issues. The answers your child provides will be kept strictly confidential. No names or personal identifiers are attached to the responses. Since your child will answer most of the questions directly into the computer, I will never see the answers, and you will not be permitted to see the completed survey. The answers your child provides will only be used for research and analysis and cannot be used for any other purpose. If it is all right with you, we could get started. (We also like to conduct the interview in as private a place as possible. Can we find a reasonably private spot to complete the interview?)

THEN, READ THE BOXED INFORMATION BELOW BEFORE STARTING EVERY
INTERVIEW WITH A 12-17 YEAR OLD

We are interviewing approximately 70,000 people across the nation and you have been chosen to participate in the study at random. Your answers will represent the experiences and opinions of over 1,000 youths in this country. Your participation in this study is voluntary and appreciated, as we cannot substitute anyone else if you decide not to participate.

GIVE STUDY DESCRIPTION TO R IF YOU HAVE NOT ALREADY DONE SO.

This study collects information on tobacco, alcohol, and drug use, knowledge and attitudes about drugs; mental health and other health related issues. The interview takes about 1 hour. You will answer most of the questions directly into the computer and I will not know how you answered. Your parents and your school will never see your answers. We are only interested in the combination of responses nationwide—not in any one person's answers. For this reason, we never record your name and we keep your answers totally separate from your address. RTI recontacts by phone or mail a small number of those who complete the interview and asks just a few questions to check the quality of my work. For this reason, at the end of the interview, participants are asked to provide their telephone number and mailing address on a form separate from their responses.

It is important to get the most accurate information possible and we hope that protecting your privacy will encourage you to provide careful answers. While some of the questions may be sensitive, your honest responses will be of great value. The answers you provide will only be used for research and analysis and cannot be used for any other purpose. The confidentiality of your answers is protected under Federal law (Section 501 of the Public Health Service Act). You are free to withdraw from this survey at any time or to refuse to answer any question. If you complete the survey, you will receive a cash payment of $30 at the end of the interview.

If it is alright with you, let's get started.

Appendix C

Email Correspondence between Dr. Colliver and me on reliability and validity of
NSDUH survey

Ms. Jimba,

 Thank you for your interest in data from SAMHSA's National Survey on Drug
Use and Health (NSDUH). Reports of methodological studies related to NSDUH
and its predecessor National Household Survey on Drug Abuse (NHSDA, the
name prior to 2002) are available on our website at
http://oas.samhsa.gov/nsduh/methods.cfm#Reports . A volume summarizing
methodological work through 2005 is attached to this email.

 The NSDUH questionnaire is not a psychometric instrument in the sense of
scales developed using multiple items addressing the same topic with small
differences intended to obtain inter-item reliability scores. In the context of
survey research, where a myriad of topics must be covered and interview time
must be minimized, it is not possible to ask what is essentially the same question
over and over simply to enable inter-item reliability to be studied. Thus, the
ordinary measures of reliability and validity applied to psychometric instruments
do not pertain to the NSDUH questionnaire.

 However, we obviously are concerned about issues of reliability and validity of
the questionnaire in a larger sense and have conducted numerous studies, as
indicated by the reports and collections of abstracts available at the website
referenced above. NSDUH has conducted a very extensive series of
methodological studies, which are well documented in reports available on the
website. A number of studies have looked at validity of self reports of drug use.
One recently published volume available from the website looked at urine and
hair test results in comparison to self-report; that study is available at
http://oas.samhsa.gov/validity/drugTest.cfm . Note, however, that there are
issues in biological testing for drug use that make such tests imperfect as
standards; because of the time windows for detection of drugs in the body by the
various assays, self-report is often a more valid measure than such tests. In
addition, biological assays cannot reveal lifetime use, which self-report can.

 Highlights from the study comparing self-report on the NSDUH questionnaire
with biological specimen assays are:

- This 214 page validity report provides data comparing respondents' self reported drug use with drug tests for tobacco, marijuana, cocaine, opiates, and amphetamines. Drug testing included both urine and hair specimens. Other methodological issues examined included the technical aspects of collecting urine and hair samples, the willingness of respondents to provide specimens, and questionnaire strategies.
- For tobacco, there was 84.6% agreement between self report in the past 30 days and urine test results. About 5.8% reported no use and tested positive and 9.6% reported use in the past 30 days and did not test positive.
- For marijuana, there was 89.8% agreement between self report in the past 30 days and urine test results. About 4.4% reported no use and tested positive and 5.8% reported use in the past 30 days and did not test positive.
- Comparison of the 7 day self reports for cocaine with the urine test results showed 98.5% agreement (98.2% reported no use and tested negative and 0.3% reported use and tested positive.
- This validity study concluded that biological drug tests can be used as objective markers of drug use to verify self reports among youth and young adults. However, researchers employing drug tests in epidemiological studies must be knowledgeable concerning the performance characteristics of analytical procedures used for the drug tests. These include the capabilities of the test methods and validation of procedures used by the testing laboratory. Researchers also need to know the pharmacology of the drugs tested to enable an acceptable study design and correct interpretation of the drug test results in the different biological specimen matrices.

The ultimate measure of reliability, of course, is test-retest reliability, not inter-item reliability.   We undertook an evaluation of test-retest reliability recently by returning to a sub-sample of the original households and re-interviewing the participants. Such a study, of course, is immensely expensive. The report of that study should be published in the next few weeks and will be on our website's methodological studies page referenced above.

 Thank you again for your interest in the NSDUH survey and data from SAMHSA.

Best regards,

James D Colliver, PhD
Statistician, National Survey on Drug Use and Health
Division of Population Surveys, Office of Applied Studies
Substance Abuse and Mental Health Services Administration
U.S. Department of Health and Human Services
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Rockville, MD 20850 (U.S. Postal Service zipcode 20857)
Phone (+1) 240-276-1252
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Website http://oas.samhsa.gov/nsduh.htm

CURRICULUM VITAE

KAFILAT T. JIMBA
1123 Tara Drive • Williamstown, NJ 08094
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OBJECTIVE:
To obtain a position that will utilize my skills and experience in public health, research and community outreach

EDUCATION:
WALDEN UNIVERSITY   2010
PhD-Community Health Promotion and Education
Dissertation: Racial/Ethnic Differences in Susceptibility and Intention to smoke on Smoking Behavior Among Adolescents

UNIVERSITY OF MEDICINE AND DENTISTRY OF NJ   2006
Master of Public Health-Urban Health Administration
Fieldwork Project: Correlation between Nutrition and Academic Performance of Students (grades 3-6) from the Archdiocese of Newark School System.

OGLETHORPE UNIVERSITY
Bachelor of Arts in Psychology   2003
Senior Research Thesis: Social Facilitation and Self-Efficacy-Effect of Presence of People on Performance

WORK EXPERIENCE:
UNIVERSITY OF MEDICINE AND DENTISTRY OF NJ, Newark, NJ

Institute for the Elimination of Health Disparities   2005-2007
Health Program Analyst
- Recruited/interviewed participants for studies, administered questionnaires and assisted in answering questions
- Conducted literature reviews for various projects and focus groups on research studies
- Program planning, implementation, evaluation for community based and prevention programs
- Maintained and updated department website with current research and issues in health disparities
- Participated in conferences, seminars, community outreach programs and served as liaison
- Researched health issues for grant applications and prepared final grant application for submission

- Analyzed, collected &managed data, prepared reports and created and disseminated department newsletter
- Identified issues and assisted in formulating strategic planning

Institute for Complementary and Alternative Medicine   2004-2005
Research Associate
- Managed distribution and collection of vitamin logs for thirty-seven participating schools
- Maintained records of incoming data and provided analysis using SPSS software
- Reviewed academic school records for data collection and prepared study for final analysis
- Developed questionnaires to be used for pre-testing and post- testing and program evaluation
- Provided support for program planning in obesity and nutrition and community outreach

ATLANTA BEHAVIORAL MEDICINE, Roswell, Georgia   2003-2004
Research Assistant
- Assisted in preparing reports for various projects and collected and analyzed data
- Maintained patients logs, inputted information and prepared reports
- Conducted literature review on different health topics related to behavioral medicine

COMPUTER SKILLS:
Microsoft Word, Excel, SPSS, ATLAS.ti, PowerPoint, GIS