CORRELATES OF SMOKING BEHAVIOR AMONG OLDER ADOLESCENTS

By

Susan Mee

A dissertation submitted to the

Graduate School-Newark

Rutgers, The State University of New Jersey

In partial fulfillment of requirements

For the degree of

Doctor of Philosophy

Graduate Program in Nursing

Witten under the direction of

Professor Mary Ann Scoloveno

and approved by

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Newark, New Jersey

May, 2009

ABSTRACT OF THE DISSERTATION

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Thesis director: Professor Mary Ann Scoloveno

This study developed and tested theory to gain a better understanding of smoking behavior among older adolescents. This correlational study empirically tested theoretical relationships postulated between the dependent variable, smoking behavior and each of the independent variables of (a) depression, (b) social support and (c) smoking resistance self efficacy. This study also tested the relationship of smoking resistance self efficacy and (a) social support and (b) depression. In addition, this study examined two mediational models, which tested the role of smoking resistance self efficacy as a mediator in the relationship of (a) social support and smoking behavior, and (b) depression and smoking behavior.

A convenience sample of 364 college students 18-21 years of age was recruited from a large urban public college in the South Eastern region of New York State. Volunteers completed the study instrument which consisted of a demographic data sheet and three standardized instruments.

There were statistically significant negative relationships between smoking resistance self efficacy and (a) smoking behavior, and (b) depression. There was a statistically significant positive relationship between depression and

smoking behavior. Additionally, smoking resistance self efficacy was a mediator of the relationship between depression and smoking behavior. The study did not provide evidence of a statistically significant relationship between (a) smoking behavior and social support and (b) smoking resistance self efficacy and social support. Smoking resistance self efficacy failed to act as a mediator of the relationship between social support and smoking behavior.

In summary, this study contributes to theory based nursing research in determining the role of SSE as (1) a mediator of the relationship between smoking behavior and depression, and (2) a strong correlate of smoking behavior. Through the explication of SSE as mediator of the relationship between depression and smoking behavior, this study invites further nursing research, specifically those employing interventions designed to enhance SSE. The findings of this study have implications for nursing interventions targeted to both current smokers and smoking initiation prevention. In addition, this research identifies a need for further theory-driven study of the relationship of depression and smoking behavior among adolescents.

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Preface

This research marks the end of a journey, punctuated by remarkable intellectual and personal growth. This dissertation is dedicated to my parents, Mary and Thomas Mee, in recognition of their unfailing support and generosity. In particular, I would like to acknowledge the inspiration provided by my mother, Mary Mee, who succumbed to lung cancer on September 1st, 2000.

I am indebted to the chair of my dissertation committee, Dr. Mary Ann Scoloveno, for her generosity, mentorship and academic excellence. Dr. Scoloveno's insightful guidance was pivotal in shaping the direction of inquiry. Her great kindness, stellar intellect and patience have been both inspiring and humbling.

I would like to thank Dr. Elsie Gulick for the gift of her time and talent in sharing her expertise in smoking behavior research; I am forever grateful to Dr. Gulick for both the privilege of working with her and the unparalleled guidance in the analysis of data. Dr. Gulick's kindness toward me and her passion for nursing research was extraordinary.

I am indebted to the members of my committee who helped to shape the research questions and guided me throughout the research process. Their collegiality made the research experience both unique and wonderful. I would like to thank Dr. Ganga Mahat for her encouragement, direction and generosity of spirit and time in supporting this research and my endeavor. I am also grateful for the support and guidance of Dr. Claudia Beckman, whose patience and kindness to me throughout my course of study in the graduate program has been

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CHAPTER I

The Problem

Cigarette smoking is major threat to health. The younger an individual is at the time of smoking initiation, the more likely they are to be addicted to nicotine (Centers for Disease Control [CDC], 2004). In fact, ninety percent of adult smokers report initiating smoking prior to age 21 (American Lung Association [ALA], 2005). Each day 4400 – 6000 youths aged 12-17 try their first cigarette (CDC, 2004). It is estimated that 4.5 million U.S. adolescents are cigarette smokers. Of adolescents who have smoked at least 100 cigarettes in their lifetime, most report that they would like to quit but cannot (ALA, 2005). It is therefore critical to investigate factors that influence adolescent smoking initiation in order to prevent tobacco dependence and its attendant health complications.

Although cigarette smoking has declined in the young adolescent population, evidence suggests that smoking among older adolescents and college students is rising (Kear, 2002). There is concern that while current tracking methods indicate a decline in smoking, in reality, there has only been a chronological shift in smoking initiation trends. Many current smokers are initiating smoking behaviors in late adolescence, often in college. However, the current prevalence of adolescent smoking behavior is not known because the current tracking system (Centers for Disease Control Youth Risk Behavioral Surveillance System [CDCYRBSS]) terminates with high school students in their junior year. Accordingly, smoking rates among older adolescents are not systematically tracked and recorded. This complicates research in the area of

adolescent smoking behavior. Despite this complication, it is evident that the problem does indeed exist; therefore, there is need for research specific to older adolescents in order to address the growing concern of smoking initiation among older adolescents and contribute to the state of the science.

Understanding the nature of the older adolescent tobacco experience is crucial; however, this understanding is complicated by empiric studies that attempt to explain adolescent tobacco use predicated on the assumptions that (a) adolescents have similar experiences as adults and (b) all adolescents share common experiences of tobacco. Developmental theory explains why this is not possible; yet the literature is inundated by studies that disregard this fundamental aspect of the problem (Orr & Ingersoll, 1995). Application of developmental theory precludes sweeping generalization that all adolescents share a similar experience of tobacco. The period of adolescence encompasses more than ten years of physical growth, cognitive development and emotional maturation. Young adolescents are inherently different than older adolescents; therefore, it is likely that their tobacco experience will also be different (Kandel, Kiros, Schaffran, & Hu, 2004; Poulin, Hand, Boudreau, & Santor, 2005). Developmental theory explains that there are distinct and unique developmental attributes that evolve during this time. This ten year span of adolescence is stratified by distinct changes in cognitive processing, emotional maturity and formal academic achievement. Scientific study requires sensitivity to the specific qualities of the age group under investigation. There is a lack of developmentally tailored research and a resultant gap in the state of the science with respect to

understanding the adolescent tobacco experience and resultant tobacco dependence. The present study investigated factors that contribute to smoking initiation among older adolescents in order to contribute to the state of the science and ultimately help prevent tobacco use and it's serious threat to health across the life span.

Smoking accounts for serious morbidity across the life span. According to the American Lung Association (2006), cigarette smoking is the third leading cause of death in the United States, responsible for one in five deaths. Also, worldwide, cigarette smoking is the leading source of preventable morbidity and premature mortality. Smoking is a major contributor to pulmonary illness, coronary artery disease, stroke, cancer, peptic ulcer disease and slow wound healing. Smoking in pregnancy accounts for 20-30% of low birth weight babies, 14% of preterm deliveries and 10% of all infant deaths. Additionally, smoking accounts for $167 billion in annual health costs and lost productivity among Americans.

Parents who smoke contribute both directly and indirectly to health problems seen in their children. These complications include: exacerbation of asthma, increased frequency of colds and upper respiratory infections, ear infections and sudden infant death syndrome. Environmental Tobacco Smoke (ETS) causes an estimated 150,000 -300,000 cases of lower respiratory tract infection in children less than 18 months of age resulting in 7500-15,000 annual hospitalizations. The indirect effect of parental smoking is profound: Ninety percent of middle school children who smoke have a household member who

smokes. Conversely, of middle school children who never smoke, 32% have a household contact who smokes. Given that ninety percent of adult tobacco users began smoking prior to age 21, it is important to study the role of parental smoking as a determinant of adolescent smoking behavior.

One factor that contributes to smoking behavior is Smoking Resistance Self Efficacy (SSE). Smoking Resistance Self Efficacy is defined as one's belief that they can resist smoking behavior. Smoking Resistance Self Efficacy (SSE) has been theorized to be positively related to the avoidance of smoking behavior (Bradley & Corwyn, 2001; Coelho, 1984; Condiotte & Lichtenstein, 1981; DiClemente, 1981; Gulick, Hayes, & Kennelly, 1991). The relationship of SSE and smoking behavior has been studied by numerous investigators (DiClemente & Prochaska, 1982; DiClemente, Prochaska, & Gibertini, 1985; Gulick & Escobar-Florez, 1995; Lawrance, 1985; Lawrance & Rubinson, 1986; Kear, 2002). Conrad, Flay, and Hill (1992) reported a meta-analysis of studies of smoking initiation; they found that smoking resistance self efficacy was a major factor in whether or not individuals smoked. To date, however, the mechanism by which SSE impacts smoking behavior has not been studied. Clearly, both smoking initiation and smoking behavior are multifactorial. Both the empiric and theoretical literature point to several factors which influence both smoking initiation and the continuation of smoking behavior. Among these are depression and social support. This study evaluated the role of SSE as mediator of the relationship between (a) social support and smoking behavior and (b) depression and smoking behavior.

Social support has been theorized to be positively related to positive health practices. Simantov, Schoen, and Klein (2000) studied a national cross section of adolescents and found parental support was protective for the prevention of initiation of high risk behaviors. The theoretical and empiric literature suggest an inverse relationship between social support and high risk behavior such as cigarette smoking, alcohol consumption and illegal drug use. Tobacco use alone is considered a risk factor for other high risk behaviors. Among adolescents, tobacco is considered the "gateway drug"; that is, teens who smoke cigarettes are eight times more likely to smoke marijuana and 22 times more likely to use cocaine when compared with a similar group of non-smoking adolescents (ALA, 2004). Tobacco use in adolescence is associated with increased likelihood of being in a fight, carrying weapons, engaging in high risk sexual behavior and using other drugs and alcohol (Biglan, Mrazek, Carnine, & Flay, 2003).

The period of older adolescence encompassing the college years is characterized by increasing independence from established means of social support. Many college students move away from home while others, who study close to home, are likely to experience shifts in friendships concurrent with new school experiences. The loss of established social support increases the older adolescent's vulnerability. College aged adolescents are at risk for depression. There is a need to evaluate the relationship of depression and smoking behavior. Some researchers believe that the biochemical attributes of tobacco dependence predispose a smoker to depression. This is evidenced by recent successful

treatment of nicotine dependence with pharmacologic antidepressant medication. It is therefore important to separately examine the relationship of (a) social support to smoking behavior, and (b) depression to smoking behavior in this unique population. It can not be assumed that depression is a result of loss of social support; it may be a symptom of nicotine dependence.

There is a strong relationship between depression and smoking behavior among adolescents. Empirical studies in young adults and in adolescents have provided support for the relationship between depression and smoking behavior. Vogel, Hurford, Smith and Cole (2003) investigated the relationship of depression to adolescent smoking. This relationship has been supported by the research of others (Escobedo & Kirch, 1996; Goodman & Capitman, 2000; Kandel et al., 2004; Killen et al., 1997; Poulin et al., 2005; Tercyak et al., 2002; Vogel et al., 2003). The direction of the relationship of depression and nicotine dependence is a matter of great interest and, to date, has not been determined.

The present study examined the relationship between (a) social support and smoking behavior and (b) depression and smoking behavior in older adolescents aged 18-21 years. Researchers have examined these relationships in adults but there is need for developmentally accurate research specific to this age group (Tucker, Ellickson & Klein, 2002). The prevalence of tobacco use is highest among 18-24 year olds (CDC, 2006). College students are a large subset of this age population. Cigarette use among college students increased by 28% between 1993 and 1997. The CDC reports that the highest rates of smoking among high school students are among high school seniors (1991:

30%; 1993: 35%; 1995 38%; 1997: 40%; 1999: 43%; 2001: 35%; 2003: 26%;

2005: 28%). The trend in smoking prevalence points to increasing tobacco use

among college students which may be a reflection of a delay in smoking initiation

among adolescents, rather than a true decline. At the present time this

assessment can not be made since the actual incidence of smoking among

college students is not reported by the CDC. In order to address the problem of

smoking initiation and tobacco dependence, it is critical to assess smoking

behavior across the lifespan.

Statement of the problem

1. What is the relationship between social support, depression, smoking
   resistance self efficacy (SSE), and smoking behavior among older
   adolescents?

Subproblems:

1. What is the relationship between social support and smoking behavior?

2. What is the relationship between social support and smoking resistance
   self efficacy?

3. What is the relationship between smoking resistance self efficacy and
   smoking behavior?

4. What is the relationship between depression and smoking behavior?

5. What is the relationship of depression and smoking resistance self
   efficacy?

Definition of terms: conceptually & operationally

Adolescent

An older adolescent is defined as an individual between 18-21 years of age (CDC, 2006).

Smoking behavior

Smoking behavior is defined by the CDC as having smoked even one cigarette in the preceding 30 days. Smoking behavior was operationally defined by the response to the question "have you smoked even one cigarette in past 30 days?"

Smoking resistance self efficacy

Smoking resistance self efficacy (hereafter referred to smoking self efficacy [SSE]) is theoretically defined as an individual's expectation that they will be successful in avoiding smoking behavior (DiClemente, 1981). Smoking resistance self efficacy (SSE) was measured using the Lawrance (1989) self efficacy resistance scale.

Social support

"Social support is defined as the relational provisions of attachment, social integration, opportunity for nurturant behavior, reassurance of worth, sense of reliable alliance and obtaining guidance." (Weiss, 1974). Social support was operationally defined as a participants score on the PRQ-85—part 2.

This study examined the relationship between smoking behavior and (a) social support, (b) depression, and (c) SSE. Adolescents with high smoking resistance self efficacy are less likely to smoke. This study investigated the role

of SSE as a mediator of the relationship between (a) social support and smoking behavior and (b) depression and smoking behavior.

Depression

Depression is defined by the DSM-IV criteria. Adolescents exhibiting or reporting five or more of the following persistent symptoms within the same two week period are classified as 'depressed': (a) feeling sad, tearful or irritable, (b) markedly diminished interest or pleasure in most activities, (c) weight loss or weight gain or failure to make expected weight gains, (d) insomnia or hypersomnia (e) psychomotor agitation or retardation, (f) fatigue, (g) feelings of worthlessness or guilt, (h) diminished ability to think or concentrate,(i) recurrent thoughts of death and/or suicidal ideation. Depression was operationally defined as a participants score on the Beck Depression Inventory-II (BDI-II). Beck provides stratification of scores with attendant degrees of depression. Total score of 0-13 indicate minimal depressive symptoms; 14-19 indicate mild depressive symptoms; 20-28 indicate moderate depressive symptoms and 29-63 indicate severe depressive symptoms.

Delimitations

This sample was delimited to a single college population within one campus of a major urban public university; students were recruited from all sections of one mandatory core course: Fitness for Life. Eligible participants self identified as being within 18-21 years of age, were mentally and physically capable of completing the study instrument and able to read English.

Significance of the study

The U.S. Surgeon General first reported smoking as a health risk in 1964. Although smoking rates have declined substantially since that time, current prevalence of smoking is far from the Healthy People 2010 goal of 16 percent. Given the fact that Environmental Tobacco Smoke (ETS) is class A carcinogen, a smoking rate of 16% is unacceptably high. Smoking among 18-24 year olds is the highest among all populations (23.6%).

This study examined factors that contribute to smoking in the population of 18-21 years old college students in New York City in the borough of Staten Island. This population of young adults is at higher risk than the national average for smoking. The New York City Department of Health and Mental Hygiene [NYCDOHMH] 2005 Community Health Survey reports 18.9 % of adults in New York City [NYC] smoke, a slight increase from the 2004 rate of 18.4%. This rise in smoking rates occurred despite aggressive efforts by the government to curtail cigarette smoking. Although the sale of cigarettes to minors in NYC is prohibited, 11% of NYC public high school students report smoking. In the borough of Staten Island, 23% of high school students smoke. This figure is identical to the national average reported by the CDC following the 2005 National Youth Risk behavior Survey [YRBS]. However, Staten Island Youth smoking is more than double that of other boroughs of NYC and a quantum leap from the Healthy People 2010 goal of 16% (objective no 27-2b). It is unknown why Staten Island has a disproportionate number of both adolescent and adult smokers (NYCYRBS,NYCDOHMH, vol 5 (1), 2006).

This study explored factors that contribute to smoking behavior in the unstudied population of young adults who attend college on Staten Island. Clearly, many high school students who smoke do not quit smoking prior to college entrance; yet current monitoring does not capture this population. The CDC reports the incidence of adult smoking; the population of 18-24 year olds are a subset of this 'adult' group. Of concern is that, among adult smokers, smoking rates for individuals 18-24 years of age are highest for all adult smokers (CDC, 2006). Despite a decline in the incidence of smoking among adolescents since 1999 (CDC, 2006), smoking among college students and young adults is rising (CDC, 2006; Kear, 2002).

The NYCYRBS gathered statistics relevant to smoking prevalence but did not assess other factors that may contribute to smoking behavior. There is a need to examine factors that contribute to smoking behavior in this vulnerable population. The ALA (2006) reports that recent increases in smoking among persons 18-24 years of age may be attributable to either: (a) the aging of the cohort of high school student smokers, or (b) may be indicative of a rise in smoking in this population.

Current strategies have not been effective in reducing the prevalence of smoking in NYC youth. Paternalistic governmental strategies such as public smoking bans and high cigarette taxes have met limited success (NYCDOHMH, 2006, vol 5 (1). There is no research to evaluate how these strategies may impact smoking initiation. It is suggested that they may only delay smoking

initiation until the college years when it is legal to purchase cigarettes and considered a status symbol of wealth to be able to buy them (NYCDMHH, 2006).

Theory based nursing research is needed to determine the contributors to smoking behavior in order to design effective intervention strategies. Nursing is uniquely poised to address this health problem. Nurses are already in the school systems and have access to the population at risk. Nurses can be involved in new research to critically evaluate the problem as current strategies do not seem effective (Spellbring, 1991). Nurses are already in place to educate youth, contribute to policy, train educators, involve families and address cessation programs (LaSala & Todd, 2000). Nursing should be at the table when mulit-disciplinary teams approach this health problem from a shared theoretical perspective (Clayton, Scutchfield & Wyatt, 2000; NIH, 2002). This study contributes to the body of knowledge that will serve as a resource for both community health nurses, school based nurses and other disciplines to design and implement both effective smoking prevention and smoking cessation programs.

In order to better understand the problem of adolescent smoking behavior it is necessary to look at the relationships among smoking behavior, smoking refusal self efficacy, social support, and depression.

Chapter II

Review of the Literature

Theories of Smoking Behavior

The present study examined factors that contribute to smoking behavior among older adolescents. Review of the theoretical literature yields several constructs that persist across disciplines: Smoking Resistance Self Efficacy (SSE), Depression and Social Support (SS). This study examined the relationship of these factors to smoking behavior among older adolescents.

Adolescent smoking behavior is complex. Perry, Murray, and Klepp (1987) have proposed that adolescent smoking serves a number of purposes which are each specific to different developmental tasks. They describe smoking behavior as an: (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) strategy to increase or maintain personal energy.

Others explain smoking behavior in a developmental framework. Gulick et al. (1991) developed and tested a model of smoking behavior among women that is specific to life cycle developmental periods. Gulick et al. encourage nurses to evaluate each individual's unique set of circumstances and developmental needs in an effort to prevent smoking and assist cessation efforts. Gulick et al. include childhood and adolescence as distinct periods within the model. This sophisticated model incorporates beliefs and attitudes that are formed in early childhood and are influenced by (a) parents and peers, (b) sociability and social

competence, (c) stress, (d) coping, (e) self efficacy, (f) motivation, (g) nicotine dependence and (h) support. The theory further defines support as encompassing parental influence and modeling, social support and societal sanctions. Flay and Petraitis (1994) developed the Theory of Triadic Influence to explain adolescent substance abuse. Like Gulick et al., these authors propose that attitudes, social influences and perceptions of self efficacy influence behavior. Their model provides for a comprehensive analysis of social situation, cultural environment, and personal biologic factors.

Biobehavioral theory suggests that smoking behavior is influenced by biochemical dependence. Goodman & Capitman (2000) suggest that the effect of nicotine on noradrenergic receptors receptor systems bears further investigation. The author cites the recent success of the efficacy of antidepressants in smoking cessation programs and recommends that future studies incorporate this biologic component of nicotine addiction.

In summary, smoking among adolescents is a complex behavior motivated by a myriad of biologic, psychosocial, intrapersonal and environmental factors. Smoking behavior among adolescents can best be explained by examining a variety of biologic, sociocultural and intrapersonal factors that influence behavior. The present study evaluated the relationship among depression, smoking resistance self efficacy, social support and smoking behavior among older adolescents.

Empirical studies of smoking behavior

When viewed chronologically, the empiric literature reflects an ontological divide on the relative importance of peers versus familial influence in adolescent smoking initiation. The essential debate was summarized by Conrad, Flay and Hill's (1992) meta-analysis of 27 studies of smoking initiation dating from 1980. This review identified 300 measures of predictors of smoking behavior. Antecedents and co-variates identified by the Conrad et al. review were grouped into categories of: (a) social bonding: including family peer and school relationships, (b) social learning: including family smoking, family approval, prevalence estimates and offers and availability of cigarettes, (c) intra-personal/personality/self image: including locus of control, tolerance of deviance, curiosity, social helplessness, emotional well being, risk taking and rebelliousness, (d) refusal skills, (e) knowledge, attitudes and behaviors: including intention to smoke.

Conrad et al. (1992) identified over 200 factors that predicted smoking initiation. The factor with highest predictive value was refusal skill self efficacy. Conrad et al. made several recommendations for future research. They suggest that future research be theory driven and theory testing, use proven methods of reliability and validity, report analysis of scale properties and use appropriate statistical methodology. This study addressed all of these recommendations. Additionally, Conrad et al. recommend that future research among adolescents, and resultant interventions, should be targeted to peers, consistent with their belief that peer relationships are stronger than family bonds. Others would not

agree with Conrad et al.'s assessment; they argue that the relationships of peer

influence and parental influence are not mutually exclusive but are intricately

related to the developmental level of the adolescent (Bradley & Corwyn, 2001;

Hogan, 2000; Nolte, 1983; Orr & Ingersol, 1995, Simons Morton et al., 1999).

Early attempts at smoking prevention and cessation programs predicated solely

on the importance of peer influence for smoking have met with marginal success.

Simantov et al. (2000) offer the following explanation. Simantov et al. argue that

parental influences and stressful life experiences of adolescents are an essential

contributor to adolescent tobacco use. In a national study of over five thousand

young adolescents in grades 5-12, Simantov et al. found that parental support

was protective of health risk behaviors for both boys and girls. Simantov et al.

report stressful life events and childhood abuse are factors that contribute to

smoking behavior. Additionally, they found that factors that influence smoking

initiation and continuation also differ by gender. Among girls in the study, family

violence, stressful life event and depression were strongly associated with risk for

regular smoking. The authors suggest that the association of negative life events

in childhood and later initiation of tobacco use may differ by gender and

recommend further inquiry into the association of negative life events and

tobacco use. The direction of the relationship between antisocial behavior and

smoking remains unclear, yet one study suggests that delinquent behavior may

precede smoking initiation. Kandel et al. (2004) report that delinquent behavior

(defined as 14 incidents within 12 months such as stealing, fighting or damaging

property) was a strong predictor of smoking initiation both at baseline (OR= 1.06
[1.05,1.08], P< 0.001) and time 2

(OR=1.04 [1.03, 1.06], p < 0.001).

The common thread among these divergent perspectives is the influence
of the social network of the adolescent. The present study builds on the
recommendations of prior research; it examined the nature of social support as
described by the adolescent and measured the effect of social support on
smoking behavior.

In addition to the extramural social network in which the child resides,
there is the domain of the intrapersonal attributes of the individual. Research has
examined the role of intrapersonal factors on the development of smoking
behavior. Kear (2002) examined psychosocial determinants of cigarette smoking
among college students. Kear tested an apriori model based on the Theory of
Triadic Influence. The sample included 224 college students ranging in age from
17-25 years. Participants completed an anonymous internet survey. Instruments
included the Lawrance (1989) Smoking Resistance Self Efficacy Scale, The
Arnett Inventory of Sensation Seeking, the Center for Epidemiological
Depression Scale, and an Index of Social Normative Beliefs specific to cigarette
smoking. Kear reported Smoking Resistance Self Efficacy (SSE) had the highest
impact on smoking behavior ($r = -.840$, beta = $-.819$; $t = -20.515$, $p < .05$). Of the
four indices measured, SSE was the only predictor with a statistically significant
direct effect on smoking behavior. In addition, Kear conducted a brief qualitative
survey to assess why college students smoked or did not smoke. Fifty one

percent of smokers cited 'curiosity' as the leading reason for trying cigarettes. Among non-smokers, health concerns and characterization of smoking as "gross" were cited reasons for smoking avoidance.

Similarly, Goodman & Capitman (2000) were interested in the intrapersonal aspect of smoking behavior. Goodman & Capitman assessed the nature and direction of the relationship between cigarette smoking and depression in a large population of teens. This prospective study measured depression using the Center for Epidemiologic Studies Depression Scale (CES-D) at baseline and one year follow up. A sample of 8704 teens identified as not depressed and 6947 teens identified as having high depressive symptoms were tracked after a one year time lapse. Goodman and Capitman (2000) report the single best predictor of moderate to heavy smoking behavior is having experimented with cigarettes in the past (OR:3.04 [1.93, 4.88], $p< 0.05$). Jarvelaid (2004) also studied the relationship of smoking behavior and psychosocial health risk factors. Jarvelaid measured depressive symptoms using the Beck Depression Inventory (BDI) in 997 Estonian school children ranging in age from 14-18 years. Like Simantov et al., Jarvelaid also found gender differences. Results revealed that smoking behavior among girls was associated with a mean BDI score above 9 indicative of high depressive symptoms (OR= 2.6; [1.6, 4.4], $p < 0.05$). Jarvelaid cautions that while smoking is certainly a health compromising behavior, it is also an indicator for probable depressed mood. What remains unclear is the causal relationship of smoking and depression. Jarvelaid suggests that, in particular, girls who smoke may be high

risk for suicide (OR= 2.4; [1.1, 2.2], p < 0.05). Jarvelaid's research also mirrors the earlier findings of Simontov et al. The importance of parental influence was clear: a significant positive correlation was found between parental and child smoking both for mothers (OR= 2.0, [1.2 – 2.2], p < 0.05) and fathers (OR= 2.5[1.4, 2.8], p< 0.05). Among respondents who smoked daily, 72% reported having both parents as smokers. In contrast, among children who smoked, 6% of females reported non-smoking parents and 9.5 % of male smokers reported non-smoking parents.

Prospective study of a cohort of adolescents is complex. Jarvelaid's longitudinal design illustrates a sample bias germane to all smoking behavior research; that is 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). Attrition of subjects is particularly problematic in longitudinal design. Commonly, this is due to change in residence or school with advances in grade level. Longitudinal studies report a loss of the sample to absence, attrition, refusal; or inability to locate the subject. 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! Some researchers have attempted to address this concern by eliminating parental consent. It has been argued that in order to fully understand the scope of adolescent smoking

behavior among children younger than 18, that participation should not require parental consent (Seversen & Biglan, 1989). In theory, the exclusion of parental consent has merit. Children who smoke may fear the consequence of their parent's discovery of their smoking behavior. Some small qualitative studies of smoking behavior among adolescents who express a desire to stop smoking have used this design; however, such methods invite ethical debate regarding a population of vulnerable human subjects. In an effort to rise above ethical questions of appropriate treatment of vulnerable human subjects, the proposed study will recruit adolescents over the age of 18 who volunteer for the study. It is acknowledged that smokers are perhaps more likely to be among the population opting out of the study population. This method is consistent with sampling methods prevalent in the literature.

In summary, there is substantial empirical support for the unique and complex nature of adolescent smoking behavior as reported by several investigators (Conrad et al., 1992; Goodman & Capitman, 2000; Hogan, 2000; Jarvelaid, 2004; Kandel et al., 2004; Kear, 2002). Integrated review of the state of the science demonstrates that Smoking Resistance Self-Efficacy (SSE) is a statistically significant variable that influences smoking behavior (Conrad et al., 1992; Simontav et al., 2000). Both depression and social support are also correlated with adolescent smoking behavior (Jarvelaid, 2004). The present study examined the relationships between (a) social support and smoking behavior and (b) depression and smoking behavior as mediated by SSE.

Empirical studies of smoking resistance self efficacy and smoking behavior

A review of the published empiric literature of smoking behavior yields few studies that are theoretically congruent with Bandura's conceptualization of self efficacy. Bandura (1997) emphatically defends self efficacy as both situation and task specific and maintains that generalized scales of self efficacy are not theoretically sound. Many studies purport to measure self efficacy but, upon review, do not meet the criteria for operational adequacy (Fawcett, 1999). Following is a discussion of studies that have met Bandura's criteria.

Kear (2002) examined psychosocial determinants of cigarette smoking among college students. Kear tested an a priori model based on the Theory of Triadic Influence. The sample included 224 college students ranging in age from 17-25 years. Participants completed an anonymous internet survey. Instruments included the Lawrance (1989) Smoking Resistance Self Efficacy Scale, The Arnett Inventory of Sensation Seeking, the Center for Epidemiological Depression Scale, and an index of Social Normative Beliefs specific to cigarette smoking. Smoking Resistance Self Efficacy had the highest impact on smoking behavior ($r= -.840$, beta= $-.819$, t= -20.515, $p< .05$). Additionally, of the four indices measured, SSE was the only predictor with a statistically significant direct effect on smoking behavior. Kear (2002) reported depression has a statistically significant indirect effect on smoking behavior mediated by smoking self efficacy. There was an inverse relationship between depression and resistance self efficacy reflected by high scores on the depression scale associated with low scores on the smoking self efficacy scale (total effect = - 0.249 , $p< .05$).

Haukkala, Uutela, Vartianen, McAlister, and Knekt (2000) examined the relationship among cessation self efficacy, depression and smoking behavior in a sample of 3403 Finnish men and women ranging in age from 25-64. Depression was measured using the Beck Depression Scale (BDI). Smoking cessation self efficacy was evaluated by asking respondents "If you try to quit smoking do you think you would be successful? (No/Yes/Not Sure)." Smoking behavior was assessed by asking the open ended question "how many cigarettes do you smoke on the average, daily?" Haukkala et al. report 10% of smokers in the sample scored as moderate or severely depressed compared with 7% among never smokers and former smokers ($p < 0.05$). Higher depression scores were related to lower smoking cessation self efficacy, especially among male smokers (OR= 0.63 [0.45, 0.90], $p< 0.05$).

Engels, Hale, Noom, and DeVries (2005) examined self efficacy and emotional adjustment as precursors of smoking in early adolescence in a prospective study of 1861 children ranging in age from 12-13 years. Questionnaires were administered at baseline and six months after baseline. Self efficacy was measured using 6 items abstracted from a larger self efficacy tool with a Chronbach alpha of 0.85. Among smokers, Engels et al. (2005) report "robust associations" between low self efficacy and smoking behavior (β= -.032, $p< 0.001$ boys; β= 0.26, $p< 0.001$, girls). In addition low levels of self efficacy were related to higher likelihood of smoking at Time 2, reflective of the predictive nature of smoking resistance self efficacy. No gender differences were found for smoking resistance self efficacy.

In summary, empiric research has consistently demonstrated a strong to moderate negative relationship between smoking resistance self efficacy and smoking behavior among adolescents (Engels et al., 2005; Haukkala et al., 2000; Kear, 2002). These finding support the theories that propose a relationship between these variables (Bandura, 1977; Condiotte & Lichtenstein, 1981; DiClemente, 1981; DiClemente et al., 1985; Gulick et al., 1991). The present study will examined the relationship between Smoking Resistance Self Efficacy (SSE) and (a) social support, (b) depression and (c) smoking behavior in a sample of older adolescents. Since previous research identified the relationship as moderately strong, SSE was examined as a mediator of the relationship between (a) social support and smoking behavior and (b) depression and smoking behavior (Baron & Kenny, 1986; Kenny, 2007).

Theories of social support

Social support is a multidimensional construct having both qualitative and quantitative dimensions encompassing both subjective and objective perceptions. The evolution of social support begins with Weiss' (1974) conceptualization of social support as a dynamic interplay of six categories of relational provisions "each ordinarily associated with a particular type of relationship" (Weiss, 1974, p.23). These categories include: (1) attachment: attachment is experienced within close familial or significant other relationships; (2) social integration: characterized by a reciprocal network that shares common concerns and provides social engagement; (3) opportunity for nurturance: common to the experience of adults with responsibility for children's well being;

(4) reassurance of worth: provided by relationships which confirm an individual's social competence in a social role such as work relationships; (5) a sense of reliable alliance: provided by persistent familial relationships; (6) obtaining guidance: important to persons at times of stress, this relates to relationships an individual has cultured with an authoritative individual who can provide emotional support and assist in developing plans of action.

Brandt and Weinert (1981) reflect on Cobb's (1976) conceptualization of social support as the person's perception that they are loved, esteemed and a member of a network of mutual obligation. Additional conceptualizations also include the importance of exchange of goods, services, emotional comfort, intimacy, assistance, problem solving and enmeshment in the local community (Caplan, 1974, Lin, Dean, & Ensel, 1977).

Bruhn and Philips (1984) emphasize the theoretical underpinning of social support. They characterize social support as (1) dynamic: its form and quantity change over time; (2) interactive: having both qualitative and quantitative dimensions that must be simultaneously considered, (3) available: the individual must perceive its availability for it to be used, (4) developmental: changeable with life situations.

Kahn and Antonucci (1980) elaborated on Weiss (1974) conceptualization of social support; in their view, social support is a network of interpersonal transactions which provide affirmation of a person's value and provision of assistance. Three key elements of social support are: affect, aid and affirmation.

House (1981) identified four dimensions of social support : (1) emotional: providing empathy, encouragement and understanding, (2) instrumental: behaviors that provide direct help in time of need; (3) informational: advice, directives or information that can facilitate coping with personal and environmental problems and (4) appraisal: behaviors that transmit information that can be relevant to self evaluation.

In sum, the theories of social support can be categorized as emanating from three related paradigms: stress and coping, social constructionist, and qualities of social relationships. Each of these three paradigms further elucidates social support in terms of whether social support is stress buffering or has direct effects on health outcomes. Some experts maintain the conceptualization of social support can be further refined as contextually specific (Gigliotti, 2006; Murray, 2000; Williams, Barclay, & Schmied, 2004).

Social support has been theorized to be antecedent to positive health practices (Langlie, 1977; Cohen & Syme, 1985). Among adolescents, social support contributes to positive health practices (Cannella, 2006; Diorio, Faherty & Manteuffel, 1992; Mahon & Yarcheski, 1998; Mahat & Scoloveno. 2001; Mahat, Scoloveno & Whalen, 2002; McNicholas, 2002; Yarcheski, Mahon, & Yarcheski, 2004). Resistance to smoking cigarettes is a form of positive health practice. Elder et al. (2000) report that social support is predictive of tobacco use among adolescents.

Empirical studies of Social Support and Smoking Behavior

A number of researchers have examined the relationship between social support and smoking behavior among older adolescents: Weinrich (1996) examined the relationship between smoking behavior under stress and social support in a sample of 1168 high school aged adolescents. Respondents completed a 174 item survey which included measures of depression and social support. Social Support was measured using the Carolina Adolescent Social Support Inventory (SSI). The researchers reported adolescents with less social support were more likely to smoke when under stress (OR= 0.81[0.75, 0.87], p< 0.05).

Kandel et al. (2004) conducted a one year longitudinal study in which they measured depressive symptoms, parental support and smoking behavior in a national sample of 12,158 adolescents in grades 7-12. Smoking behavior was restrictively defined as one cigarette per day over the past thirty days prior to interview 2. This definition is inconsistent with known patterns of cigarette use by adolescents; it is incongruous with the CDC definition of smoking ("ever-smoked in the past thirty days"). Depression was measured using the Center for Epidemiologic Studies –Depression Scale (CES-D) and social support was measured using a parent connectedness scale designed for the study. Kandel et al. report that parent child connectedness is protective both for smoking behavior at baseline (OR= 0.74[0.63,0.87], p<0.001) and for smoking initiation one year later (OR = 0.64[0.55-0.74], p<0.001).

Vogel et al. (2003) examined smoking behavior in a sample of 98 high school and college aged adolescents. Vogel et al. did not begin with the intention of studying social support but the results point to the importance of social support as a construct of interest in this area of inquiry. Vogel et al. investigated the relationship of depression to adolescent smoking behavior using the MDI measure of depression which identifies depression and it's source. The MDI has ten subscales reflecting the theoretical aspects of the construct: Low Energy, Cognitive Difficulty, Guilt, Low Self Esteem, Social Introversion (social withdrawal and feelings of social isolation), Pessimism, Irritability, Sad Mood, Instrumental Helplessness (actively eliciting help or sympathy from others but finding it lacking) and Learned Helplessness. Vogel et al. found that adolescents who reported an inability to feel connected to their family or others were more likely to smoke. In step-wise regression, only the subscales reflecting the alienating aspects of depression (social introversion [R^2 = .0243] and instrumental helplessness [R^2 = .0243]) were statistically associated with smoking. Vogel et al.'s study lends support for the relationship of social support to smoking behavior and illustrates the connection between social support and depression. While these are two separate constructs, in the absence of social support, an individual is at higher risk for depression. As previously noted, older adolescents, in particular college students are uniquely vulnerable to a lack of social support.

In summary, there is substantial support in the empiric literature for a moderate negative relationship between smoking behavior and social support

(Kandel et al., 2004; Vogel et al., 2003; Weinrich, 1996). These findings support the theories proposing a relationship between the variables. The present study examined the relationship between social support and smoking behavior in a sample of older adolescents. Additionally, the present study examined the role of SSE as a mediator of the relationship between social support and smoking behavior.

Empirical studies of SSE and social support

There is limited empiric research specific to the relationship of SSE and social support. There is a need for rigorous study of these constructs. The present study contributes to the state of the science by describing and measuring the relationship of SSE to social support.

Empiric studies of self efficacy and social support

While studies specific to SSE and social support and rare, there are studies that examine other contextual applications of self efficacy as it relates to social support. This is congruent with Bandura's conceptualization of self efficacy as context specific. DiIorio et al. (1992) examined the relationship of self efficacy and social support to self management in individuals with epilepsy. The sample included 98 individuals ages 17-66 years who experienced seizures and were managing epilepsy. Participants completed the Personal Resource Questionnaire PRQ-2 (Brandt & Weinert, 1981), the Epilepsy Self Efficacy Scale (ESES), and the Epilepsy Self Management Scale (ESMS) (DiIorio et al., 1992) The results revealed self efficacy was positively correlated with self management

(r=.50, p < 0 .0001) and social support was positively correlated with self management (r= .17, p= .045). DiIorio et al. suggest that the small positive correlation between social support and self management bears further investigation and that the interaction of social support and self efficacy is theoretically grounded and requires empiric testing. The present study tested the relationship of SSE and social support.

Smoking self efficacy

A review of the literature yielded only one study of college students that examined self efficacy and social support. Von Ah, Ebert, Ngamvitro, Park, and Kang (2004) examined a range of specific self efficacy behaviors and social support in a cross sectional sample of 161 college students. The authors found a strong positive association between self efficacy and smoking behavior [$F(4, 84) = 10.6$, $p < .0001$] but a strong negative correlation for all other measured health risk behaviors. The authors suggest that this unpredicted result warrants further investigation of the psychometrics of the instruments. (The authors used a newly developed tool for this study). The present study used established measures of the intended constructs with well documented reliability and validity.

In summary, there is strong support in the theoretical and empiric literature for the nature and direction of the relationship between social support and positive health practices. The belief that one can resist smoking cigarettes (SSE) and the resultant avoidance of this behavior is a form of positive health practice. Smoking resistance self efficacy is a type of positive health practice. Lawrance

and McLeroy (1986) maintain that self efficacy is so strongly linked to behavioral performance that it can serve as a substitute measure of behavior change resulting from health education programs. There is a need for further research measuring both SSE and smoking behavior in relation to social support. The present study aimed to contribute to the state of science by measuring smoking behavior and smoking resistance self efficacy (SSE) in a population of older adolescents. Further, the relationship between these variables was examined and statistically analyzed.

Empirical studies of depression and smoking behavior

There is strong support in the empiric literature for the relationship of smoking behavior and depression. What remains unclear however, is the temporal direction of this relationship. Over the past decade, research has emphasized the importance of examining this seemingly circuitous relationship.

Escobedo and Kirch (1996) were among the first to examine the relationship between smoking behavior and depression. The cross-sectional sample was comprised of 5090 Latinos of Mexican, Cuban and Puerto Rican ancestry residing in the U.S. Depression was measured by two instruments: the Center for Epidemiologic Studies –Depression Scale (CES-D) and the Diagnostic Interview Schedule, which is based on personal interview. Escobedo and Kirch examined smoking behavior as a covariant of depression. They found that among children less than 12 years of age, depressed mood was a statistically significant predictor of smoking initiation (OR = 1.6 [1.2, 2.2], $p< 0.05$). Among adolescents, only major depression was predictive of smoking behavior

(OR= 2.0 [1.3, 3.1], p< .05). Among young adults (ages 19-35 years) both depressed mood and major depression were predictive of smoking behavior (OR= 1.5 [1.1, 2.2], p< 0.05 and 2.2 [1.7, 2.9], p< 0.05; respectively). Escobedo and Kirch posit that the relationship between smoking and depression occurs early in life and may be causal in nature. They suggest that future research be prospective to assess the direction of this relationship.

The findings of Escobedo and Kirch (1996) were recently supported when Poulin et al. (2005) measured depression in 12,771 Canadian Junior and Senior High school students. The students' mean age was 15.2 years; depression was measured using a version of the Center for Epidemiological Studies – Depression scale: the Student Drug Use Survey in the Atlantic Provinces. This scale is reported to inform on the risk of clinical depression. Cigarette smoking was measured by categorizing self report of smoking behavior into three patterns: no smoking, smoking 10 or fewer cigarettes per day and smoking more than 10 cigarettes per day, reported by 76%, 18% and 4% of students respectively. Among males, 29.6% of adolescents smoking more than 10 cigarettes per day had depressive symptoms (CI= 99%, OR= 1.88; p< .001). Of male adolescents who smoked between 1-10 cigarettes daily, 24.8 % reported depressive symptoms (OR= 2.38, p< .001). Despite these alarming statistics, Poulin et al. (2005) reported that cigarette smoking is a predictor for depressive symptoms in females only. For females, this breakdown was further stratified according to level of depressive symptoms: 45% of adolescent females who smoked more than 10 cigarettes/day exhibited somewhat elevated depressive

symptoms (RRR= 2.47, +- 10.1; CI= 99%; p< .001). Thirty-five percent of adolescent females who smoke less than 10 Cigarettes/day exhibited elevated depressive symptoms (CI= +/- 4.1; 99% CI; p< .001). Additionally, the authors suggest there is an unmet need for help for depressive symptoms in adolescents as only 10 % of children with identified depressive symptoms sought help.

The CES-D is a widely used instrument; however, when comparing studies that use it, results are often inconsistent. For example, Tercyak, Goldman, Smith & Audrin (2002) examined depression and smoking behavior using the CES-D in a sample of 1123 high school freshman. Forty percent of the sample reported a history of past or current smoking behavior. Depression was not found to be a statistically significant predictor of smoking behavior (OR 1.39, [0.95, 2.05], p= .09). Tercyak et al. caution that the CES-D is not intended to diagnose clinical depression; also, as previously noted, the exclusion of non-consenting members of the student body who were not studied may have changed the findings. Additionally, absentee students were excluded from the study. It is probable that depressed students may be absent more than non-depressed students, or, if present, be less willing to participate; therefore, the sample may not have been representative of the intended population. Another reason that studies using the CES-D yield surprising results may be, in part, related to the semantic clarity of the instrument (Fawcett, 1999). The theoretical congruency of the CES-D is not well documented. It should be noted however, that one possible explanation for the popularity of the CES-D is that it is widely

published and available for use without copyright fees. The cost of other

instruments may be burdensome to large sample studies.

An example of an instrument that meets the criteria for semantic clarity is

the Beck Depression Inventory (BDI-II). The BDI-II has been used to measure

depression among adolescents. The BDI-II is also an example of an instrument

with substantial copyright cost. Jarvelaid (2004) examined the relationship

between smoking behavior and psychosocial health risk factors using the BDI in

a sample of 997 Estonian school children ranging in age from 14-18 years.

Results revealed that smoking behavior among girls was associated with a mean

BDI score above 9 indicative of high depressive symptoms (OR= 2.6; [1.6, 4.4],

p< 0.05). Jarvelaid cautions that while smoking is certainly a health

compromising behavior it is also an indicator for probable depressed mood.

Jarvelaid suggests that in particular, girls who smoke may be high risk for suicide

(OR= 2.4 [1.1, 2.2], p<0.05). (The BDI-II will be discussed at length in chapter

three of this proposal.)

There have been several longitudinal studies of note that provide strong

support for the relationship of smoking behavior and depression. Kandel et al.

(2004) conducted a longitudinal study over one year in which they measured

depressive symptoms, parental support, smoking initiation and smoking behavior

one year. The large national sample of 12,158 students in grades 7-12 is

considered a strength of the study however, smoking behavior was defined as

one cigarette per day over the past thirty days prior to interview 2. This is an

unusual and limiting definition given the patterns of cigarette use by adolescents

and is more restrictive than the CDC definition of smoking (The CDC definition is "ever-smoked in the past thirty days".) Depression was measured using the Center for Epidemiologic studies –Depression Scale (CES-D). Kandel et al. reported depressive symptoms as strongly predictive of transition to smoking at time 2 (OR= 1.03 [1.02,1.04], p<.001).

Killen et al. (1997) measured depressive symptoms and smoking behavior among two longitudinal cohorts of never-smoking Californian high school students (N= 1026). Yearly assessments were performed. Cigarette smoking was a dichotomous variable assessed as ever smoked even one puff. Depression was measured using the Center for Epidemiologic Studies – Depression Scale (CES-D). Depressive symptoms were significantly predictive of smoking behavior among never smoking boys ([chi square] (1,481) = 7.84, p< .01).

Goodman and Capitman (2000) assessed the nature and direction of the relationship between cigarette smoking and depression among teens. This prospective study measured depression using the Center for Epidemiologic Studies Depression Scale (CES-D) at baseline and one year follow up. A sample of 8704 teens identified as not depressed and 6947 teens identified as having high depressive symptoms were tracked after a one year time lapse. Goodman & Capitman (2000) report, that among baseline non-smokers, high depressive symptomatology at baseline was predictive of a two fold increase in the odds of moderate to heavy smoking at one year follow up (OR= 4.0 [1.82, 8.82], p< 0.05). The single best predictor of moderate to heavy smoking behavior is having

experimented with cigarettes in the past (OR: 3.04 [1.93, 4.88], p< 0.05).

Goodman and Capitman suggest that depression in adolescents is complex and

dynamic and should include psychosocial co-morbidity variables such as abuse

history and psychological traits and states. The study suggests that the effect of

nicotine on noradrenergic receptors receptor systems bears further investigation.

The author cites the recent success of the efficacy of antidepressants in smoking

cessation programs and recommends future studies incorporate this biologic

component of nicotine addiction.

In sum there is substantial empiric evidence to support the theories

purporting a relationship between smoking behavior and depression. The

present study examined the relationship of depression to smoking behavior and

SSE. Additionally, the study examined the role of SSE as mediator of the

relationship between depression and smoking behavior in a population of older

adolescents. The present study is unique in that it incorporates a discrete

population of older adolescents not currently tracked by the US Youth Risk

Behavior Surveillance System. The population from which the sample was

selected has a dramatically higher smoking rate than the average resident of

New York City. Additionally, among the same population, incidence of both

depression and substance abuse is also high. This study examined the

relationship among these variables.

Empirical studies of SSE and depression

Several researchers have examined the relationship between SSE and

depression. Haukkala et al. (2000) examined the relationship among cessation

self efficacy, depression and smoking behavior in a sample of 3403 Finnish men and women ranging in age from 25-64. Depression was measured using the Beck Depression Scale (BDI). Smoking cessation self efficacy was evaluated by asking respondents "If you try to quit smoking do you think you would be successful? (no/Yes/Not Sure)." Smoking behavior was assessed by asking the open ended question "how many cigarettes do you smoke on the average, daily?". Haukkala et al. report 10% of smokers in the sample scored as moderate or severely depressed compared with 7% among never-smokers and former-smokers ($p< 0.05$). Higher depression scores were related to lower smoking cessation self efficacy, especially among male smokers (OR= 0.63 [0.45, 0.90], $p< 0.05$). The findings of this study are unique in that depression among male smokers was a significant finding. Other studies have reported gender differences in both SSE and report of depression. The present study used the BDI-II which is a highly sensitive instrument which identifies gradients of depression and is designed to correlate with DSM-IV criteria for depression.

Engels, et al., (2005) examined self efficacy and emotional adjustment as precursors of smoking in early adolescence in a prospective study of 1861 children ranging in age from 12-13 years. Questionnaires were administered at baseline and six months after baseline. Depression was measured using the Depressive Mood List of Kandel and Davies (1982). Self efficacy was measured using 6 items abstracted from a larger self efficacy tool with a Chronbach alpha of 0.85. Engels et al. (2005) reported that higher depressive mood and low self

efficacy are related to increased levels of smoking. In general, girls reported higher levels of depressed mood than boys (t= 4.51, p< .001). Depression was significantly associated with smoking at Time 2 (β= 0.07, p < 0.05, for both girls and boys). No gender differences were found for smoking resistance self efficacy. However, among smokers, Engels, et al. (2005) report "robust associations" between low self efficacy and smoking behavior (β= -.032, p < 0.001 boys; β= 0.26, p < 0.001, girls).   In addition, low levels of self efficacy were related to higher likelihood of smoking at Time 2, reflective of the predictive nature of smoking resistance self efficacy. Engels et al. suggest the emotional aspects of adolescent development are integral to smoking behavior as a coping mechanism for ameliorating feelings of depression and emotional maladjustment. The researchers stated that girls are more at risk of poor emotional adjustment than are males.

Kear (2002) examined psychosocial determinants of cigarette smoking among college students. Kear tested an a priori model based on the Theory of Triadic Influence. The sample included 224 college students ranging in age from 17-25 years. Participants completed an anonymous internet survey. Instruments included the Lawrance (1989) Smoking Resistance Self Efficacy Scale, The Arnett Inventory of Sensation Seeking, the Center for Epidemiological Depression Scale, and an Index of Social Normative Beliefs specific to cigarette smoking.

Kear (2002) reports smoking resistance self efficacy (SSE) had the highest impact on smoking behavior (r= -.840, β= -.819, t= -20.515, p= .000).

Additionally, of the four indices measured, SSE was the only predictor with a statistically significant direct effect on smoking behavior. Kear (2002) reported depression has a statistically significant indirect effect on smoking behavior mediated by smoking self efficacy. There was an inverse relationship between depression and resistance self efficacy reflected by high scores on the depression scale associated with low scores on the smoking self efficacy scale (total effect = -.249, p< .05).

In summary, there is moderate support in the literature for the relationship of depression and SSE among children, adolescents and young adults. There is limited but strong support in the literature for the role of SSE as mediator of the relationship between depression and smoking behavior. Further research that is developmentally specific is needed. The present study measured the relationship between depression and smoking behavior in a population of older adolescents in an effort to contribute to the state of the science. This study examined the role of SSE as a mediator of the relationship between depression and smoking behavior. This has not been previously reported in the available literature.

Theoretical Rationale

Smoking behavior is an outcome variable defined as smoking one lifetime cigarette. Over 75% of all high school students report this behavior. Further, smoking behavior can be described as (a) current smoker: having smoked one cigarette in the past thirty days (CDC) or (b) past smoker: having smoked more than one cigarette in one's lifetime but not in the past thirty days. In the

proposed study, the CDC definition of smoking behavior will be applied in examining a sample of older adolescents ages 18-21 years.

SSE has been postulated to be directly related to smoking behavior (Lawrance & McLeroy, 1986). Lawrance and McLeroy (1986) maintain that self efficacy theory has remarkable ability to predict behavior. Lawrance and McLeroy maintain that self efficacy is so strongly linked to behavioral performance that it can serve as a substitute measure of behavior change resulting from health education programs. Several researchers have supported the proposition that SSE is related to smoking behavior in various samples. Theorists (Bandura, 1977,1997; Condiotte & Lichtenstein, 1981; DiClemente, 1981; DiClemente et al., 1985; Gulick et al., 1991; Kear, 2002) have proposed a negative relationship between smoking behavior and smoking resistance self efficacy (SSE); that is, those with high SSE will have a lower likelihood of engaging in smoking behavior. Relationships between SSE and smoking behavior are strong.

Mediational model one: Social Support

Theory

Social support is conceptualized as the interplay of six relational provisions*:* (a) attachment, (b) social integration, (c) opportunity for nurturance, (d) reassurance of worth (e) a sense of reliance, and (f) obtaining guidance and information in stressful situations (Weiss, 1974). Norbeck (1985) defines social support in the context of three domains: functional, network and loss. Social support bears a theoretical relationship to self efficacy (Bandura, 1997).

Empirical studies have provided support for the relationship between social support and positive health practices. DiIorio et al. (1992) found that self efficacy was a predictor of health behavior. Mahon et al. (1998) report a moderately strong relationship between social support and positive health practices. Canella (2006) found a positive relationship between social support and positive health practices. The avoidance of smoking behavior is a form of positive health practice.

Empirical studies have provided support for the relationship between SSE and social support (Von Ah et al., 2004). A number of researchers (Weinrich, 1996; Kandel et al., 2004) proposed that social support (SS) influences smoking behavior. Individuals with more social support are less likely to engage in health compromising behaviors. Several research studies have supported the relationship between SS and smoking behavior.

Based on theory and published empiric research, the relationships posited in the mediational model suggest that SS is negatively related to smoking behavior and positively related to smoking resistance self efficacy (SSE). SSE is negatively related to smoking behavior. In the proposed study, SSE is hypothesized to mediate and thereby help to explain the relationship between social support and smoking behavior.

Mediational model two: Depression

Review of the literature reveals depression as strongly linked to smoking behavior. Depression bears a theoretical relationship to smoking behavior (Goodman & Capitman, 2000). The temporal nature of the relationship between

smoking behavior and depression is unclear; the literature indicates that further research is needed in order to explicate the relationship. Some studies propose that depression precedes smoking behavior, others hypothesize that the neurochemical side effect of nicotine, and other active ingredients in cigarettes, contribute to depressive symptomatology. One possible mediator of the relationship between depression and smoking behavior is SSE. In addition, SSE is an internal property of an individual which is, by definition, a characteristic of a mediator (Baron & Kenny, 1986).

Beck (2005) conceptualizes depression as "the biased interpretation of events attributed to the activation of negative representations of the self, the personal world and the formation of the negative cognitive triad". Escobedo and Kirch (1996) posit that depression is bi-directionally related to smoking behavior. Poulin et al. (2005) theorize that the relationship of age and depression in adolescents is curvilinear and suggests that findings are dependent upon sensitive instruments.

Empirical studies in young adults and in adolescents have provided support for the relationship between depression and smoking behavior. Vogelet al. (2003) investigated the relationship of depression to adolescent smoking. This relationship has been supported by the research of others (Escobedo et al., 1996; Goodman & Capitman, 2000; Kandel et al., 2004; Killen et al., 1997; Poulin et al., 2005; Tercyak et al., 2002; Vogel et al., 2003).

Based on theory and empirical evidence, the relationships posited in the mediational model suggest that depression is positively related to smoking

behavior, and bears a negative relationship with SSE. In the proposed study,

SSE is hypothesized to mediate and thus help explain the relationship between

depression and smoking behavior among adolescents. That is, when considered

together with SSE, the relationship between depression and smoking behavior

significantly decreases.

Hypotheses

1. There is a negative relationship between Smoking Resistance Self
    Efficacy (SSE) and Smoking Behavior (SB). (With higher SSE,
    It is less likely that an adolescent will smoke).

2. There is a positive relationship between Smoking Resistance Self Efficacy
    (SSE) and Social Support (SS). (With high SSE, there is more reported
    social support.)

3. There is a negative relationship between Social Support (SS) and
    Smoking Behavior (SB). (With more reported SS, it is less likely that the
    adolescent will smoke.)

4. When Smoking Resistance Self Efficacy (SSE) is controlled for
    statistically, the relationship between Social Support (SS) and Smoking
    Behavior (SB) will diminish.

5. There is a negative relationship between SSE and Depression.
    (With higher SSE, there is lower depression.)

6. There is a positive relationship between Depression and Smoking
    Behavior. (With higher Depression, it is more likely that the
    adolescent will smoke.)

7. When SSE is controlled for statistically, the relationship between
    Depression and Smoking Behavior will diminish.

Smoking Resistance Self Efficacy

Social Support   +   Smoking behavior

Figure 1.

Mediational model of the relationship between Social Support and Smoking Behavior with Smoking Resistance Self Efficacy as the mediating variable
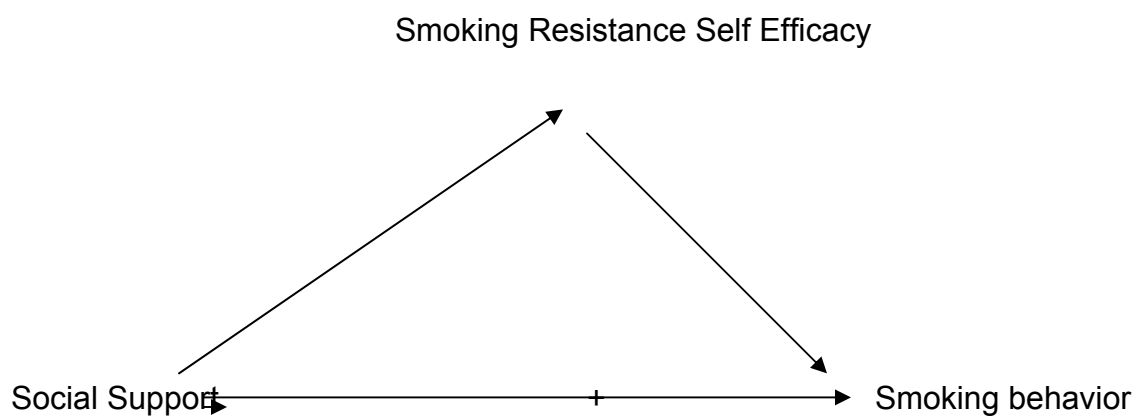
Smoking Resistance Self Efficacy

Depression   Smoking behavior
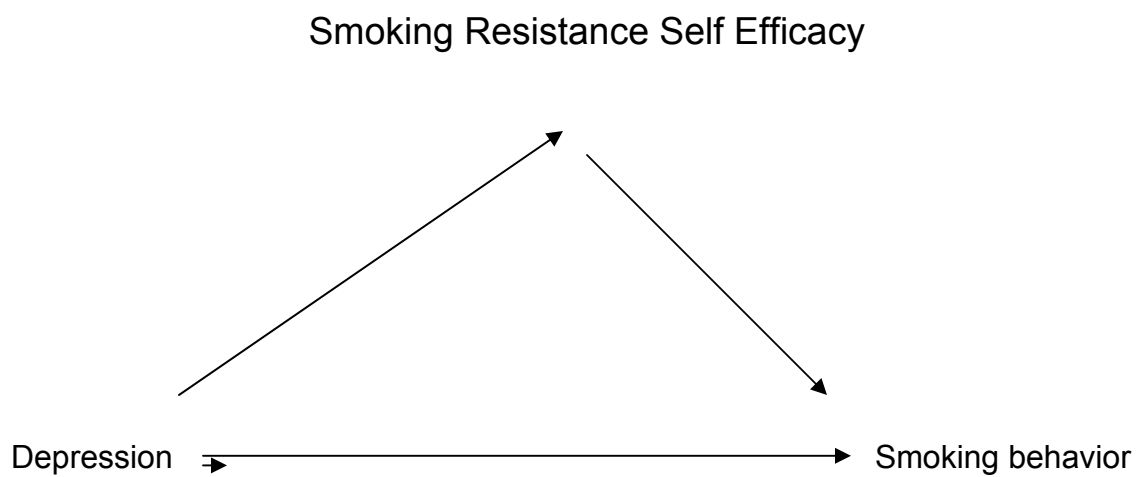
Figure 2. Mediational model of the relationship between depression and smoking behavior with Smoking Resistance Self Efficacy as the mediating variable

CHAPTER III

Methods

This chapter describes the methods of the present correlational study that examined the relationship between the dependent variable of smoking behavior and each of the independent variables of (a) smoking resistance self efficacy (SSE), (b) social support, and (c) depression. In addition, this study tested the relationship between SSE and each of the dependent variables of depression and social support. The study further examined two mediational models in which the role of SSE as a mediator of the variables of depression and social support was developed and tested through examination of theory and empirical research. Model one examined the relationship between social support and smoking behavior as mediated by SSE. Model two examined depression and smoking behavior as mediated by SSE.

This chapter includes a discussion of the (a) research setting, (b) sample, (c) instrumentation, (d) data collection methods and (e) data analysis.

Research setting

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 comprised of approximately 12,000 students. All data collection occurred on campus in classroom settings, during regular scheduled class times.

Sample

The convenience sample consisted of 364 adolescent college students between the ages of 18-21 enrolled in a credit-bearing required general education course entitled "Fitness for Life" at a large public comprehensive college in southern New York. In accordance with the mandate of the Institutional Review Board of the college where the sample was collected, all students enrolled in the course were invited to participate by completing the research questionnaire. In the final analysis, only those students who met the delimitations of the study were included in the analysis of data.

In determining the minimum sample size, the sample size was calculated using Cohen (1988) classical procedure for a priori power analysis and following both Baron and Kenny's (1986) and Kenny's (http://davidakenny.net/cm/mediate.htm retrieved on 9-11-07) recommendations for power analysis with mediational models. Specifically, it is recommended that in consideration of multicollinearity between the initial variable and the mediator, power is reduced. Also, in the final regression equation which looks at the relation between the initial variable and the outcome variable, when controlling for the mediator, the effect size of the initial variable is substantially reduced if the mediational model holds true. Finally, according to Baron and Kenny (1986) the number of hypotheses to be tested in each mediational model can increase the risk of making a type one error. Therefore, Kenny recommends using a Bonferroni correction; as a result the conventional alpha level of .05 has been reduced to .025. Thus with two predictors in each mediation model, a low effect

size of 0.10 was selected according to recommendation by Kenny

(http://davidakenny.net/cm/mediate.htm retrieved on 9-11-07), and the alphas

were conservatively set at .025. This resulted in a sample size of 76.

Additionally, since the outcome variable is dichotomous, sampling will continue

until a yield of both 76 smokers and 76 non smokers is achieved. Since the

expected ratio of non-smokers to smokers is approximately 3:1, it is expected

that there will be more nonsmokers in the total pooled sample. It was expected

that a minimum of 156 participants would be analyzed with a minimum of total

304 participants surveyed. The present study exceeded the minimum

expectation for sample size. The total sample was 364 students, with 99 self

identifying as smokers. Thus, the ratio of smokers to nonsmokers was within the

suggested limits (Kenny, 2007).

Instrumentation

PRQ 85 Part 2

The Personal Resource Questionnaire (PRQ 85 Part 2) was initially

developed by Brandt and Weinert (1981) to measure perceived social support.

Content validity of the PRQ 85 Part 2 is demonstrated by the emergence of the

PRQ 85 from Weiss (1974) conceptualization of social support assessing

relational provisions with five subscales measuring: (a) intimacy, (b) social

integration, (c) nurturance, (d) worth and (e) assistance (Brandt & Weinert,

1981). The PRQ 85 Part 2 is a 25 item 7 point Likert scale (1 *strongly disagree -*

7 strongly agree), self administered instrument (Brandt & Weinert, 1981). Total

scores range from 25-75 with higher scores representing greater levels of

perceived social support. Weinert and Brandt (1987) revised the PRQ to remove age references from items in the nurturance subscale.

Initial content validity of the PRQ was reported by Brandt and Weinert (1981). The instrument was reviewed by a team of three expert social support research professors to insure clarity of content and to ensure that the content domain was adequately represented. In addition, 15 experts categorized the dimensions according to Weiss' 5 relational provisions. Lastly, the instrument was piloted with adults from the community who were asked to provide feedback specific to the relevance of the scales. Brandt and Weinert (1981) report that revisions were made following each of these three validity procedures.

Brandt and Weinert (1981) describe the predictive validity of the PRQ 85 Part 2 with respect to family functioning and marital adjustment. The PRQ 85 Part 2 was correlated with two other instruments measuring family functioning and dyadic satisfaction/consensus. Correlation coefficients reported ranged between 0.30 to 0.44 ($p<.001$). Brandt and Weinert concluded that the validity coefficients indicate the predictive capability of the PRQ 85 Part 2 for marital adjustment and family functioning.

Construct validity was reported by comparison of the PRQ 85 Part 2 with the Self-Help Ideology measure (SHI). Three of the five subscales correlated in the expected direction with the SHI: intimacy ($r= -.25, p<.001$); assistance, ($r= -.23, p< .01$); social integration ($r= -.14, p< .05$). In a later study, Weinert and Brandt (1987) established construct validity of the PRQ 85 Part 2 in a sample of 100 adults aged 30-37. Construct validity was evidenced by statistically

significant correlations found between the PRQ-85 and the theoretically relevant variables of anxiety (r= -.37, p< .01); depression (r = -.42, p< .01); extroversion (r= .32, p< .01); and neuroticism (r= .28, p< .01).

Yarcheski, Mahon and Yarcheski (1992) reported construct validity of the PRQ in a sample of 325 adolescents ages 12-21. A principal components analysis with an oblique rotation demonstrated a four factor rotated solution explaining 48.9% of the variance. Factor I was described as Intimacy/Integration/ Assistance, factor II was a sense of alliance, factor III as Worth, factor IV as Nurturance. Weinert and Brandt (1987) postulated that nurturance is theoretically distinct from the other subscales and suggested that there may be only two theoretical distinct dimensions of the PRQ-85 Part 2: nurturance and a combination of intimacy, social integration, worth and assistance.

Relative to the reliability of the PRQ-85 part 2, Weinert and Brandt (1987) reported a coefficient alpha reliability of 0.89 for the total scale in a sample of 149 adults. In a sample of 100 adults with a test-retest reliability coefficient of r= .72; the coefficient alphas were reported at .93 and .91. Mahon and Yarcheski (1988) reported a coefficient alpha of .91 in a sample of 112 adolescents. Mahon and Yarcheski (1992) reported coefficient alphas of .89, .91, .89 for a sample of 113 early adolescents, 106 middle adolescents and 106 late adolescents, respectively. Yarcheski, Scoloveno and Mahon (1994) reported a coefficient alpha of .90 in a sample of 99 high school students aged 15-17. Yarcheski et al., (1997) reported a coefficient alpha of 0.89 in a sample of adolescents 15-21 years. Mahon et al. reported a coefficient alpha of 0.89 in a sample of young

adults ages 22-34. Mahat and Scoloveno (2001) reported a coefficient alpha of

0.76 in a sample of 101 Nepalese adolescent girls. Mahat et al., (2002) reported

a coefficient alpha of 0.74 in a sample of 65 adolescents ranging in age from 15-

17. Yarcheski et al. (2004) reported a coefficient alpha of 0.92 in a sample of

134 adolescents aged 12-14. Canella (2006) reported a coefficient alpha of 0.90

in a sample of 152 pregnant women between the ages of 20-40.

Beck Depression Inventory-II

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 are scored from 0- 3. Possible scores range from 0-63,

with higher scores reflective of greater depressive symptomatology.

The BDI II was developed to assess the criterion depressive symptoms in

the DSM IV. An earlier scale, the original BDI was developed in 1961 based on

symptoms reported frequently by individual identified as having depression (Beck

et al., 1996). The original scale underwent revision in 1971 which ultimately

resulted in the BDI-IA (Beck and Steer, 1996). In response to emergent research

and the enlightened state of the science regarding mental health and depression,

Beck and associates revised the BDI to reflect homogeneity with the DSM IV

criteria of depression. The resultant BDI –II represents 35 years of accumulated

psychometric data and clinical experience with the BDI and BDI-IA. Beck et al

(1996) reported a correlation of 0.93 ($p<$ .001), between the BDI-IA and the BDI-II in a study of 191 outpatients.

There is empiric evidence to support discriminate validity for the BDI-II. Depression is theoretically and empirically linked to anxiety and hopelessness. The BDI-II demonstrates correlations with other psychological tests. There is empiric evidence of convergent validity of the BDI-II with other instruments The BDI-II is positively correlated with the Beck Hopelessness scale ($r=$ .68; $p<$ .001) and the Beck Anxiety Inventory ($r=$ 0.60; $p<$ .001). Additionally, Beck et al, (1996) report robust discriminate validity between the BDI-II and the Hamilton Rating Scale for Anxiety($r=$ .47; T= 2.96, $p<$ .01).

Krefetz et al. (2002) reported a high correlation between the BDI-II and the Reynolds Adolescent Depression Scale($r =$ .84) suggesting evidence of convergent validity. Osman et al. (2004) reported the internal consistency coefficient of the BDI-II as 0.93 in a sample of 408 inpatient adolescents.

BDI-II and college population

To determine the usefulness of the BDI-II in a "comparative normal" group, the psychometric properties of the BDI-II were tested following administration of the tool to a population of 120 college students enrolled in an introductory college psychology course at the University of New Brunswick in Canada (Beck et al., 1996, p. 15). Fifty six percent of the sample was women and 44% were men. The mean age was 19.58 years. The students completed the BDI-II in a standard classroom setting (Beck, et al., 1996). The range of corrected item total correlations for the student sample was .27 (Loss of Interest in Sex) to 0.74 (Self

Dislike). Item-total correlations were reported as well beyond the .05 level using a one tailed test.

Reliability for the BDI-II among college students is 0.93 (Beck, 1996). The internal consistency of the BDI- was reported 0.86 in a population of non referred high school students (Moilanen, 1995). Oksoo (2002) reported a Chronbach alpha of 0.88 in a population of 434 Korean college students ranging in age from 18-28 years. In a sample of Puerto Rican adolescents ranging in age from 13-18 years of age the reported alpha coefficient was 0.88 (Rivera, Bernal & Rossello, 2005).

Lawrance Smoking Self Efficacy Scale

The Lawrance Smoking Self Efficacy scale (SSE) is a 36 item self administered tool which measures perceived self efficacy of an individual to resist smoking cigarettes. The SSE is based on the conceptualization of smoking resistance self efficacy as a predictor of health behavior (Condittte & 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 activates that might trigger the desire for a cigarette such as studying, watching TV or waiting. Of 36 factors, 29 have factor loadings of .6 or greater. The Lawrance scale was originally developed for use with middle school

children and was adapted for college students by Kear with permission and consultation from the author (Kear, 2002). The adapted items will be used in the proposed 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 resistance self efficacy.

Content validity of the scale was established through consultation with Dr Bandura for approval of both the format and response scale (Lawrance, 1989). Construct validity was examined by factor analysis revealing the subscales previously discussed. Concurrent validity was established using ANOVA, evaluating the relationships between the three subscales and smoking behavior, demonstrating a significant relationship (Lawrance, 1989).

Kear (2002) reported a coefficient alpha of 0.98 for the SSE scale; item to total correlation ranged from .65-.95. Lawrance (1989) reported a coefficient alpha of 0.94 to 0.97. Chen et al. (2001) reported Chronbach alphas of 0.98 for a Chinese version of the SSE scale. Chammah (1995) reported a Chronbach alpha for each of the three subscales of 0.93-0.96.

Procedure for data collection

Data were collected from college students attending a senior college of major metropolitan public university in New York State. Permission to proceed with this study was granted by the respective Institutional Review Boards of both Rutgers University and the participating college. Following the approval of the Institutional Review Boards, a series of letters were sent to the faculty members teaching the course "Fitness for Life". The first letter was written by the chair of

the college department responsible for the course. In letter one, the Chairperson of the department indicated her support for the study and invited the faculty teaching "Fitness for Life" to facilitate the students' participation in the study by allowing the PI to visit the class. The second letter was written by the primary investigator introducing the study and requesting permission to visit their class. This letter was followed in one week by a phone call requesting an appointment to discuss the study. At this appointment, details of the study were presented, permission to visit the faculty member's class was granted and arrangements for a convenient time were planned.

On the pre-arranged day and time, PI visited the classroom. The course instructor introduced the investigator and left the room. The investigator explained the purpose of the study, answered any questions that the students voiced, assured them that participation is completely voluntary, and that anonymity was assured. In addition, students were advised that non-participation in the study would not affect their academic standing. In accordance with a requirement of the college hosting the study, students signed an assent from prior to being given the study instrument. No identification of subjects was sought. The consent forms were not coded and are kept in a separate locked cabinet from the survey to insure anonymity. Only one student refused to sign the assent form. The student who chose not to participate in the survey was given health education materials to read and retain.

For those who signed the assent, a questionnaire packet containing the three instruments (with titles removed) and demographic questionnaire was

distributed. A quiet environment was maintained. Time to complete the survey ranged from 10-20 minutes.

Following completion of the study instrument, students were thanked for their participation and given time to study their course assignments until the group finished the survey. This procedure was followed in the same manner for all section of "Fitness for Life". All students registered for the course were given an opportunity to participate.

Only the primary investigator has access to the completed surveys. The data will be retained by the primary investigator in a locked cabinet in her home office for the length of time ascribed by the respective IRB's. Thereafter, it will be shredded.

CHAPTER IV

The purpose of this study was to examine the relationship between the dependent variable of smoking behavior among adolescents and each of the independent variables of (a) social support, (b) depression and (c) smoking resistance self-efficacy. Additionally, the relationships between the independent variables smoking resistance self-efficacy and depression and smoking resistance self-efficacy and social support were examined. Participants completed the Personal Resource Questionnaire 85-Part 2 (PRQ 85-Part 2), the Lawrance Smoking Self Efficacy Scale (SSE) and the Beck Depression Inventory (BDI-II). The final sample consisted of 364 respondents. This chapter presents descriptive and inferential findings resulting from statistical analysis of data.

Demographic data

Demographic characteristics are presented in table one. Participants ranged in age from 18-21 with the majority being 19 years of age or younger. All participants were enrolled students in a college health course. The majority were white, single and living with both parents in a nuclear family. More than half were female and the majority had tried smoking at least once in their life.

Table one summarizes the major demographic data such as age, ethnicity, family composition, marital status and smoking history.

Table 1: Demographic data

Variable	N	Percent
Racial/Ethnic background		
White	225	58%
Asian	49	12.6%
Hispanic	38	9.8%
Mix	27	7%
Age		
18	147	37.9%
19	118	30.4%
20	68	17.5%
21	54	13.9%
Gender		
Male	155	40%
Female	233	60%
Marital status		
Single	385	99.2%
Married	3	0.8%
Ever smoked		
Yes	214	55%

Statistical Description of the Variables

Smoking behavior was a dichotomous variable measured by the CDC definition of "have you smoked in the past thirty days". Scores ranged from 1 to 2 reflecting a yes or no answer. Scores on the SSE scale measuring ability to resist smoking cigarettes, ranged from 58 to 270. (M=236.82, SD = 56.25). Scores of the PRQ-85 part 2 which measured social support, ranged from 44 to 168 (M=136.39, SD=18.34). Respondents' scores on the BDI, measuring depression, ranged from 0 to 40 (M=10.31, SD= 8.62). These findings are summarized in Table two.

For the total sample population, smoking behavior was higher than the reported national and regional average at 25.5% (n=99). For the overall population, both Social Support and Smoking Resistance self-efficacy were relatively high. The BDI scores, reflecting depressive characteristics, were relatively low. Upon closer examination however, the descriptive statistics can be divided into the subdivisions of smokers and nonsmokers. In making this distinction, the aggregate data can be subdivided into the populations of smoker and non-smoker.

The descriptive statistics for smokers can be found in table three. Smokers, on average shared a similar level of social support with their peers. 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). SSE scores were substantially lower among smokers ranging from 57-270 (M= 169.58, SD= 64.57).

If considered a total cohort, this group of older adolescents represented high level of smoking, as well as a high level of smoking resistance self efficacy. In addition they demonstrated a high level of social support and low overall level of depression as compared to their peers as reported in the NYCDOHHS.

Descriptive Statistics of Study Variables

Table 2: Total samples

Variable	Range	M	Median	SD
Smoking behavior	1-2	1.27	1	.44
Social support	44-168	136.39	138.5	18.34
Smoking resistance self efficacy	58-270	236.82	269	56.25
Depression	0-40	10.31	8	8.62

Table 3: Smokers

Variable	Range	M	SD
Social support	90-166	137	17.17
Smoking resistance self efficacy	57-270	169.58	64.57
Depression	0-40	12.4396	12.4396

Table 4: Non smokers

Variable	Range	M	SD
Social support	44-168	135.36	18.9
Smoking resistance self efficacy	90-270	262.245	20.7
Depression	0-38	9.77	8.38

Psychometric Properties of the Instruments

Alpha reliability coefficients for the BDI-II, SSE and PRQ-85 Part 2 were calculated in order to establish internal consistency of these instruments (Table 5). All instruments demonstrated a coefficient alpha greater than 0.70, a standard of reliability established by Nunnally (1978) and affirmed by Nunnally and Bernstein (1994).

The PRQ 85 part 2 yielded a coefficient alpha of 0.89 which is identical to that reported by: Brandt (1987) in a sample of 149 adults, Mahon and Yarcheski (1992) for a sample of 106 late adolescents and Yarcheski et al., (1997) with a sample of adolescents 15-21 years. Similarly, Mahon and Yarcheski (1988) reported a coefficient alpha of 0.91 in a sample of 112 adolescents while Yarcheski et al., (1994) reported a coefficient alpha of 0.90 in a sample of 99 high school students aged 15-17.

The SSE scale had a coefficient alpha of 0.99 which is slightly higher than those reported by Kear (2002) in a similar population of college students. Additionally, the coefficient alpha exceeded those reported by Lawrance (1989), Chen et al. (2001), and Chammah (1995).

The BDI demonstrated a coefficient alpha of 0.89, which is slightly lower than that reported by Beck (1996) among college students but virtually identical to that reported by Oksoo (2002) in a population of 434 Korean college students ranging in age from 18-28 years and Rivera et al., (2005) in a sample of Puerto Rican adolescents. The established coefficient was also higher than that reported by Moilanen (1995).

Table 5

Instrument	Coefficient alpha
Smoking Resistance Self efficacy	.991
Beck Depression Inventory	.889
Personal Resource Questionnaire – 85 Part 2	.894

Hypotheses

Hypothesis 1

Hypothesis 1 stated that there is a negative relationship between Smoking Resistance Self Efficacy (SSE) and Smoking Behavior (SB). (The higher SSE the less likely the adolescent is to smoke). The Pearson Product-Moment correlation testing this relationship was $r = -.744, p= .01.$ Thus the negative correlation was statistically significant and Hypothesis 1 was supported.

Hypothesis 2

Hypothesis 2 stated that there is a positive relationship between Smoking Resistance Self Efficacy (SSE) and Social Support (SS). The Pearson Product-Moment correlation testing this relationship was $r = .071, p= .08.$ Thus the correlation was not statistically significant and Hypothesis 2 was not supported.

Hypothesis 3

Hypothesis 3 stated that there is a negative relationship between Social Support and Smoking Behavior. (The more reported social support, the less likely the adolescent is to smoke). The Pearson Product-Moment correlation testing

this relationship was *r = .018, p= .367.* Thus the correlation was not statistically significant and Hypothesis 3 was not supported.

Hypothesis 4

Hypothesis 4 stated that when SSE is controlled for statistically, the relationship between Social Support and Smoking behavior will diminish. Since the Pearson Product Moment correlations between Social Support and Smoking Behavior (*r* = .018, *p*= .367) and between Social Support and Smoking Resistance Self-Efficacy (*r* = .071, *p* = .089), requirements for testing mediation (Baron & Kenny, 1986), hypothesis 4 was not supported.

The regression statistic testing this relationship was *β*= .071*, p*= 0.178 . Thus the relationship was not statistically significant and Hypothesis 4 was not supported.

Hypothesis 5

Hypothesis 5 stated that there is a negative relationship between SSE and depression (higher smoking self efficacy, lower depression). The Pearson Product-Moment correlation testing this relationship was *r* = -.233, *p*= .000*.* Thus the negative correlation was statistically significant and Hypothesis 5 was supported.

Hypothesis 6

There is a positive relationship between depression and smoking behavior (higher depression, more likely to smoke.) The Pearson Product-Moment correlation testing this relationship was *r* = .122, *p*= .01*.* Thus the positive correlation was statistically significant and Hypothesis 6 was supported.

Hypothesis 7

Hypothesis 7 stated that when SSE is controlled for statistically, the relationship between depression and smoking behavior will diminish. The mediational model was tested using three regression equations as specified by Baron and Kenny (1986). The first equation regressed the mediator variable, smoking resistance self-efficacy, on the independent variable, depression that yielded a statistically significant standardized Beta (β= -.232, *p*= <.001). The second equation regressed the dependent variable, smoking behavior, on the independent variable, depression, that yielded a statistically significant standardized Beta (β= .123, *p*= .019). The third equation regressed the dependent variable, smoking behavior, on both the independent variable, depression, and on the mediator variable, smoking resistance self efficacy. In the third equation the mediator, smoking resistance self efficacy, significantly affected the dependent variable, smoking behavior (β= -.757, *p*= <.001) and the effect of the independent variable, depression on the dependent variable, smoking behavior, must be less in the third equation (β= -.053, *p*= .141) than the second equation (β= .123, *p*= .019). Thus, Hypothesis 7 was supported.

Measurement error discussion

There are two required assumptions when using multiple regression to estimate mediational models as described by Baron and Kenny (1986) (a) there is no measurement error in the mediator, and (b) the dependent variable does not cause the mediator through feedback. Kenny (2007) suggests that

researchers have the responsibility to choose instruments with high reliability in order to minimize bias.

There is no measurement error due to the high reliability coefficients of the instruments (Kenny, 2007). Additionally, there is no feedback due to the theoretical linkages in the literature.

Mediational models

Model one: social support

According to Baron and Kenny (1986) and Kenny (2007) there are four steps that must be followed in establishing mediation:

1. The initial variable (Social support) must be correlated with the outcome (Smoking behavior). According to Kenny (2007) this step establishes that there is an effect that can be mediated. Since the relationship was not statistically significant, this mediational model cannot be tested.

2. The initial step (Social support) must be correlated with the mediator (Smoking Resistance Self-Efficacy). Social support as measured by the PRQ was not correlated with Smoking Resistance Self Efficacy. This requirement is not met.

3. The mediator must affect the outcome variable. Kenny (2007) specifies that it is not sufficient to correlate the mediator with the outcome. He suggests that the initial variable (social support) be controlled in establishing the effect of the mediator on the outcome (smoking behavior). There was not a statistically significant relationship between social support and smoking behavior.

4.   Finally, step 4 involves the establishment of complete mediation by

establishing that the mediator completely mediates the relationship of

social support and smoking behavior as reflected by a correlation of zero

controlling for the mediator in a regression analysis. Given that

requirements 1, 2 and 3 were not met, this mediational model can not be

tested.

Model two: depression

According to Baron and Kenny (1986) and Kenny (2007) there are four

steps that must be followed in establishing mediation:

1.   The initial variable (Depression) must be correlated with the outcome

(Smoking Behavior). According to Kenny (2007) this step establishes that

there is an effect that can be mediated. There was a statistically

significant relationship between depression and smoking behavior

[β=.123 p< .01].

2.   The initial step (Depression) must be correlated with the mediator

(Smoking Resistance Self Efficacy). Depression was negatively

correlated with SSE [β= -.232, p<.01].

3.   The mediator must affect the outcome variable. Kenny (2007) specifies

that it is not sufficient to correlate the mediator with the outcome. He

suggests that the initial variable (Depression) be controlled in establishing

the effect of the mediator on the outcome (Smoking Behavior).

4.   Step 4 involves the establishment of complete mediation by establishing

that the mediator completely mediates the relationship of social support

and smoking behavior as reflected by a correlation of zero controlling for the mediator in a regression analysis. Step 4 as described by Kenny (2007) bears discussion and reflection. Kenny suggests that this step is not necessary and in fact, only steps two and three are considered "essential steps in establishing mediation" by most analysts (Kenny, 2007).

Smoking Resistance Self Efficacy

r = .071   r = -.749*

Social Support   Smoking behavior

r = .018

Social Support   Smoking behavior

r = .071

Figure 3

Results of the mediational model of the relationship between Social Support and Smoking Behavior with Smoking Resistance Self Efficacy as the mediating variable.

Smoking Resistance Self Efficacy

β= -.757* (p < .000)

β = -.232*(p < .000)

Depression ➤ ──────────────────────➤ Smoking behavior

β= .123* (p < .019)

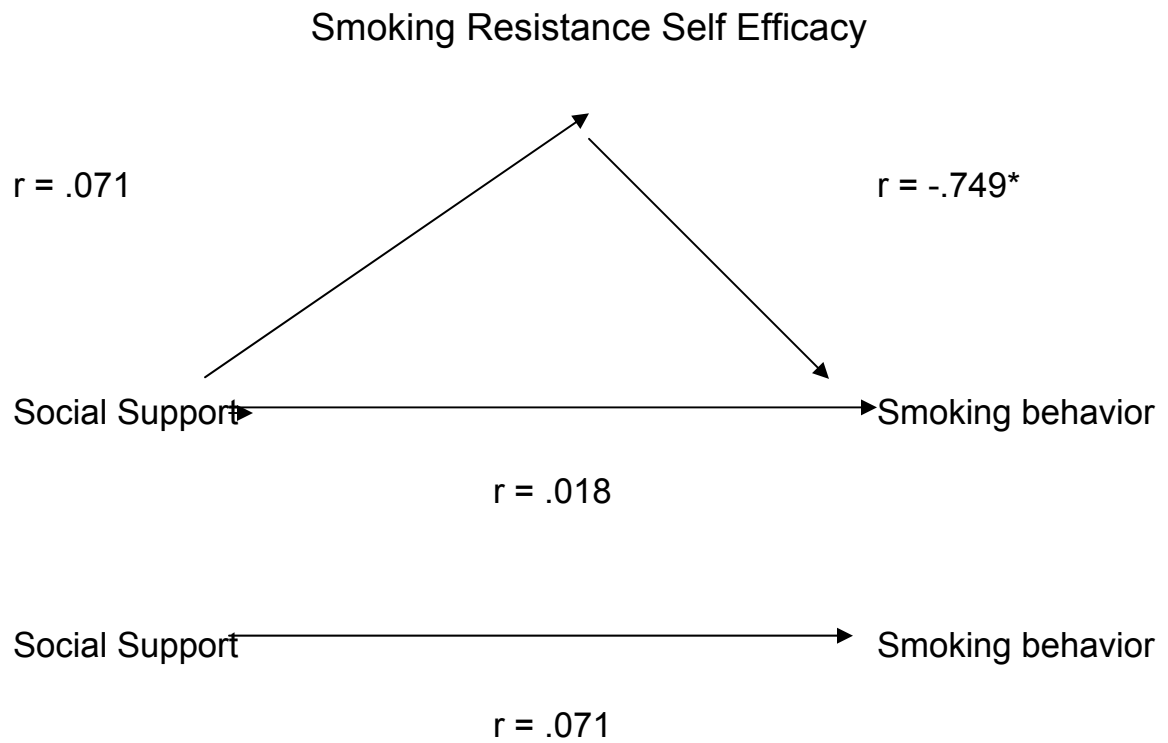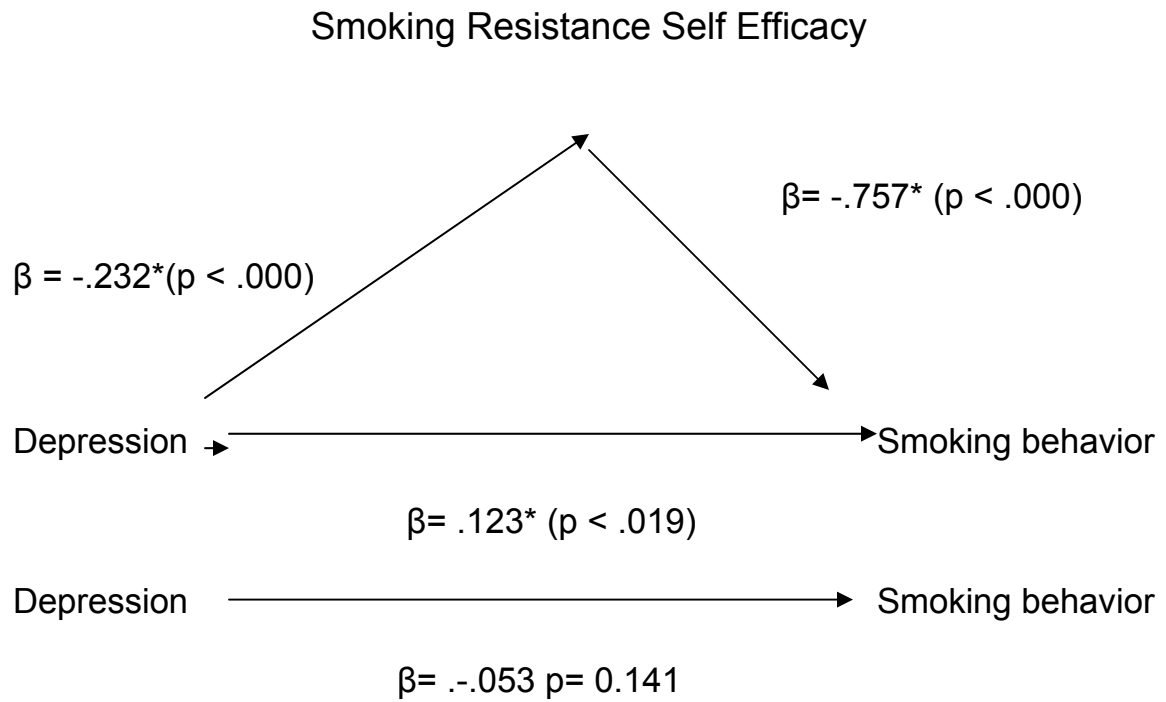Depression ──────────────────────➤ Smoking behavior

β= .-.053 p= 0.141

Figure 4

 Results of the mediational model of the relationship between
depression and smoking behavior with Smoking Resistance Self
Efficacy as the mediating variable.

Chapter V

Discussion of the findings

The purpose of this study was to examine the theoretical relationships

between the dependent variable of smoking behavior among adolescents and

each of the independent variables of (a) social support, (b) depression and

(c) smoking resistance self efficacy. Additionally, the relationships between the

independent variables smoking resistance self efficacy and depression and

smoking resistance self efficacy and social support were examined. In an effort

to explicate the nature of the relationships, this study tested two mediational

models. In mediational model one, SSE was hypothesized to mediate and

thereby help to explain the relationship between social support and smoking

behavior. In mediational model two, SSE was hypothesized to mediate and thus

help explain the relationship between depression and smoking behavior among

adolescents.

Smoking Resistance Self Efficacy and Smoking Behavior

Hypothesis one stated that there is a negative relationship between

smoking resistance self efficacy (SSE) and smoking behavior (SB). It was

expected that adolescents with higher smoking resistance self efficacy would be

less likely to smoke. This hypothesis and the underlying theory were supported

in this study. This hypothesis was derived from the theory that smoking

resistance self efficacy (SSE) is positively related to the avoidance of smoking

behavior (Bandura, 1977, 1997; Condiotte & Lichtenstein, 1981; DiClemente, 1981; Gulick et al., 1991; Lawrance & McLeroy, 1986).

The seminal work in self efficacy as a determinant of health behavior was begun by Bandura (1977). Bandura (1997) describes self efficacy as both situation and task specific. An individual's perception of their self efficacy is determined by their interaction of four influencing factors: mastery experiences, vicarious experience, social persuasion and emotional and physical reactions. Mastery experiences are the most effective way of building self efficacy (Bandura, 1997). Bandura postulates that self efficacy is a behavior specific construct; it can not be measured globally (Bandura, 1991).

Condiotte and Lichtenstein (1981) were among the first to publish a theory specific to Smoking Resistance Self Efficacy in relation to smoking cessation success, followed by DiClemente (1981). DiClemente (1981) proposed that efficacy expectations are a better predictor of future behavior than is past performance. Lawrance and McLeroy (1986) suggested that Smoking Resistance Self Efficacy is a predictor of smoking behavior among young adolescents. Lawrance and McLeroy (1986) maintain that self-efficacy is so strongly linked to behavioral performance that it can serve as a substitute measure of behavior change resulting from health education programs. Lawrance later designed the smoking self efficacy instrument for adolescents (1987).

Gulick et al., (1991) proposed that smoking behavior among women is specific to life cycle developmental periods. Adolescence is a distinct

developmental period within the model. This sophisticated model incorporates

beliefs and attitudes that are formed in early childhood and are influenced by (a)

parents and peers, (b) sociability and social competence, (c) stress, (d) coping,

(e) self efficacy, (f) motivation, (g) nicotine dependence and (h) support. Flay

and Petraitis (1994) developed the Theory of Triadic Influence to explain

adolescent substance abuse. The theory suggests that that attitudes, social

influences and perceptions of self efficacy influence behavior.

Hypothesis testing demonstrated a statistically significant negative

correlation between smoking resistance self efficacy and smoking behavior

among the tested population of older adolescents. The Pearson Product-

Moment correlation testing this relationship was $r = -.744$, $p = .01$. Thus the

negative correlation was statistically significant and Hypothesis 1 was supported.

This finding is consistent with an earlier study reported by Kear (2002) in a

similar sample. Kear (2002) tested an apriori model based on the Theory of

Triadic Influence using a sample of 224 college students ranging in age from

17-25 years. Smoking resistance self efficacy (SSE) had the highest impact on

smoking behavior ($r = -.840$, $\beta = -.819$; $t = -20.515$, $p < .05$). Of the four indices

measured, SSE was the only predictor with a statistically significant direct effect

on smoking behavior. Engels et al., (2005) reported "robust associations"

between low self efficacy and smoking behavior ($\beta = -.032$, $p < 0.001$ boys;

$\beta = 0.26$, $p < 0.001$, girls) in a prospective study of 1861 children ranging in age

from 12-13 years.

Among adults, Condiotte and Lichtenstein (1981) correlated self efficacy with both relapse of smoking behavior among quitters ($r = 0.57$) and time to relapse ($r = 0.69$). Coelho (1984) reported a correlation of $r = .55$ in a sample of 66 adults enrolled in a smoking cessation program. DiClemente et al., (1985) reported a correlation of $r = -0.24$ among smoking resistance self efficacy scores and long term quitters in a study of 954 adults in various stages of smoking cessation.

As mentioned previously, studies that are theoretically congruent with Bandura's conceptualization of self efficacy are not readily available in the published literature. Bandura (1997) maintains that self efficacy is both situation and task specific and that generalized scales of self efficacy are not theoretically sound. Many studies purport to measure self efficacy but, upon review, do not meet the criteria for operational adequacy (Fawcett, 1999). This study has delimited a review of empiric literature to studies that have met Bandura's criteria.

The results of the current research support the theory regarding the relationship of smoking resistance self efficacy and smoking behavior in the defined population of late adolescent college students from 18-21 years of age. In addition, the strength of the relationship between smoking behavior and smoking resistance self efficacy met the criterion established by Baron and Kenny (1986) for an evaluation of the role of SSE as a mediator among variables that contribute to smoking behavior.

Smoking Resistance Self Efficacy and Social Support

Hypothesis two stated that there is a positive relationship between smoking resistance self efficacy (SSE) and social support (SS). This hypothesis is based on the theory that social support is rooted in social integration. Social integration is characterized by a reciprocal network that shares common concerns and provides opportunity for social engagement (Weiss, 1974). Social support influences smoking resistance self efficacy through various mechanisms; among these are vicarious experience (Bandura, 1997), and attachment of close familial or social relationships (Weiss, 1974). Additionally, Bruhn and Philips (1984) propose that social support is both dynamic and developmental; it changes with different life situations. Other theorists maintain that social support is contextually specific (Gigliotti, 2006; Murray, 2000; Williams et al., 2004). Social Support has been theorized to be antecedent to positive health practices (Langlie, 1977; Cohen and Syme, 1985). Everett et al., (2000) propose that social support is predictive of tobacco use among adolescents.

The results of hypothesis testing demonstrated that the correlation between smoking resistance self efficacy and social support was not statistically significant [$r = .071$, $p = .08$]. Hypothesis 2 was not supported.

There are several possible explanations for the result obtained in this study. A theoretical explanation of the results can be related to the variability in conceptualization of social support. This study examined social support using theoretical and operative definitions of social support congruent to those in published studies using similar populations (Cannella, 2006; Diorio, et al., 1992;

Mahon & Yarcheski, 1998; Mahat & Scoloveno. 2001; Mahat et al., 2002; Mahon et al., 2004; McNicholas, 2002). The theoretical and empiric literature demonstrate strong support for the use of the PRQ-85 part 2 in the population of adolescents. The reliability of the instrument was high and consistent with that of other studies. One possible explanation for the lack of significance may be related to the conceptualization of social support. Smoking resistance self efficacy is highly specific and is influenced by situational factors. Therefore, an alternative theoretical conceptualization of social support as contextual and specific to a situation - and attendant operational definition - may have yielded different results. If researchers planned to examine social support in this population again, it could be argued that a contextual theoretical and operational definition of Social Support could yield different results. The PRQ-85 Part 2 was not contextually specific; this may be a consideration for future research.

Substantive explanation

A methodological explanation for the results of this relationship may be explained by looking at the homogeneity of the sample. Overall, social support for the total sample was reported as high with little variability between smokers and non-smokers. Scores of the PRQ-85 part 2 ranged from 44 to 168 (M=136.39,SD=18.34). The participants were a homogenous sample with respect to many factors, including age, and family and household composition. The majority of the population were island-dwellers living in an insular community. These adolescents were very similar in age with the overwhelming majority living at home with both parents.

Another possible explanation of the lack of expected variation in social support relates to a phenomenon found in the literature specific to parenting style. Simons-Morton et al.,(1999) report that when adolescents are asked to describe the parenting style of their own parents in categories of authoritarian, passive, or autocratic, the overwhelming majority relate their parents' style as autocratic – despite evidence to the contrary and the reality that not every parent is autocratic. This phenomenon of "protecting" one's family image and attendant lack of critical analysis of one's upbringing could be a related factor to the adolescents' report of social support being high. That being said, since a large portion of the surveyed population lives at home, their social support, specifically familial social support, is likely to be relatively high. Since over 90% of the students surveyed lived at home with their parents, the evaluation of social support was an indirect measure of parental support, which may be universally high for all college students living at home.

Empiric studies of smoking resistance self efficacy and social support are rare. Von Ah et al. (2004) examined a range of specific self efficacy behaviors and social support in a cross sectional sample of 161 college students. The authors found a strong positive association between self efficacy and smoking behavior [$F(4, 84) = 10.6$ $p < .0001$] but a strong negative correlation for all other measured health risk behaviors. The authors suggest that this unpredicted result warrants further investigation of the psychometrics of the instruments. Since Bandura (1997) conceptualizes self efficacy as context specific, it is not theoretically congruent to search the literature for generalized self efficacy as it

relates to social support. This study aimed to contribute to the state of the

science with respect to providing empiric evidence to support the theory

connecting smoking resistance self efficacy and social support. There is need for

additional evaluation and testing to accomplish this. Further evaluation of

available instruments and use of a more varied population may be considerations

for future study of this relationship. Additionally, the development of a social

support instrument specific to smoking behavior may be necessary to capture the

desired information.

Social Support and Smoking Behavior

Hypothesis three stated that there is a negative relationship between

social support and smoking behavior. It was expected that adolescents with

higher levels of reported social support would be less likely to smoke. This

hypothesis was based on the theory that social support is linked to positive

health practices (Cohen & Syme, 1985; Langlie, 1977). Everett et al., (2000)

report that social support is predictive of tobacco use among adolescents.

Several researchers have demonstrated that among adolescents, social support

contributes to positive health practices (Cannella, 2006; Diorio et al., 1992;

Mahon & Yarcheski, 1998; Mahat & Scoloveno, 2001; Mahat et al., 2002;

Mahon,et al., 2004; McNicholas, 2002).

Hypothesis testing demonstrated that the correlation between Social

Support and Smoking Behavior was not significant [r = .018, p= .367]*.* Thus,

hypothesis 3 was not supported. This finding differs from research studies

reported in the literature. There is support in the empiric literature for a moderate

negative relationship between smoking behavior and social support (Kandel et al., 2004; Vogel et al., 2003; Weinrich, 1996).

Kandel et al. (2004) conducted a one year longitudinal study in which they measured depressive symptoms, parental support and smoking behavior in a national sample of 12,158 adolescents in grades 7-12. . Kandel et al. (2004) report that parent child connectedness is protective both for smoking behavior at baseline (OR= 0.74[0.63,0.87], p < 0.001) and for smoking initiation one year later (OR = 0.64[0.55-0.74], p < 0.001).

Vogel et al.(2003) examined smoking behavior in a sample of 98 high school and college aged adolescents. Vogel et al. found that adolescents who reported an inability to feel connected to their family or others were more likely to smoke. Vogel et al. found that in step-wise regression, only the subscales reflecting the alienating aspects of depression (social introversion [R^2 = .0243] and instrumental helplessness [R^2 = .0243]) were statistically associated with smoking. This study lends support for the relationship of social support to smoking behavior.

Weinrich (1996) examined the relationship between smoking behavior under stress and social support in a sample of 1168 high school aged adolescents. Adolescents with less social support were more likely to smoke when under stress (OR = 0.81[0.75, 0.87], p < 0.05).

The present study aimed to contribute to the state of the science by using a reliable and valid instrument of social support for the evaluation of the relationship of smoking behavior to social support. Among the cited and

available literature, one recurring problem is the inconsistency in the operational definition of social support. Of the cited studies, none used the PRQ-85 Part 2, which was used in this study. The PRQ-85 Part 2 was selected for this study because of its high reliability and validity in the studied population. Additionally, the PRQ-85 Part 2 is theoretically congruent to the construct as described in the theoretical literature (Fawcett, 1999). Others may argue that social support is contextually specific and should be measured in a context-specific manner (Gigliotti, 2006; Murray, 2000; Williams et al., 2004).

A Mediational Model with Smoking Resistance Self Efficacy explaining the relationship between Social Support and Smoking Behavior

Hypothesis four stated that when smoking resistance self efficacy is controlled for statistically, the relationship between social support and smoking behavior will diminish. This hypothesis was derived form a series of theoretical propositions that suggest a connection between social support and smoking behavior (Cohen & Syme, 1985; Everett et al., 2000; Langlie, 1977), between social support and smoking resistance self efficacy (Bandura, 1997; Diorio et al., 1992; Weiss, 1974), and between smoking resistance self efficacy and smoking behavior (Bandura, 1977, 1997; Condiotte & Lichtenstein, 1981; DiClemente, 1981; Gulick et al., 1991; Lawrance & McLeroy, 1986).

The Pearson Product Moment correlations between social support and smoking behavior (r = .018, p = .367) and between social support and smoking resistance self efficacy (r = .071, p= .089), were not statistically significant. Requirements for testing mediation were not met (Baron & Kenny, 1986). Thus, hypothesis 4 was not supported.

Smoking Resistance Self-Efficacy and Depression

Hypothesis five stated that there is a negative relationship between SSE and depression. It was expected that adolescents with higher smoking resistance self efficacy would have lower reported depression. This hypothesis was derived from the theoretical linkage of depression to smoking resistance self efficacy (Kear, 2002).

Hypothesis testing revealed the negative correlation between depression and SSE to be significant [r= -.233, p= .000]. Thus the hypothesis suggesting the negative relationship between SSE and depression was supported. This is similar to results obtained in other studies. Engels et al. (2005) reported that higher depressive mood and low self efficacy are related to increased levels of smoking in a prospective study of 1861 12 and 13 year-old adolescents. Depression was significantly associated with smoking (β = 0.07, p< 0.05, for both girls and boys). Haukkala et al., (2000) examined the relationship among cessation self efficacy, depression and smoking behavior in a sample of 3403 Finnish men and women ranging in age from 25-64. Higher depression scores were related to lower smoking cessation self efficacy, especially among male smokers (OR = 0.63 [0.45, 0.90], p< 0.05).

Kear (2002) reported depression has a statistically significant indirect effect on smoking behavior mediated by smoking self efficacy. There was an inverse relationship between depression and resistance self efficacy reflected by high scores on the depression scale associated with low scores on the smoking self efficacy scale (total effect = - .249 , p < .05).

Depression and Smoking Behavior

Hypothesis six stated that there is a positive relationship between Depression and Smoking Behavior. It was expected that adolescents with higher depression would be more likely to smoke. This hypothesis was derived from the theoretical literature suggesting a correlation between depression and smoking behavior (Escobedo & Kirch, 1996; Goodman & Capitman, 2000). Escobedo and Kirch posit that the relationship between Smoking and Depression occurs early in life and may be causal in nature.

Hypothesis testing revealed a positive relationship between Depression and Smoking Behavior [r = .122, p = .01]. Thus the positive correlation was statistically significant and Hypothesis 6 was supported.

The results of this study are similar to those obtained by other researchers in previously published reports. Jarvelaid (2004) revealed that smoking behavior among girls was associated with a mean BDI score above 9 indicative of high depressive symptoms (OR = 2.6; [1.6, 4.4], p < 0.05). Another commonly used reliable instrument measuring depression is the CES-D. Escobedo and Kirch (1996) examined smoking behavior as a covariant of depression. They found that among children less than 12 years of age, depressed mood was a statistically significant predictor of smoking initiation (OR= 1.6 [1.2, 2.2], p< 0.05). Among adolescents, only major depression was predictive of smoking behavior (OR= 2.0 [1.3, 3.1], p < .05). Among young adults (ages 19-35 years) both depressed mood and major depression were predictive of smoking behavior (OR= 1.5 [1.1, 2.2], p < 0.05 and 2.2 [1.7, 2.9], p < 0.05; respectively). Poulin

etal., (2005) reported of male adolescents who smoked between 1-10 cigarettes daily, 24.8 % reported depressive symptoms (OR= 2.38, p < .001). Among females, 45% who smoked more than 10 cigarettes/day exhibited somewhat elevated depressive symptoms (RRR= 2.47, +- 10.1;

CI= 99%; p< .001). Kandel et al., (2004) reported depressive symptoms as strongly predictive of transition to smoking (OR= 1.03 [1.02,1.04], p <.001). Killen et al. (1997) found depressive symptoms were significantly predictive of smoking behavior among never smoking boys ([chi square] (1,481) = 7.84,

 p< .01).

The results of the research support hypothesis six and extend the theory and empiric literature describing the relationship between smoking behavior and depression.

A Mediational Model with Smoking Resistance Self Efficacy Explaining the Relationship Between Depression and Smoking behavior

Hypothesis seven stated that when smoking resistance self efficacy is controlled for statistically, the relationship between depression and smoking behavior will diminish. This hypothesis was derived from a series of theoretical propositions that suggest a relationship between depression and smoking behavior (Escobedo & Kirch, 1996; Goodman & Capitman, 2000; Kandel et al., 2004; Killen et al., 1997) and depression and smoking resistance self efficacy [SSE] (Engels et al., 2005; Kear, 2002) and between smoking resistance self efficacy and smoking behavior. SSE is an internal property of an individual which is, by definition, a characteristic of a mediator (Baron & Kenny, 1986).

The mediational model was tested using three regression equations as specified by Baron and Kenny (1986). The first equation regressed the mediator variable, smoking resistance self efficacy, on the independent variable, depression. This yielded a statistically significant standardized Beta (β= -.232, p= <.001). The second equation regressed the dependent variable, smoking behavior, on the independent variable, depression, that yielded a statistically significant standardized Beta (β= .123, p= .019). The third equation regressed the dependent variable, smoking behavior, on both the independent variable, depression, and on the mediator variable, smoking resistance self efficacy. In the third equation the mediator, smoking resistance self efficacy, significantly affected the dependent variable, smoking behavior (β= -.757, p= <.001) and the effect of the independent variable, depression on the dependent variable, smoking behavior, must be less in the third equation (β= -.053, p= .141) than the second equation (β = .123, p= .019). Thus, Hypothesis 7 was supported.

The results obtained in this study add to the body of knowledge regarding the relationship of smoking behavior and depression and the role of smoking resistance self efficacy. This study is unique in its quantitative explication of the relationship of SSE, depression and smoking Behavior. This study supports the work of Kear (2002) in determining SSE as a mediator of the relationship between depression and smoking behavior. This is a significant finding with implications for smoking prevention.

Depression among children and adolescents is common. The causes of depression may be biologic or deeply rooted in family or interpersonal dynamics

and may not be amenable to prevention measures. Additionally, studies have

shown that depression among adolescents to be developmental and cyclical with

a curvilinear trajectory (Poulin et al., 2005). While Depression is multifaceted, it

can be argued that SSE is more amenable to early intervention. The belief that

one will not smoke may be amenable to early intervention through peer and

family role modeling. Such early intervention strategies can be community or

schools based, integrated into early education curricula and are highly cost

effective public health strategies.

CHAPTER VI

Summary

Purpose of the study

The results obtained in this study add to the body of knowledge regarding smoking behavior among older adolescents by developing and testing theory. The theoretical and empiric relationships between the dependent variable of smoking behavior among adolescents and each of the independent variables of (a) social support, (b) depression and (c) smoking resistance self-efficacy were examined. Additionally, the relationships between the independent variables smoking resistance self-efficacy and depression and smoking resistance self-efficacy and social support were examined. In an effort to explicate the nature of the relationships, this study tested two mediational models. In mediational model one, SSE was hypothesized to mediate and thereby help to explain the relationship between social support and smoking behavior. In mediational model two, SSE was hypothesized to mediate and thus help explain the relationship between depression and smoking behavior among adolescents.

Outcome variable: smoking behavior

Smoking behavior is an outcome variable defined by the CDC 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?"

Adolescent smoking behavior is complex. Perry et al., (1987) proposed that adolescent smoking serves a number of purposes which are specific to

different developmental tasks. They describe smoking behavior as 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) strategy to increase or maintain personal energy. Gulick et al., (1991) developed and tested a model of smoking behavior among women that is specific to life cycle developmental periods. Similarly, Flay and Petraitis (1994) propose that attitudes, social influences and perceptions of self efficacy influence smoking behavior; their model provides for analysis of social situation, cultural environment, and personal biologic factors. Goodman and Capitman (2000) theorizes that smoking behavior is influenced by biochemical dependence, suggesting that the effect of nicotine on noradrenergic receptors adds a physiologic dimension to the complexity of smoking behavior. In summary, smoking behavior among adolescents is a complex behavior motivated by a myriad of biologic, psychosocial, intrapersonal and environmental factors. Smoking behavior among adolescents can therefore be explained by examining a variety of biologic, sociocultural and intrapersonal factors that influence behavior.

Review of the literature identifies constructs that are both theoretically and empirically linked to smoking behavior. Smoking resistance self efficacy (SSE) has been theorized to be positively related to the avoidance of smoking behavior (Bradley & Corwyn, 2001; Condiotte & Lichtenstein, 1981; Coelho, 1984; DiClemente, 1981; Gulick, et al., 1991). Smoking resistance self efficacy is defined as one's belief that they can resist smoking behavior. The relationship

between SSE and smoking behavior has been studied by numerous investigators (Conrad et al., 1992; DiClemente & Prochaska, 1982; DiClemente et al., 1985; Gulick & Escobar-Florez, 1995; Kear, 2002; Lawrance, 1985; Lawrance & Rubinson, 1986). To date, however, the mechanism by which SSE impacts smoking behavior has not been studied. Both the empiric and theoretical literature point to several factors which influence both smoking initiation and the continuation of smoking behavior. Among these are depression and social support. This study evaluated the role of SSE as a mediator of the relationship between (a) social support and smoking behavior and (b) depression and smoking behavior.

Depression and Smoking Behavior: Theory

Depression has been theoretically linked to smoking behavior (Goodman & Capitman, 2000). Beck (2005) conceptualizes depression as "the biased interpretation of events attributed to the activation of negative representations of the self, the personal world and the formation of the negative cognitive triad". The temporal nature of the relationship between smoking behavior and depression is not fully explicated. Escobedo and Kirch (1996) posit that the relationship between smoking and depression occurs early in life and that depression is bi-directionally related to smoking behavior. Some studies propose that depression precedes smoking behavior, others hypothesize that the neurochemical side effect of nicotine, and other active ingredients in cigarettes, contribute to depressive symptomatology (Goodman & Capitman, 2000). Goodman and Capitman cite the recent success of antidepressant therapy in

smoking cessation programs and recommends future studies incorporate this biologic component of nicotine addiction. Poulin et al. (2005) theorize that the relationship of age and depression in adolescents is curvilinear; the authors caution that findings are dependent upon sensitive instruments.

Depression and Smoking Behavior: Empiric

Empiric research has established a relationship between depression and smoking behavior. Escobedo and Kirch (1996) were among the first to examine the relationship between smoking behavior and depression and found that across adolescence, depressed mood was a statistically significant predictor of smoking initiation. Poulin et al. (2005) reported that cigarette smoking is a predictor for depressive symptoms among females and is positively correlated with the number of cigarettes smoked per day.

There have been several longitudinal studies that provide strong support for the relationship of smoking behavior and depression (Kandel et al., 2004; Killen et al., 1997). Goodman and Capitman (2000) assessed the nature and direction of the relationship between cigarette smoking and depression among teens. Goodman and Capitman suggest that depression in adolescents is complex and dynamic and should include psychosocial co-morbidity variables such as abuse history and psychological traits and states.

In sum there is substantial empiric evidence to support the theories purporting a relationship between smoking behavior and depression. This study examined the relationship of depression to smoking behavior and SSE.

Additionally, the study examined the role of SSE as mediator of the relationship between depression and smoking behavior in a population of older adolescents.

Social support theory

The theoretical and empiric literature suggests an inverse relationship between social support and high risk behavior such as cigarette smoking, alcohol consumption and illegal drug use among adolescents. Tobacco use alone is considered a risk factor for other high risk behaviors. Among adolescents, tobacco is considered the "gateway drug"; that is, teens who smoke cigarettes are eight times more likely to smoke marijuana and 22 times more likely to use cocaine when compared with a similar group of non-smoking adolescents (ALA, 2004).

Weiss (1974) conceptualized social support as a dynamic interplay of six categories of relational provisions "each ordinarily associated with a particular type of relationship" (Weiss, 1974, p.23). These categories include: (1) attachment, experienced within close familial or significant other relationships; (2) social integration: characterized by a reciprocal network that shares common concerns and provides social engagement; (3) opportunity for nurturance; (4) reassurance of worth; (5) a sense of reliable alliance, provided by persistent familial relationships; (6) obtaining guidance: important to persons at times of stress, this relates to relationships an individual has with an authoritative individual who can provide emotional support and assist in developing plans of action. Similarly, Brandt and Weinert (1981) reflect on Cobb's (1976)

conceptualization of social support as the person's perception that they are

loved, esteemed and a member of a network of mutual obligation. Additional

conceptualizations also include the importance of exchange of goods, services,

emotional comfort, intimacy, assistance, problem solving and enmeshment in the

local community (Caplan, 1974, Lin et al., 1977). Bruhn and Philips (1984)

emphasize the theoretical underpinning of social support. They characterize

social support as (1) dynamic: its form and quantity change over time;

(2) interactive: having both qualitative and quantitative dimensions that must be

simultaneously considered, (3) available: the individual must perceive its

availability for it to be used, (4) developmental: changeable with life situations.

Kahn and Antonucci (1980) elaborated on Weiss (1974) conceptualization of

social support; in their view, social support is a network of interpersonal

transactions which provide affirmation of a person's value and provision of

assistance. Three key elements of social support are: affect, aid and affirmation.

House (1981) identified four dimensions of social support: (1) emotional:

providing empathy, encouragement and understanding; (2) instrumental:

behaviors that provide direct help in time of need; (3) informational: advice,

directives or information that can facilitate coping with personal and

environmental problems and (4) appraisal: behaviors that transmit information

that can be relevant to self evaluation.

Social support has been theorized to be positively related to positive

health practices. Simantov et al. (2000) studied a national cross section of

adolescents and found parental support was protective for the prevention of

initiation of high risk behaviors. Tobacco use in adolescence is associated with increased likelihood of being in a fight, carrying weapons, engaging in high risk sexual behavior and using other drugs and alcohol (Biglan et al., 2003).

In sum, the theories of social support can be categorized as emanating from three related paradigms: stress and coping, social constructionist, and qualities of social relationships. Each of these three paradigms further elucidates social support in terms of whether social support is stress buffering or has direct effects on health outcomes. Some experts maintain the conceptualization of social support can be further refined as contextually specific (Gigliotti, 2006; Murray, 2000; Williams et al., 2004).

Social support is an integral aspect of human experience but may have particular significance to the adolescent. The period of older adolescence encompassing the college years is characterized by increasing independence from established means of social support. Many college aged students move away from home while others, who study close to home, are likely to experience shifts in friendships concurrent with new school experiences. The loss of established social support increases the older adolescent's vulnerability.

Social support has been theorized to be antecedent to positive health practices (Langlie, 1977; Cohen and Syme, 1985). Empiric research demonstrates that, among adolescents, social support contributes to positive health practices (Cannella, 2006; Diorio et al., 1992; Mahat & Scoloveno, 2001; Mahat et al., 2002; Mahon & Yarcheski, 1998; Mahon et al., 2004; McNicholas, 2002). Resistance to smoking cigarettes is a form of positive health practice.

Everett et al., (2000) report that social support is predictive of tobacco use among adolescents. Weinrich (1996) examined the relationship between smoking behavior under stress and social support in a sample of 1168 high school aged adolescents; adolescents with less social support were more likely to smoke when under stress.

Kandel et al., (2004) report that parent child connectedness is protective both for smoking behavior and for smoking initiation. Vogel et al. (2003) reported that adolescents who reported an inability to feel connected to their family or others were more likely to smoke.

In summary, there is substantial support in the empiric literature for a moderate negative relationship between smoking behavior and social support (Kandel et al., 2004; Vogel et al., 2003; Weinrich, 1996). These findings support the theories proposing a relationship between the variables. This study examined the relationship between Social Support and smoking behavior in a sample of older adolescents. Additionally, the role of SSE as a mediator of the relationship between social support and smoking behavior was evaluated.

*Theoretical linkages of mediational model*s

This study examined the relationship between (a) social support and smoking behavior and (b) depression and smoking behavior in older adolescents aged 18-21 years.

Mediational model one: Social Support

Theory

Social support is conceptualized as the interplay of six relational

provisions*:* (a) attachment, (b) social integration, (c) opportunity for nurturance,

(d) reassurance of worth, (e) a sense of reliance, and (f) obtaining guidance and

information in stressful situations (Weiss, 1974). Norbeck (1985) defines social

support in the context of three domains: functional, network and loss. Social

support bears a theoretical relationship to self efficacy (Bandura, 1997).

Empirical studies have provided support for the relationship between

social support and positive health practices. DiIorio et al. (1992) found that self

efficacy was a predictor of health behavior. Yarcheski and Mahon (1998) report

a moderately strong relationship between social support and positive health

practices. Canella (2006) found a positive relationship between social support

and positive health practices. Specifically, the avoidance of smoking behavior is

a form of positive health practice.

Empirical studies have provided support for the relationship between SSE

and social support. (Von Ah et al., 2004). A number of researchers (Weinrich,

1996; Kandel et al., 2004) proposed the belief that social support influences

smoking behavior. Individuals with more social support are less likely to engage

in health compromising behaviors. Several research studies have supported the

relationship between social support and smoking behavior.

Based on theory and published empiric research, the relationships posited

in the mediational model suggest that social support is negatively related to

smoking behavior and positively related to SSE. SSE is negatively related to smoking behavior. In the proposed study, SSE is hypothesized to mediate and thereby help to explain the relationship between social support and smoking behavior.

Mediational model two: Depression

Review of the literature reveals depression as strongly linked to smoking behavior. Depression bears a theoretical relationship to smoking behavior (Goodman & Capitman, 2000). The temporal nature of the relationship between smoking behavior and depression is unclear; the literature indicates that further research is needed in order to explicate the relationship. Some studies propose that depression precedes smoking behavior, others hypothesize that the neurochemical side effect of nicotine, and other active ingredients in cigarettes, contribute to depressive symptomatology. One possible mediator of the relationship between depression and smoking behavior is SSE. In addition, SSE is an internal property of an individual which is, by definition, a characteristic of a mediator (Baron & Kenny, 1986).

Beck (2005) conceptualizes depression as "the biased interpretation of events attributed to the activation of negative representations of the self, the personal world and the formation of the negative cognitive triad". Escobedo and Kirch (1996) posit that depression is bi-directionally related to smoking behavior. Poulin et al. (2005) theorize that the relationship of age and depression in

adolescents is curvilinear and suggests that findings are dependent upon sensitive instruments.

Empirical studies in young adults and in adolescents have provided support for the relationship between depression and smoking behavior. Vogel et al. (2003) investigated the relationship of depression to adolescent smoking. This relationship has been supported by the research of others (Escobedo et al., 1996; Goodman & Capitman, 2000; Kandel et al., 2004; Killen et al., 1997; Poulin et al., 2005; Tercyak et al., 2002; Vogel et al., 2003).

Based on theory and empirical evidence, the relationships posited in the mediational model suggest that depression is positively related to smoking behavior, and is negatively related to SSE. In the proposed study, SSE is hypothesized to mediate and thus help explain the relationship between depression and smoking behavior among adolescents. That is, when SSE is controlled for statistically, the relationship between depression and smoking behavior diminishes.

The following hypotheses were formulated from the theoretical linkages and were tested in this study:

Hypotheses

1. There is a negative relationship between Smoking Resistance Self Efficacy (SSE) and Smoking Behavior (SB). (With higher SSE the less likely the adolescent is to smoke).

2. There is a positive relationship between Smoking Resistance Self Efficacy (SSE) and Social Support (SS). (With higher SSE, there is more reported social support.)

3.   There is a negative relationship between Social Support and Smoking Behavior.(With more reported social support, it is less likely that the adolescent will smoke).

4.   When SSE is controlled for statistically, the relationship between Social Support (SS) and Smoking Behavior will diminish.

5.   There is a negative relationship between SSE and depression.(With higher smoking self efficacy, there is lower depression.)

6.   There is a positive relationship between Depression and Smoking Behavior. (With higher depression, it is more likely that the adolescent will smoke.)

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

The final sample consisted of 364 college students between the ages of 18 and 21 years. The sample was recruited from a required core course for all majors in a large urban public college. Participation was voluntary. Only one student refused to complete the survey. Additionally, only complete surveys were analyzed and reported. The majority of participants were 19 years of age or younger (58%). The majority were white (58%), single (99%) and living with both parents in a nuclear family. The remaining participants self identified as Asian (12.6%), Hispanic (9.8%) and Mixed (7%). More than half were female (60%) and the majority had tried smoking at least once in their life (55%). For the total sample population, smoking behavior was higher than the reported national and regional average at 25.5% (n = 99). For the overall population, both social support and SSE were relatively high. The BDI scores, reflecting depressive characteristics, were relatively low. Upon closer examination however, the descriptive statistics can be divided into the subdivisions of smokers and

nonsmokers. In making this distinction, the aggregate data can be subdivided into the populations of smoker and non-smoker.

Smokers, on average shared a similar level of social support with their peers. Depression, as measured by the BDI-II, was higher among smokers than non smokers. Smokers scores on the BDI-II , measuring depression, ranged from 0 to 40 (M= 12.44, SD= 9.58). SSE sores were substantially lower among smokers ranging from 57-270 (M= 169.58, SD= 64.57).

If considered a total cohort, this group of older adolescents represented high level of smoking, as well as a high level of smoking resistance self efficacy. In addition they demonstrated a high level of social support and low overall level of depression as compared to their peers as reported in the NYCDOHHS.

All participants completed the BDI-II, the PRQ-85 Part 2, the SSE and a demographic sheet. All instruments yielded a Chronbach alpha greater than .70 demonstrating good reliability for internal consistency. The PRQ yielded a coefficient alpha of 0.89; the SSE scale had a coefficient alpha of 0.99 and the BDI demonstrated a coefficient alpha of 0.89.

The Hypotheses were tested at the .05 level of significance. The correlational hypotheses 1, 2, 3, 5, and 6, were tested using a Pearson Product Moment correlation coefficient. One tailed test of significance was used to test these directional hypotheses. Hypotheses 4 and 7, the mediational models, were tested using a series of multiple regression analysis as specified by Baron and Kenny (1986).

Hypothesis 1, which stated that there is a negative relationship between Smoking Resistance Self Efficacy (SSE) and Smoking Behavior (SB) was supported (r = -.744, p= .01).

Hypothesis 2, which stated that there is a positive relationship between Smoking Resistance Self Efficacy (SSE) and Social Support (SS) was not supported (r = .071, p= .08).

Hypothesis 3, which stated that there is a negative relationship between Social Support and Smoking Behavior was not supported (r = .018, p= .367).

Hypothesis 4, which stated that when SSE is controlled for statistically, the relationship between Social Support and Smoking behavior will diminish was not supported (β = .071, p= 0.178). Since correlations between Social Support and Smoking Behavior (r= .018, p= .367) and between Social Support and Smoking Resistance Self-Efficacy (r = .071, p= .089), were not significant, requirements for testing mediation were not satisfied (Baron & Kenny, 1986).

Hypothesis 5, which stated that there is a negative relationship between SSE and depression, was supported (r = -.233, p= .000).

Hypothesis 6, which stated there is a positive relationship between depression and smoking behavior, was supported (r = .122, p= .01).

Hypothesis 7, which stated that when SSE is controlled for statistically, the relationship between depression and Smoking Behavior will diminish, was supported. The mediational model was tested using three regression equations as specified by Baron and Kenny (1986). The first equation, which regressed the mediator variable, Smoking Resistance Self-Efficacy, on the independent

variable, depression yielded a statistically significant standardized Beta

(β = -.232, p = <.001). The second equation, which regressed the dependent

variable, Smoking Behavior, on the independent variable, Depression, yielded a

statistically significant standardized Beta (β = .123, p= .019). The third equation

regressed the dependent variable, Smoking Behavior, on both the independent

variable, depression, and on the mediator variable, Smoking Resistance Self-

Efficacy. In the third equation the mediator, Smoking Resistance Self-Efficacy,

significantly affected the dependent variable, Smoking Behavior (β = -.757,

p= <.001) and the effect of the independent variable, Depression on the

dependent variable, Smoking Behavior. In this third equation, the statistical

regression which controlled for SSE demonstrated a significant decrease in the

relationship between depression and smoking behavior (β = -.053, p= .141) than

was found in the second equation (β = .123, p= .019). Therefore, SSE was

found to be a strong mediator of the relationship between depression and

smoking behavior.

Conclusions

Hypotheses 1, 5 and 6 that linked the independent variables of

depression, and smoking resistance self efficacy to the outcome variables of

smoking behavior were supported in this study. Therefore, based on empiric

support for these three hypotheses, it can be concluded that (a) there is a

positive correlation between depression and smoking behavior; (b) smoking

resistance self efficacy bears a negative relationship with smoking behavior; that

is, with higher smoking resistance self efficacy it is less likely that the adolescent

will smoke; and (c) there is a negative relationship between SSE and depression; that is, with lower smoking resistance self efficacy it is more likely that the adolescent will be depressed.

In addition, hypothesis 7, testing a mediation model of the relationship between depression and smoking behavior was supported, identifying SSE as mediator of this relationship. Therefore, based on the strong empiric support for hypothesis 7, it can be concluded that SSE helps to explain the relationship between depression and smoking behavior and that, SSE is a mediator of this relationship.

Hypotheses 2 and 3, which linked the independent variables of social support, smoking resistance self efficacy wit the outcome variable of smoking behavior were not supported by this study. Therefore it can be concluded that: (a) this study provided no empiric evidence of a positive relationship between social support and SSE and (b) this study provided no empiric evidence of a relationship between social support and smoking behavior. Additionally, Hypothesis 4, which sought to evaluate the relationship between social support and smoking behavior, was not tested since the requirements for mediational model were not met (Baron & Kenney, 1986).

Implications for nursing

This study contributes to the state of the science by its contribution of theory based nursing research in determining the role of SSE as 1) a mediator of the relationship between smoking behavior and depression and 2) a strong correlate of smoking behavior. This study is unique in it's quantitative explication

of the relationship of SSE, Depression and Smoking Behavior. These are significant finding with implications for nursing interventions targeted to both current smokers and smoking initiation prevention.

Nursing is uniquely poised to design effective research and intervention strategies to address the problem of adolescent smoking behavior (Spellbring, 1991). Nurses are already in the school systems with access to the adolescents at risk; they can educate youth, contribute to policy, train educators, involve families and address cessation programs (LaSala & Todd, 2000). Nursing should be at the table when mulit-disciplinary teams approach this health problem from a shared theoretical perspective (Clayton et al., 2000; NIH, 2004). This study has contributed to the body of knowledge that will serve as a resource for both community health nurses, school based nurses and other disciplines to design and implement effective smoking prevention and smoking cessation programs.

This study builds on the work of previous research. Smoking Resistance Self Efficacy (SSE) has been theorized to be positively related to the avoidance of smoking behavior (Bradley & Corwyn, 2001; Coelho, 1984; Condiotte & Lichtenstein, 1981; DiClemente, 1981; 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; Gulick & Escobar-Florez, 1995; Kear, 2002; Lawrance, 1985; Lawrance & Rubinson, 1986;). SSE is a strong correlate of smoking behavior and can be evaluated as a surrogate marker for smoking behavior (Lawrance & 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 commonly 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 lends support to the use of SSE as a predictor or surrogate of smoking behavior.

The establishment of SSE as a strong correlate of smoking behavior and a mediator of the relationship between smoking behavior and depression has profound implications for smoking prevention programs. Depression among adolescents is common, increasing and perhaps biologic and cyclical (Goodman & Capitman, 2000). The etiology of depression may be biologic or deeply rooted in family or interpersonal dynamics; therefore, these aspects of depression are complex and are not easily addressed in school or community settings. They require personalized attention by qualified professionals in collaboration with agreeable families and adolescents as willing partners.

This study explicates the role of SSE as a mediator of the relationship between depression and smoking behavior. Given that depression is

multifactorial and complicated to modify, it is logical to look toward the other elements of the equation in hope of finding one that is more amenable to intervention. Therefore, the next logical step is to evaluate the ability of interventions to modify 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 (1997) describes self efficacy as both situation and task specific and suggests that mastery experiences are the most effective way of building self efficacy. Vicarious experiences provided by social models provide a mechanism for observers to develop effective skills and strategies for handling challenges (Bandura, 1994). Social persuasion includes both positive verbal support and the construction of activities that provide opportunities for mastery experiences (Bandura, 1997). Therefore, it is theoretically congruent to design nursing interventions tailored to fostering smoking resistance self efficacy that include opportunities for role play, peer and family role modeling. Intervention strategies can be community or school based and integrated into early education curricula. Broad-based and community education strategies are cost effective means of intervention.

In summary, this study contributes to the state of nursing science by its contribution of theory based nursing research in determining the role of SSE as (1) a mediator of the relationship between smoking behavior and depression, and (2) a strong correlate of smoking behavior. Through the explication of SSE as mediator of the relationship between Depression and Smoking Behavior, this

study invites further nursing research, specifically those employing interventions designed to enhance smoking resistance self efficacy. The findings of this study have implications for nursing interventions targeted to both current smokers and smoking initiation prevention. Additionally, the continued study of the nature of depression a correlate of smoking behavior is needed.

Recommendations

The theoretical and empirical findings of this study provide direction for future research. Recommendations for future investigation of adolescent smoking, SSE, social support among adolescents and depression among adolescents include the following:

1. Replicate the present study among college students of a broader age range using a more specific instrument of social support, targeted to social support for smoking behavior, with the intention of testing theory and contributing to the state of the science regarding the nature of social support and smoking behavior.

2. Identify the prevalence of depression and SSE across childhood and adolescence using a reliable developmentally appropriate tool. A longitudinal design would contribute to the state of the science by describing the temporal nature of SSE and depression.

3. Test the relationships between depression and smoking behavior, SSE and depression, social support and smoking behavior, social support and SSE and smoking behavior and SSE across the developmental span of childhood and adolescence.

4. Build on the results obtained in this study, developing an intervention targeted to increasing SSE among school age children, young adolescents, middle adolescence and older adolescence, in the interest of theory building using developmentally appropriate instruments. Identify potential mediators of these relationships with the intention of designing intervention studies to decrease smoking behavior among children and adolescents and thereby improve health.

5. Update the SSE to be congruent with common social and behavioral patterns among current older adolescents.

6. Conduct longitudinal study of college students' smoking behavior and depressive symptoms.

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VITA

Susan M. Mee

1962   Born March 8th in Staten Island, New York

1980   Graduated Saint Joseph-by-the-Sea High School, Staten Island, New York

1984   BS Nursing: Hunter College, City University of New York

1984-1997   Staff Nurse, Childbirth Educator: Saint Vincent's Medical Center

1996   MS Nursing: Seton Hall University

1996   Certification ANCC Pediatric Nurse Practitioner

1996   Clinical Adjunct: Wagner College: Staten Island, New York

1997-2007   Lecturer: The College of Staten Island: New York

1998   New York State Department of Education certification:
                Child Abuse Lecturer

2007- present   Assistant Professor: The College of Staten Island, New York

2009   PhD Nursing, Rutgers College of Nursing: Rutgers the State University of
                New Jersey, Newark, New Jersey