Ethnic Differences in Susceptibility to Smoking and Intention to Smoke on Smoking Behavior among Adolescents

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Abstract

**Objectives:** This quantitative study examined the differences in susceptibility to smoking and intention to smoke on smoking behavior among adolescents of different ethnic groups.

**Methods:** The study utilized secondary data from the 2007 National Survey on Drug Use and Health (NSDUH). The study population included 18,314 persons in the ages 12-17 years, both smokers and nonsmokers and representing the races: White, African American, Hispanic, Asian, Multi-Racial, American Indian and Native Hawaiian. The theory of reasoned action by Ajzen and Fishbein formed the basis of this study.

**Results:** A statistically significant positive relationship was found between participants' susceptibility to smoking and their intentions to smoke \((r = .57, p < .01)\). Additionally, Hispanics demonstrated a significantly higher intention to smoke in the next 12 months than the White participants. More specifically, a significant difference was found among ethnic groups on smoking intentions and among age groups on susceptibility to smoking.

**Discussion:** The constructs of susceptibility to smoking and intention to smoke can be targeted by health education interventions in primary and secondary interventions to reduce smoking behavior in different ethnic groups.

**Keywords:** Susceptibility to smoking; Smoking intentions; Adolescents smoking; Smoking behavior

Introduction

Over the past few decades smoking and tobacco use have gained immeasurable attention and resources from public health officials in the United States and the world. Every year, more than 400,000 Americans die prematurely because of tobacco use and most smokers began smoking during their teen years [1]. In the Healthy People Two major public health objectives were (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 [2]. The need for effective youth tobacco cessation programs has been recognized by many organizations, including the Centers for Disease Control and Prevention (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 [3]. 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 [4,5]. The CDC reported that despite significant improvement 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 [6]. In addition, the U.S. Office of Minority Health [7] stated that there are important but poorly understood differences in health behaviors within and among various racial and ethnic groups. Therefore, understanding the differences in susceptibility to smoking and intention to smoke on smoking behavior across racial/ethnic groups could contribute to more focused efforts at tailored and early intervention. There are several behavioral theories that look at health behaviors including smoking behavior. The theory of reasoned action (TRA) is one such theory that 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 [8,9]. In addition, the theory of reasoned action emphasizes 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) [8]. Theory of reasoned action posits that attitudes and social norms predict intentions to engage in behavior, which, in turn, predicts behavior change [8]. 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 [10] 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 [11]. 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 action helped in understanding the tendency
of participants’ to smoke due to social factors (such as pressure from referent) across the ethnic groups.

**Purpose**

It is in this backdrop that the purpose of this study was to examine whether there are significant differences in susceptibility and intention to smoke in smoking behavior among adolescents of different ethnic groups. 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.

**Methods**

This study was approved by Walden University IRB department with approval # of 07-17-09-0364701.

**Setting**

The objective of the study was to examine the significant of the differences in susceptibility and intention to smoke among adolescent of different ethnic groups. Also, was to evaluate how well "susceptibility to smoking" and "smoking intention" 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 (NSDUH) in 2007. The study utilized a sample from the 2007 NSDUH databases to get good representation of the study populations, especially of the ethnic groups. This study utilized a descriptive cross sectional approach to investigate the differences across the racial/ethnic groups.

**NSDUH sample**

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 youth 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). 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.

**Data collection**

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 computer-assisted interviewing (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 to 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 [12].

**Participants**

The study population included 18,314 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. The descriptive statistics for the participants’ demographics are listed in Table 1.

**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. The 2007 NSDUH has total sample size of 67,870 of which 18,314 are aged 12 - 17 years. 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 the terms of use. Related data can then be obtained or analyzed on the site.

**Instrument**

The content validity of the survey used in the study was assessed. Content validity is a subjective approach designed to assess the degree to which the instrument successfully measures a concept [13]. The content validity of the instrument was measured using a quantitative and subjective method developed by [14], 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 question 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 [14].

| Variable                        | n  | %  |
|---------------------------------|----|----|
| Gender                          |    |    |
| Female                          | 8,959 | 48.9 |
| Male                            | 9,355 | 51.1 |
| Ethnicity                       |    |    |
| White                           | 11,113 | 60.7 |
| Hispanic                        | 3,063 | 18.7 |
| 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

**Table 1:** Descriptive statistics for participants’ demographics.
Equation 1 shows the formula developed by Lawshe for the content validity ratio:

$$\text{CVR} = \frac{(n_e - N/2)}{(N/2)}$$  \hspace{1cm} (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 [14] 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 [14] the questions have content validity. Further, to establish face validity, the researchers recruited four doctoral candidates from a national University to participate in determining the extent to which the questions measure what they were 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 comprehensible. Based upon feedbacks from participants, the instrument appears to be measuring what it is intended to measure.

Variables measurement

Upon University’s 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. 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). 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 was base 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.

Data Analysis

The data were entered into Statistical Package for the Social Sciences (SPSS) 15.0. The data analyses proceed in two stages. First, descriptive statistics were calculated on all research variables. Means ranks and inferential statistics were also used to test the research questions. All statistical tests were conducted at $\alpha = .05$. In the present study the researcher utilized the Kruskal-Wallis test in lieu of ANOVA to evaluate susceptibility to smoking and smoking intentions among the ethnic groups because of the ordinal nature of the dependent variables.

Results

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 2 shows the relationship between susceptibility and smoking intentions. Additionally, a Kruskal Wallis test found no significant difference among the ethnic groups on the susceptibility to smoking and the test further revealed a significant difference among the ethnic groups on the intentions to smoke. Further, Bonferroni post hoc tests revealed that the Whites ($M = 6748.32$) scored significantly higher than the Hispanics ($M = 6507.51$) on intentions to smoke, $\chi^2(6) = 21.38$, $p < .01$. 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. Further, the 14 – 15 year old groups were significantly more susceptible to smoking than the 12 – 13 year olds and 16 – 17 year olds; however, the age groups did not significantly differ on the intentions to smoke.

Discussion

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 [8]. 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 [15], 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. The results are similar to a study conducted [16] which suggested ethnical differences in cigarette smoking intention among female teenagers. In

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

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

Table 2: Correlation between susceptibility to smoking and intentions to smoke.
addition, a study [17], 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. A two-way between-subjects factorial ANOVA (analysis of variance) was conducted and showed 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 14-15 year old group could be explained by the fact that this age group is more ‘self conscious’ and can self identify with others compared to the 12-13 years old. Therefore, making this group responds strongly to peer pressure thus trying to have that ‘bad’ boy or girl image. For example, [18] 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 [19]. 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 [20] 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 [21].

**Implications 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’s 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. Health educators and program planners in designing age-specific programs targeting participants’ ages 12-17 years especially the 16-17 years age group could use the outcomes of this current study. 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. Additionally, 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. Also, education programs that will prevent adolescents to develop smoking intentions and protect them from being susceptible to smoking are needed in different ethnic groups to decrease tobacco products use among adolescents. 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.

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