Self-Efficacy: A Mediator of Smoking Behavior And Depression among College Students

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Cigarette smoking is a growing problem among adolescents. This correlational study tested theoretical relationships between the dependent variable (smoking behavior) and the independent variables (depression and smoking resistance self-efficacy) in a convenience sample of 364 college students ages 18 to 21 years recruited from a large urban public college. An a priori mediational model tested the role of smoking resistance self-efficacy as a mediator in the relationship between smoking behavior and depression. Findings showed there was a statistically significant positive relationship between depression and smoking behavior ($r = 0.122, p = 0.01$). There was a statistically significant negative relationship between smoking resistance self-efficacy and smoking behavior ($r = -0.744, p = 0.01$). Additionally, smoking resistance self-efficacy was a mediator of the relationship between depression and smoking behavior ($\beta = -0.757, p = 0.001$). This study identifies a need for further theory-driven study of the relationship of adolescent depression and smoking behavior. The findings of this study have implications for nursing interventions targeted to both current smokers and smoking initiation prevention programs.

Trends in Adolescent Smoking in the United States

Smoking initiation is a growing problem among American youth. The exact prevalence of adolescent smoking behavior is elusive. Factors that contribute to the difficulty identifying adolescent smokers include the limited use of national surveys of high school students exclusively and the reluctance of youth smokers to self-identify as smokers (Folds et al., 2010). Many adolescents consider themselves "social smokers" and deny nicotine addiction (Schance, Glantz, & Ling, 2009). Current national surveys of youth tobacco use are limited to younger high school students who attend school (CDC, 2012). Additionally, smoking behavior is underestimated by virtue of evidence suggesting that smokers are less likely to participate in studies, more likely to drop out of studies, and more likely to be absent on survey days due to illness, such as respiratory problems (Lawrence, Fagan, Backinger, Gibson, & Hartman, 2007; Seversen & Ary, 1983). Trends in use of cigarettes among adolescents are divided among younger adolescents (grades 8, 10, and 12) and older adolescents (18 to 24 years of age). Young adults (18 to 25 years of age) are a subset of the adolescent’s age group; they are often referred to as "older adolescents."

Smoking among Younger Adolescents

Historically, among young adolescents, smoking prevalence peaked in 1976 at 39% (12th grade). By 1981, this rate dropped substantially to 29% and remained stable until 1992 (28%). In the 1990s, smoking rates among adolescents rose sharply, peaking in 1997. A decline in smoking rates occurred between 1997-2002. Currently, there has been a sharp deceleration in...
the decline of smoking among younger adolescents since 2004 (U.S. Department of Health and Human Services [DHHS], 2012). Today, one in four high school seniors (CDC, 2009) and one in three young adults (DHHS, 2012) are current smokers.

Smoking among Older Adolescents

Smoking initiation among post-high school students is escalating. Trended data demonstrate that smoking initiation among young adults (ages 18 to 25) nearly doubled from 2002 to 2008. In 2010, young adults (ages 18 to 25) had the highest rate of current use of a tobacco product (40.8%), with 34.2% reporting use of cigarettes. This represents a small decline from the period 2002-2010, when rates for tobacco use and cigarette use were significantly higher, 45.3% and 40.8%, respectively (CDC, 2012). Smoking among young adults is attributed to both the continuation of smoking by post-high school students and the initiation of cigarette smoking in the young adult population (ages 18 to 25) (CDC, 2012; Ford, Diamond, Kelder, Sterling, & McAlister, 2009; Green et al., 2007; Lawrence et al., 2007; Staten et al., 2007; Tercyak, Rodriguez, & Audrain-McGovern, 2007). There are three subpopulations among young adults ages 18 to 25: the straight-to-work (STW) group, college students, and military personnel. There is a dearth of information about smoking habits of STW youth and military young adults; however, older adolescents who are not enrolled in school are twice as likely to be smokers when compared with those who are in school (Feldman, Nelson, & Feldman, 2012; Lawrence et al., 2007). College-aged students are at risk for smoking initiation because they are the youngest legal targets for tobacco industry marketing (Rigotti, Lee, & Wechster, 2000).

Literature Review: Factors That Influence Smoking Behavior Among Adolescents

To prevent tobacco dependence and its attendant health complications among adolescents, it is critical to investigate factors that contribute to smoking. The period of adolescence extends beyond the high school years, encompassing more than 10 years of physical growth, cognitive development, academic accomplishment, and emotional maturation. Smoking among adolescents is a complex behavior motivated by a myriad of biologic, psychosocial, intrapersonal, and environmental factors (Flay & Petrakis, 1994; Goodman & Capitman, 2000; Gullick, Hayes, & Kennelly, 1991). Factors that predispose young adults (18 to 25 years of age) to smoking initiation are sociodemographic, environmental, behavioral, and personal (CDC, 2012). Smoking among youth serves a number of purposes, which are specific to different developmental tasks, including a) a coping mechanism for dealing with stress, boredom, and frustration, b) a transition marker or claim to more adult status, c) a form of social entrée, d) recreational behavior, and e) a strategy to increase or maintain personal energy (Feldman et al., 2012; McEwen, West, & McRobbie, 2008; Perry, Murray & Klepp., 1987; Unger & Rohrbach, 2002). Young adults who are exposed to smoking as a social norm, either from family or peers, are more likely to smoke (Feldman et al. 2012). Additionally, young adults who smoke are more likely to consume alcohol and use illegal drugs (CDC, 2012; Feldman et al., 2012; Reed, McCabe, Lange, Clapp, & Shillington, 2010). Personal factors that influence smoking behavior include depression and smoking resistance self-efficacy [SSE] (Haukkala, Utela, Vartianen, McAlister, & Knekt; 2000; Orr & Ingersoll, 1995; Simantov, Schoen, & Klein, 2000).

Depression and Smoking Behavior

Depression has been theoretically linked to smoking behavior (Goodman & Capitman, 2000). The temporal nature of the relationship between smoking behavior and depression is not fully explicated; however, the relation of smoking and depression occurs early in life (Escobedo & Kirch, 1996; Groth & Morrison-Beedy, 2011). Across adolescence, depressed mood is a statistically significant predictor of smoking initiation (Goodman & Capitman, 2000; Kandel, Kiros, Schafran & Hu, 2004; Poulin, Hand, Boudreau & Santor, 2005). The success of antidepressant therapy in smoking cessation programs suggests that the neurochemical side effect of nicotine and other active ingredients in cigarettes contributes to depressive symptomatology (Goodman & Capitman, 2000; Groth & Morrison-Beedy, 2011; Kandel et al., 2004; Poulin et al., 2005; Tercyak, Goldman, Smith, & Audrin, 2002; Vogel, Hurford, Smith, & Cole, 2003).

Smoking Resistance Self-Efficacy (SSE)

SSE is the belief that one can resist smoking behavior and has been theorized to be positively related to the avoidance of smoking behavior (Bradley & Corwyn, 2001; Ford et al., 2009). There is a strong positive correlation between SSE and the avoidance of smoking (Conrad, Flay, & Hill, 1992; Gullick & Escobar-Florez, 1995; Kear, 2002; Lawrance, 1985; Lawrance & Rubinson, 1986). To date, however, the mechanism by which SSE has an impact on smoking behavior has not been studied. This study posits that SSE is a mediator of the relationship between smoking behavior and depression. SSE is an internal property of an individual, which is by definition a characteristic of a mediator (Baron & Kenny, 1986).

Theoretical Model

An a priori theoretical model was developed and tested (see Figure 1). The relations posited in the mediational model suggest that depression is positively related to smoking behavior (Escobedo & Kirch, 1996; Goodman & Capitman, 2000; Kandel et al., 2004; Killen et al., 1997; Poulin et al., 2005), and is negatively related to SSE (Engels, Hale, Noom, & DeVries, 2005; Haukkala et al., 2000; Kear, 2002). SSE is hypothesized to mediate, and thus, help explain the relation between depression and smoking behavior among adolescents. That is, when smoking resistance SSE is controlled for statistically, the relation between depression and smoking behavior diminishes.

Hypotheses

The following hypotheses were tested:

- There is a negative relationship between smoking resistance SSE and smoking behavior.
- There is a negative relationship between SSE and depression.
- There is a positive relationship between depression and smoking behavior.
Note: This figure shows a priori mediational model of the relationship between depression and smoking behavior with Smoking Resistance Self Efficacy as the mediating variable.

- When SSE is controlled for statistically, the relationship between depression and smoking behavior will diminish.

Methods

This study was a correlational design using a convenience sample approved by both Rutgers University Institutional Review Board (IRB) and the participants’ college IRB. The research setting was a senior college within a large urban public university system in a major metropolitan area in the Southeastern regional area of New York State. This college population is composed of approximately 12,000 students. All data were collected in classroom settings during regular scheduled class times in a quiet environment. Consenting participants completed an anonymous instrument packet inclusive of a demographic sheet that recorded information about smoking behavior, the Beck Depression Inventory (BDI-II), the SSE scale, and a demographic sheet. Time to complete the survey ranged from 10 to 20 minutes. No identification of subjects was sought.

Sample

The sample consisted of adolescent college students 18 to 21 years of age enrolled in a credit-bearing required general education course at a large public college in southern New York. In all, 22 cohorts were invited to participate, yielding a total sample size of 388 participants, of which 99 (25%) were smokers. Ultimately, 364 complete surveys were analyzed, and those with missing data were eliminated; 27% (n = 98) reported smoking in the past 30 days. Thus, the ratio of smokers to nonsmokers was within the suggested limits (Kenny, 2007). In determining the minimum sample size, the sample size was calculated using Cohen and Cohn’s classical procedure for a priori power analysis (Cohen, 1988). Additionally, both Baron and Kenny’s (1986) and Kenny’s (2007) recommendations for power analysis with mediational models were followed. The minimum required sample size was exceeded.

Instruments

Smoking behavior. Smoking behavior is an outcome variable defined by the CDC (2009) as having smoked even one cigarette in 30 days. Smoking behavior was operationally defined in this study by the response to the question, “Have you smoked even one cigarette in past 30 days?”

Depression. The Beck Depression Inventory (BDI-II) is a 21-item self-report scale that measures the affective, somatic, behavioral, motivational, and cognitive symptoms of depression. The BDI-II is intended as a screening assessment for determination of symptoms of depression; it is not equivalent to the establishment of a diagnosis of depression by a clinician (Beck, Steer, & Brown, 1996). Each of the items is scored from 0 to 3. Possible final scores range from 0 to 63, with higher scores reflective of greater depressive symptomatology. Beck et al. (1996) reported a correlation of 0.93 (p < 0.001) between the BDI-II and the BDI-IA.

Smoking Resistance Self-Efficacy scale. The Lawrance Smoking Self-Efficacy (SSE) scale is a 36-item, self-administered tool that measures perceived self-efficacy of an individual to resist smoking cigarettes. The scale is based on the conceptualization of SSE as a predictor of health behavior (Conditte & Lichtenstein, 1981; Lawrance & Mcleroy, 1986). There are three subscales identified through factor analysis: a) opportunities to smoke, b) emotional stress, and c) friends’ influence. The emotional subscale includes self-report of anxiety, nervousness, sadness, anger, restlessness, and frustration. The friends’ influence subscale includes social situations that might contribute to an individual’s acceptance of a cigarette if offered. The opportunities subscale includes daily activities that might trigger the desire for a cigarette, such as studying, watching TV, or waiting. Of 36 factors, 29 have factor loadings of 0.6 or greater.

The Lawrance scale was originally developed for use with middle school children and was adapted for college students by Kear (2002). The adapted items were used in the present study. The scale is based on a six-item rating from “I am very sure I would smoke” to “I am very sure I would not smoke.” Scores range from 36 to 216, with higher scores representing greater smoking resistance self-efficacy.

Kear (2002) reported a Cronbach alpha coefficient of 0.98 SSE scale; item to total correlation ranged from 0.65 to 0.95. Lawrance (1989) reported a Cronbach alpha coefficient of 0.94 to 0.97. Chen, Horner, and Percey (2002) reported a Cronbach alpha coefficient of 0.98 for a Chinese version of the SSE scale. In the present study, the Cronbach alpha coefficient was 0.99 (see Table 1).
Findings

The majority of participants were 18 or 19 years of age (58%), Caucasian (59%), single (99%), and living with both parents in a nuclear family. The remaining participants self-identified as Asian (12.4%), Hispanic (8.8%), Black (6.6%), and Mixed (6.6%). A small number of participants (6.6%) were categorized as “other” based on inscrutable answers to the survey question of “ethnicity.” More than half were female (62%), and the majority had tried smoking at least once in their life (57%). The percentage of study participants’ current smoking (27%) was higher than the national average (see Table 2).

For the total sample, scores on the SSE were relatively high. BDI scores, reflecting depressive characteristics, were relatively low. For closer examination, the descriptive statistics were divided into smokers and non-smokers. Depression, as measured by the BDI, was higher among smokers than non-smokers. Smokers’ scores on the BDI, measuring depression, ranged from 0 to 40 (M = 12.44, SD = 9.58). Smoking resistance self-efficacy scores were substantially lower among smokers, ranging from 57 to 270 (M = 169.58, SD = 64.57). The correlational hypotheses were tested using a Pearson Product Moment correlation coefficient. The mediational model was tested using a series of multiple regression analyses as specified by Baron and Kenny (1986).

Hypothesis 1, which stated there is a negative relationship between SSE and smoking behavior, was supported (r = -0.744, p = 0.01). Findings indicated that the higher SSE the less likely the adolescent is to smoke.

Hypothesis 2, which stated there is a negative relationship between SSE and depression, was supported (r = -0.233, p = 0.000). With higher SSE, there is lower depression.

Hypothesis 3, which stated there is a positive relationship between depression and smoking behavior, was supported (r = 0.122, p = 0.01). Findings showed that with higher depressive symptoms as reflected in the BDI-II, the adolescent is more likely to smoke.

Hypothesis 4 was supported. The mediational model was tested using three regression equations as specified by Baron and Kenny (1986). Therefore, SSE was found to be a strong mediator of the relationship between depression and smoking behavior (see Figure 2).

Discussion

It can be concluded that a) there is a positive correlation between depression and smoking behavior, b) SSE bears a negative relationship with smoking behavior (i.e., with higher SSE it is less likely the adolescent will smoke), and c) there is a negative relationship between SSE and depression (i.e., with lower SSE, it is more likely the adolescent will be depressed). The mediation model of the relationship between depression and smoking behavior was supported, identifying SSE as mediator of this relationship. Therefore, based on strong empiric support, SSE helps to explain the relationship between depression and smoking behavior, and SSE is a mediator of this relationship (see Figure 2).
Relevance of Smoking Resistance Self-Efficacy

SSE has been theorized to be positively related to the avoidance of smoking behavior (Bradley & Corwyn, 2001; Conditte & Lichtenstein, 1981; Coelho, 1984; DiClemente, Prochaska, & Gilbertini, 1985; Gulick et al., 1991). The relationship of SSE and smoking behavior has been studied by numerous investigators (Conrad et al., 1992; DiClemente & Prochaska, 1982; DiClemente et al., 1985; Ford et al., 2009; Gulick & Escobar-Florez, 1995; Kear, 2002; Lawrence, 1985; Lawrence & Robinson, 1986). SSE is a strong correlate of smoking behavior and can be evaluated as a surrogate marker for smoking behavior (Lawrence & McLeroy, 1986). Sample bias germane to all smoking behavior research is that smoking behavior is underestimated by virtue of evidence, suggesting that smokers are less likely to participate, more likely to drop out of studies, and more likely to be absent due to illness secondary to their smoking habit, such as respiratory problems (Seversen & Ary, 1997). Longitudinal studies report a loss of the sample to absence, attrition, refusal, or inability to locate the subject. Among adolescents, this is common due to change in residence or school with advances in grade level. An additional factor that complicates the study of smoking behavior among adolescents is parental consent and student assent. It is possible that the population of greatest interest to the researchers may be the potential subjects who are unable or unwilling to participate. This study supports the use of SSE as a predictor or surrogate of smoking behavior. Depression is a strong correlate of smoking; however, the temporality of this relationship is indeterminate.

Implications for Nursing

The findings of this study have implications for nursing interventions targeted to both current smokers and smoking initiation prevention. Nursing is uniquely poised to design and implement effective smoking prevention and smoking cessation programs. Across various settings, nurses are positioned to conduct effective research and intervention strategies to address the problem of smoking behavior among American youth (Ahern, 2009; LaSala & Todd, 2000; Spellbrin, 1991). The findings of this study have implications for a broad range of nursing specialties; these include nurses working in the community, schools, and college health centers, as well as nurses working in interdisciplinary teams. Nurses are already in the school systems with access to adolescents at risk; they can educate youth, contribute to policy, train educators, involve families, and implement effective cessation programs (LaSala & Todd, 2000). Nursing should be at the table when multi-disciplinary teams approach this health problem from a shared theoretical perspective (Clayton, Scutchfield, & Wyatt, 2000; McBride, 2010; National Institutes of Health, 2004).

The establishment of SSE as a strong correlate of smoking behavior and a mediator of the relationship between smoking behavior and depression has implications for practice. Depression among adolescents is common, increasing, and perhaps biologic and cyclical. Smoking among young adults is rising. Smokers are more likely to exhibit depressive symptoms. Therefore, it is important to approach this problem from several angles.

First, it is important to recognize that many older adolescents begin smoking after high school. Registered professional nurses can develop and implement enhanced smoking prevention programs, particularly during college freshman orientation programs, to assist young adults who are at risk of starting smoking during college.

Second, smoking and depression are correlated; therefore, smokers are at high risk for depression, and they should be screened and evaluated for depressive symptoms. Nurses across all settings can implement depression screening as a routine part of every nurse-student interaction (Hamrin, Antenucci, & Magorno, 2012). Additionally, because SSE is a predictor of smoking behavior, SSE can be evaluated with simple screening measures. Appropriate referrals within the existing system can be made. In particular, advanced practice nurses (APNs) can establish treatment regimes in a cost-effective manner. APN in academic settings, such as college health offices and school-based clinics, are critical in the recognition and treatment of depression among adolescents (Lazenby, 2011).

Third, nurses need to partner with other disciplines and community leaders to advocating for necessary health services for this at-risk population. Secondary schools and colleges are meeting fiscal constraints by decreasing student services; nursing must advocate for the important role that school-based nurses play in the recognition and treatment of depression, and the critical role they play in health promotion and preventive services (Crihfield & Grace, 2011).

This study explicates the role of SSE as a mediator of the relationship between depression and smoking behavior, and invites further nursing research, specifically those employing interventions designed to enhance SSE. Within the tested theoretical...
model of depression, smoking behavior, and SSE. SSE is easiest to modify. Depression is multifactorial and complicated to modify, and smoking cessation is difficult; therefore, it is logical to evaluate the effectiveness of strategies that enhance SSE. Social learning theory explains self-efficacy as a task-specific skill that is amenable to intervention through vicarious experience, mastery experience, social persuasion, and emotional and physical reactions (Bandura, 1991, 1997). Nurses can develop and implement interventions to enhance SSE through the development of peer support groups and diligent screening at every health office interaction, and by being vocal advocates for smoking avoidance. Another possible strategy would be acknowledgment and validation of smoking avoidance behavior at health visits. Motivational interviewing can be employed as an intervention to encourage behavior change and reduce risk (Jackman, 2012). It is incumbent upon nursing to educate American youth; smoking is a pervasive problem that will have escalating physiological, psychosocial, and fiscal consequences across their lifespan.

References

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Goal
To provide an overview of the relationship between smoking behavior and depression among American adolescents.

Objectives
1. Discuss the changing trends of cigarette smoking among American adolescents.
2. List the factors that influence smoking behavior among adolescents.
3. Explain how nurses can educate adolescents about the dangerous effects cigarette smoking can have on the human body.

Statement of Disclosure: The author(s) reported no actual or potential conflict of interest in relation to this continuing nursing education activity.

The Pediatric Nursing Editorial Board members reported no actual or potential conflict of interest in relation to this continuing nursing education activity.

This independent study activity is provided by Anthony J. Jannetti, Inc. (AJJ).

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This article was reviewed and formatted for contact hour credit by Rosemarie Marmion, MSN, RN-BC, NE-BC, Anthony J. Jannetti, Inc., Education Director; and Judy A. Rollins, PhD, RN, Pediatric Nursing Editor.


**Additional Readings**

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