THE INFLUENCE OF MODELING AND MESSAGING ON ATTITUDE TOWARD SMOKING IN NON-SMOKING ADOLESCENT FEMALES

by

Patricia Rose Woods

B.S.N., The University of British Columbia, 1999

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

In

THE FACULTY OF GRADUATE STUDIES

(Nursing)

THE UNIVERSITY OF BRITISH COLUMBIA

December 2005

© Patricia Rose Woods, 2005

Abstract

Preventing smoking behavior among adolescent females is a significant concern in health promotion as females have many gender-specific health risks related to smoking. The development of a more positive attitude toward smoking is currently theorized as the first stage of smoking behavior. The study was conducted to examine whether social modeling factors, parental anti-smoking messaging, and the quality of the relationship with parents are associated with attitude toward smoking in non-smoking adolescent females. Additionally, this study examined whether parental anti-smoking messaging and the quality of the relationship with parents influence the association between social modeling factors and attitude toward smoking. The research was guided by Bandura's Social Cognitive Theory of behavior.

The study (N=1345) utilized a subset of data from non-smoking adolescent females surveyed in the British Columbia Youth Smoking Survey, a 2001/2002 crosssectional, school-based study of adolescents from 13 schools in two regions of British Columbia. The social modeling factors included a smoking mother, father, sibling, boy/girl friend and best friend. The two parental anti-smoking messages included were "my parents won't allow me to smoke" and "my parents warned me about the dangers of smoking". Maternal closeness, paternal closeness and the Psychological Control Scale Youth Self Report (PCS-YSR) were used as measures of the quality of the relationship with parents.

Descriptive results showed that the majority of the non-smoking females in this study did not live or have close social contact with smokers. If there was a smoker within the household, it was most likely to be the father. Hierarchical regression results indicated that social modeling factors in the form of smoking by the father, boy/girlfriend and best friend were significantly associated with positive attitude toward smoking in non-smoking adolescent females. However, only smoking by a boy/girlfriend remained significantly associated to positive attitude when the parental messages and the quality of the parental relationship were added to the regression model.

Relating to parental messages, only half the adolescent females in the study indicated that the two parental anti-smoking messages were among the reasons why they did not currently smoke. Although both messages were associated with positive attitude toward smoking, the parental warning about the dangers of smoking was associated with a less positive attitude while the parents' not allowing smoking behavior was associated with a more positive attitude toward smoking. When the parental messages were included in the model, the effect of the father smoking became non-significant. Relating to the quality of the relationship with parents, parental control was significantly associated with positive attitude toward smoking while maternal and paternal closeness were not significantly associated.

The findings from this study provide support for Bandura's Social Cognitive Theory as a basis for smoking prevention program but also highlight the need to include consideration of parental factors in designing smoking prevention programs. Interventions that rely on social modeling influences while ignoring parental antismoking messages and the quality of the parent-adolescent relationship as inter-related social factors may not be effective in decreasing the female adolescent smoking rate.

TABLE OF CONTENTS

Page

Abstract	ii
Table of Contents	iv
List of Tables	vi
List of Figures	vii
Acknowledgements	viii
Dedication	ix

CHAPTER 1. INTRODUCTION	1
Deckground	1
Dackground	2
Adolescent Female Smoking Prevalence	6
Problem Statement	7
Purpose of the Study	8
Research Questions	9
Theoretical Framework	9
Social Cognitive Theory	12
Summary	14

CHAPTER 2: REVIEW OF THE LITERATURE	17
Trends in the Literature	18
Characteristics of Adolescence	19
Smoking Initiation Factors	22
Peer Smoking	25
Sibling Smoking	27
Parental Smoking	28
Parental Messaging	29
Quality of Relationship with Parents	30
Attitudes and Beliefs about Smoking	33
Gender Specific Smoking Attitudes, Influences, and Behavior	34
Strengths and Limitations	36
Summary	37

	,	
		V.
		•
	CHAPTER 3. METHODOLOGY	38
	Recearch Decign	38
	Research Design	20
	Survey Setting	38
	Survey Sample	39
	Study Sample	. 40
	Measures	40
	Social Modeling Variables	41
	Parental Messaging Variables	41
	Quality of Dalationship with Desents Variables	40
	Quality of Relationship with Parents variables	42
	Positive Attitude Variable	43
	Data Analysis	45
		· · · ·
	CHAPTER 4. FINDINGS	40
	Chamateristics of Study Sample	49
	Characteristics of Study Sample	49
н 	Step 1	52
	Step 2	53
•	Step 3	53
	Step 4	54
	Summary	58
	CHAPTER 5 DISCUSSION	50
	CHAPTER 5: DISCUSSION	59
	Significant Findings	59
	Social Modeling	59
	Parental Messaging	61
	Ouality of the Relationship with Parents	64
	Support for Social Cognitive Theory	66
	Implications and Decommondations	67
	Numine Desetion Incidential	07
	Nursing Practice Implications	67
	Research Recommendations	69
	Limitations of the Study	70
	Conclusion	72
	REFERENCES	74
		/+
	APPENDIX A	91
	APPENDIX B	92
	A PPENIDLY C	03
	AT LINDIA C	35
	APPENDIX D	94

List of Tables

vi

Table 1	Factor Loadings for Parental Control Scale	43
Table 2	Factor Loadings for Positive Attitude Scale	45
Table 3	Demographic Characteristics of Study Sample	50
Table 4	Characteristics of Immediate Social Environment	51
Table 5	Characteristics for Parental Messaging and Quality of Relationship with Parents	52
Table 6	Summary of Hierarchical Regression Analysis for Variables Influencing Adolescent Females' Positive Attitude Toward Smoking	55

List of Figures

PageFigure 111Figure 216

Acknowledgements

The completion of this thesis would not have been possible without the help and support of many people in my life. I would like to acknowledge my thesis chairperson, Dr. Joy Johnson, who spent a great deal of time providing guidance and direction in shaping this project.

I am also grateful to my thesis committee members, Dr. Susan Dahinten and Dr. Judy Lynam, for their valuable contributions to my learning, especially the early feedback on conceptual design.

I would like to thank my nursing colleagues who were always ready to listen and provide useful comments. Special thanks to my nursing friends of the "Pot Luck Club" whose unconditional support and good humour has saved many a day for me over the past 22 years of nursing.

I would also like to acknowledge the financial support that I received through the Registered Nurses' Foundation of B.C.

My family, Kevin, Thomas, and Bridget, are to be commended for their patience, understanding, love, and encouragement over the period of time required to complete this thesis. I'm so thankful that I have them with me on my journey through life.

Dedication

This thesis is dedicated to the memory of a wonderful girl, Rachel Badger, whose quiet strength in the face of adversity continues to inspire me to reach my goals. In nursing we often say that those we provide care for are our greatest teachers. Rachel taught me so much without saying a word.

CHAPTER 1: INTRODUCTION

Tobacco use has been described as an epidemic that poses a significant health threat at both an individual and societal level (U.S. Department of Health and Human Sciences [USDHHS], 2001). Smoking behavior is usually initiated during the adolescent years when young people experiment with lifestyle behaviors as part of the process of forming their own self identities and value systems (Lewis, 1991). Of the young people who experiment with tobacco use, about one third to one half become regular users (USDHHS). Thus, experimenting with tobacco use has a high potential for leading to a regular smoking habit with an uncertain potential for quitting (Ragon & Mouzon, 1999). Due to the addictive properties of the nicotine in tobacco, adolescents who experiment and then progress to smoking regularly are likely to continue to smoke into adulthood. However, if people do not start smoking in their youth, the research indicates that few would smoke as adults (USDHHS).

Adolescence has been clearly identified as a sensitive time period for initiation of tobacco use (Kobus, 1998). Self-identity and lifelong patterns of health self-management behavior are formed during this period. During adolescence, characteristics of this developmental age as well as decreased parental supervision and monitoring, and increased exposure to, and availability of, substances put adolescents at increased risk of substance use, including tobacco (National Institute on Drug Abuse [NIDA], 2003). Health promotion advocates and smoking prevention program developers are aware of this and many adolescents in Canada are now regularly exposed to anti-smoking messages through primarily school-based smoking prevention educational campaigns. Adolescents, and society in general, are currently well informed about the dangers of smoking. There are text and graphic images on every cigarette package, radio and television anti-smoking advertisements warn of the various diseases associated with smoking. One recent study indicated that young people now are better informed, have more negative attitudes toward smoking and have greater expressed intentions not to smoke than ever before (Grandpre, Alvaro, Burgoon, Miller & Hall, 2003).

Despite being well informed, some young people still decide to initiate smoking behavior. Information-based approaches on the negative consequences of tobacco use have been shown to be fairly ineffective in preventing smoking (Thompson, as cited in Chassin, Presson, & Sherman, 1990). Consequently, many smoking prevention programs now utilize a social psychological model. Interventions guided by this approach have been more successful than

information-based approaches in the adolescent population (Carvajal, Downing, Hanson, Coyle, & Pederson, 2004). The social psychological model recognizes the significance of social context as the factors predicting smoking behavior may vary considerably depending on socio-cultural characteristics of the adolescent (Carvajal et al). It is particularly valuable to understand how social factors influence adolescents as they are at a time in their lives when the social environment, particularly peer relationships, assume increasing importance (Erikson, 1950). There is also research evidence to suggest that girls may be more influenced than boys by smoking groups within their social world, including peers, siblings, and parents (USDHHS, 2001).

Background

Health behavior researchers have become increasingly aware of the need to explore attitudinal change toward a behavior, as a process that occurs *before* initiation of the behavior, such as smoking, in an effort to predict who is more or less at risk for behavioral uptake. Many factors have been clearly identified that help differentiate those adolescents who are more or less likely to use substances, including tobacco. All adolescents may be considered at risk for substance use and many will experiment with substances, including tobacco. The relative strength of the various risk factors is highly individual, a strong risk factor for one adolescent may not be a risk factor for another adolescent. We need to gain a deeper understanding of the contextual factors that might make some adolescents particularly susceptible, or vulnerable, to initiation of smoking behavior. Understanding, categorizing, identifying, and modifying risk factors is a current primary goal in prevention medicine (NIDA, 2003).

Recent research interest in the refinement of cognitive models of adolescent smoking has supported recognizing the importance of the influence of the adolescent's smoking beliefs and attitudes in relation to smoking behavior (Baker, Brandon & Chassin, 2004). Attitude may be defined as a mental position or feeling with regard to a state or fact (Merriam Webster, 2005). According to the U.S. Department of Health and Human Services (2001) the formation of attitudes and beliefs about smoking has been identified as the first of five 'key' stages in smoking progression from non-smoker to smoker (See Appendix A). The Vancouver Coastal Health Authority has suggested that monitoring of youth attitudes toward tobacco be done annually to help evaluate the current tobacco reduction strategies (Vancouver Coastal Health, 2004). The research indicates that adolescents form beliefs and attitudes about smoking before experimenting with this behavior and that attitudes are predictive of smoking behavior (Chassin, Presson, Sherman, Corty, & Olshavsky, 1984; Conrad, Flay, & Hill, 1992).

Recent research interest has focused on attitudes as a modifiable predictor of adolescent smoking (Simons-Morton & Haynie, 2003; Shadel, Shiffman, Niaru, Nichter, & Abrams, 2000). A large (N=2004) American study found that positive attitudes toward smoking were more predictive of smoking than self efficacy to resist smoking, negative attitudes toward smoking, impediments to smoking, and parental norms regarding smoking, and were second in predictive value for smoking behavior only to actual intention to smoke (Carnajal et al., 2004).

Gender-related differences in attitudes and beliefs about substance use are also receiving increasing attention from health promotion researchers and practitioners as it is recognized that prevention and intervention policies and programs need to be developed that are gender specific. As an example of a significant gender difference in smoking, there is now a considerable body of research evidence to support that addictive behaviors, such as smoking, progress more rapidly in girls than in than in boys and that the substance dose-physiological response is lower for females that for males (Kauffman, Silver & Poulin, 1997). This finding was supported in a large Swedish study by Galanti, Rosendahl, Post, and Gilljam (2001) who found that the transition from experimentation to regular smoking progressed more rapidly in girls than in boys. As smoking behavior and physiological response to smoking may be different in females than males, so may attitudes toward smoking. Understanding the attitudes that girls may have about smoking has increased significance as thoughts and beliefs about the impact of smoking on their health has been shown to be a more important deterrent to smoking among girls than among boys (USDHHS, 2001).

An additional factor in smoking prevention that is receiving increased research attention is the role of parents. As in childhood, parents continue to be a source of influence over behavior during adolescence. Although it has long been assumed that parental influence is eclipsed by peer influence during in the teenage years, recent research suggests that adolescents value their parents' opinions on smoking and look to them for direction and setting of norms, both within the family and in the wider social environment (von Bothmer, Mattson, & Fridlund, 2002). Examining the quality of the parent-child relationship is an important, yet under researched, area in smoking prevention. Lower smoking rates have been found in children who reported higher

levels of time spent and communication with parents compared to those children who reported lower levels of parental time and communication. (Cohen, Richardson, & Bree, 1994).

Similarly, parental messaging has become a factor of interest to researchers as several studies have found a reduced adolescent smoking rate when parents gave their children specific anti-smoking messages (Andersen, Leroux, Bricker, Rajan & Peterson, 2004; Jackson & Dickinson, 2002). Andersen et al. (2004) found that the association between parental anti-smoking messaging and a lower adolescent smoking rate was supported for both smoking and non-smoking parents, indicating that messaging may be a more important social factor than modeling of smoking behavior.

Although adolescents may engage in other risky health behaviors, such as drug and alcohol use, reckless driving, and high risk sexual behavior, only tobacco use has the potential to impact such large numbers of young people and cause such significant death and disease. On a global scale, according to The World Health Organization (WHO, 2000), nearly five million people die each year worldwide from tobacco-related illnesses and over the next 20 years, this number will escalate to 10 million deaths per year. Tobacco use and HIV are the only major underlying causes of premature death that are increasing on a worldwide basis (Cunningham, 1996). Tobacco use will eventually cause the death of one half of all long-term users (Canadian Cancer Society [CCS], 2003).

In 1998, approximately 47,581 Canadians died as a result of tobacco use and 22% of all deaths in Canada were attributable to smoking (Health Canada, 1998). Tobacco use continues to be the leading, preventable cause of disease, disability and death and causes the deaths of more Canadians than alcohol, car accidents, suicide, murder, and AIDS all combined (Health Canada). Although lung cancer and cardiovascular disease account for the majority of tobacco related deaths, current research links tobacco to 30% of all cancers (National Cancer Institute of Canada [NCIC] 2003). Twenty-four different causes of death have been identified as due to tobacco use including cardiovascular disease, lung cancer and other cancers, and chronic obstructive pulmonary disease (Doll, Peto, Wheatley, Gray, & Sutherland, 1994). Tobacco use also contributes to numerous other health problems including lowered immunity, cataracts, facial wrinkling, skin yellowing, peptic ulcer disease, gum disease, tooth loss and lowered bone density (USDHHS, 2001; Hollenbach, Barrett-Connor, Edelstein, & Holbrook, 1993).

Tobacco use in women is of particular concern as global rates of women's smoking are rising (Global Youth Tobacco Survey Collaborating Group, 2003). WHO (as cited in Greaves & Barr, 2000) warn that over 500 million women are expected to be smoking by the next generation, triple the current number. Additionally, the life expectancy for female smokers is lower than that of men with similar tobacco consumption (USDHHS, 2001). Lung cancer is now the leading cause of death due to cancer for Canadian women, having overtaken breast cancer (CCS, 2003). In terms of cancer trends among females, from 1987 to 1997 breast cancer and lung cancer both had relatively large increases in the number of new cases (NCIC, 2003). This marked rise in lung cancer is also apparent from the rank ordering of cancer incidence, where lung cancer ranked third in 1987, but increased to become second in 1997 in terms of the number of new cases (NCIC, 2003).

Women who use oral contraceptives and tobacco also greatly increase their risk of cardiovascular disease (Owen-Smith, Hannaford, Warskyj, Ferry, & Kay, 1998; USDHHS, 2001). Cardiovascular disease, defined as coronary heart disease, cerebrovascular disease, hypertension, heart failure or rheumatic heart disease, causes the deaths of 8.6 million women annually worldwide (WHO, 2000). Women may also experience significant illness and disability through cerebrovascular accident, carotid atherosclerosis and peripheral vascular atherosclerosis. For women under 50 years of age, tobacco use is the major cause of cardiovascular disease (USDHHS, 2001). Other gender-related health problems include problems with menstrual irregularities, impaired fertility, early menopause, and cervical cancer (Hobbs, Ferrence, Pope, Poland, Ashley, & Pederson, 1997; USDHHS, 2001).

In terms of female reproductive health, tobacco use has been linked to pregnancy complications such as low birth weight babies, premature and stillbirths, bleeding during pregnancy, spontaneous abortion and Sudden Infant Death Syndrome. Children born to smoking mothers have an increased risk of physical and intellectual problems including delayed growth and mental retardation (USDHHS, 2001). The infants and children of smoking mothers are exposed to environmental tobacco smoke (ETS), which has recently been recognized as a significant health issue for the pediatric population (Matt et al., 2004). ETS exposure in children is associated with lower respiratory infection; increased respiratory symptoms; reduced lung growth; exacerbation of asthma; irritation of the eyes, nose, and throat, and lower respiratory

tract; increased risk for middle-ear disease; and increased risk of tobacco-related diseases in adulthood (Stein, Haddock, O'Byrne, Hymowitz, & Schwab, 2000).

Recent research indicates that preventing tobacco use is particularly important in adolescent females. Adolescent females who use tobacco have reduced rates of lung growth (USDHHS, 2001), and girls who start smoking tobacco within their first five years of menstruation are 70% more likely to develop breast cancer compared to those who never smoked (Band, Le, Fang, & Deschamps, 2002). Tobacco use has also been linked to mental health problems including depression, anxiety disorders, bulimia, and attention deficit disorder although the exact relationship between these disorders and tobacco is unclear. This is of particular significance for females as they are more likely than males to be diagnosed with depression during their lifetime (USDHHS, 2001). Smoking behavior has been found to be associated with other high-risk health behaviors including alcohol and illicit drug use, and high-risk sexual behavior (BC Centre of Excellence for Women's Health [BCCEWH], 2001; USDHHS, 2001).

In addition to the intangible costs of pain, suffering, and dying due to tobacco use, there are also considerable economic costs to society. Tobacco use accounts for \$9.56 billion in costs, or \$336 per capita in Canada. This is more than half (51.8%) of the total costs for substance abuse in Canada (Single, Robson, Xie, & Rehm, 1996). Preventing tobacco use initiation, particularly among young women, is a significant health issue that has major implications on individual, societal and economic levels. Exploring the antecedent social factors in the development of attitudes associated with tobacco use in adolescent females will enhance understanding of the complex interactions associated with smoking initiation.

Adolescent Female Smoking Prevalence

According to 2003 statistics from the Canadian Tobacco Use Monitoring Survey (Health Canada, 2003), over five million people or 21% of the adult Canadian population are current smokers. For the 15-19 year old age group, 18% of Canadian teens smoke, a decrease from 22 % in 2002. Although smoking rates have been declining overall in Canada since the 1980's, it is still cause for concern that over one fifth of the 15-19 year old age group smoke and even more worrisome that the national smoking prevalence for teen girls, at 20%, is higher than that of teen boys, at 17% (Health Canada, 2003). Tobacco use has long been under-recognized as a

critical women's health issue although the rising prevalence of smoking among girls and women is now being recognized as "a serious matter on an international level" (BCCEWH, 2001, p.3).

At 16%, British Columbia has the lowest overall smoking prevalence (age 15 or over) of all of the Canadian provinces (CTUMS, 2003). However, the national trend of a higher smoking rate in adolescent females compared to males is echoed in British Columbia with 29% of adolescent females smoking compared to 24% of males (McCreary Society, 2003). The rates among certain subgroups of adolescents are also cause for concern, as another British Columbia survey indicated that 34% of adolescents from economically disadvantaged homes use tobacco and 39% of aboriginal adolescents smoke (Angus Reid, 1997). The 1994 Health Canada Youth Smoking Survey (YSS) found that only 2% of girls aged 10-12 smoked, and that these numbers increased to 14% for those girls aged 13-14 and 22% for 15-17 year old girls (Health Canada, 1996). The survey indicated that most girls who experiment with smoking do so by age 15 years. Other studies have supported that smoking initiation begins primarily in early adolescence (Marcus, Giovino, Pierce & Harel, 1993; Pickett, Koushik, Faelker, & Brown, 2000). However, a recent Canadian study using data from the 1994-95 National Population Health Survey found that 27% of post secondary students who were current smokers began smoking after the age of 17 (Cairney & Lawrence, 2002).

Problem Statement

Current research on smoking initiation in adolescents points to a complex interaction of personal, social, and cultural influences (USDHHS, 2001). Although it is beyond the scope of this thesis to discuss all of the potential influences on attitudes toward smoking and smoking behavior, it is important to note that social influences are only one set of factors related to smoking onset and may not be the strongest factor, depending on the individual. However, the research supports that smoking is a social behavior that is most frequently initiated with friends or family (Kegler, Cleaver, & Kinglsey, 2000). The overall influence of social context on behavior is well established in the social psychology literature and recent research suggests that girls, in particular, are influenced by their social environment in terms of smoking behavior (Gittelsohn, Roche, Alexander, & Tassler, 2001; Faucher & Carter, 2001). Smoking among girls needs to be examined from within the broader social environment as social factors appear to have greater importance in the acquisition of smoking behavior in adolescent females as

compared to adolescent males. Integration of social context in the study of smoking in girls has been identified as a research priority in a recent workshop report on research relating to adolescent female smoking (BCCEWH, 2001).

The research on social factors influencing smoking behavior has included examining the influence of social modeling factors, including peer and parental smoking, but the role of parental social factors, including messaging and the quality of the parent-adolescent relationship, has not yet been comprehensively researched. Additionally, the majority of the published literature on smoking prevention has focused on smoking behavior, rather than attitudes toward smoking as the first stage of behavioral change. At present, little is known about the possible associations and interactions between the influences of parental, sibling, and peer smoking, parental messaging, and quality of the relationship with parents on non-smoking adolescent girls' attitudes toward smoking. Gaining a better understanding of the influence of these factors in an adolescent girl's social environment in terms of her attitudes toward tobacco is important in order to prevent smoking initiation in this age group.

Purpose of the Study

The purpose of this study was to describe the associations between social modeling factors (mother smoking, father smoking, brother smoking, sister smoking, best friend smoking, boyfriend/girlfriend smoking), and positive attitude toward smoking in non-smoking adolescent females. Additionally, this study examined whether parental anti-smoking messages and the quality of the relationship with parents influence the above associations. A more in-depth understanding of the factors influencing non-smoking adolescent females' attitudes toward smoking behavior may facilitate refinement of theoretical frameworks to further the development of effective smoking prevention programs targeted toward adolescent females.

Research Questions

- 1. After controlling for age, ethnocultural diversity, and region, are social modeling factors (mother, father, sister, brother, boy/girl friend, best friend smoking) associated with non-smoking adolescent females' positive attitude toward smoking?
- 2. After controlling for age, ethnocultural diversity, region, and social modeling factors, is parental messaging ("parents won't allow me to smoke", "parents warned me about the dangers of smoking") associated with non-smoking adolescent females' positive attitude toward smoking?
- 3. After controlling for age, ethnocultural diversity, and region, does parental messaging influence the association between social modeling and non-smoking adolescent females' positive attitude toward smoking?
- 4. After controlling for age, ethnocultural diversity, region, social modeling, and parental messaging, is the quality of relationship with parents (maternal closeness, paternal closeness, parental control) associated with non-smoking adolescent females' positive attitude toward smoking?
- 5. After controlling for age, ethnocultural diversity, and region, does the quality of the relationship with parents influence the association between social modeling and non-smoking adolescent females' positive attitude toward smoking?

Theoretical Framework

While the focus of this study is not smoking behavior, research has shown that attitudes play an important role in informing behavior (Bandura, 1986). Flay, Petraitis and Hu (1999) stress that the basis of understanding a behavior lies in an integrative analysis of both the broad and immediate social environments surrounding the behavior, the personal characteristics of the person, the behavior itself and related behaviors, and finally the interactions among all of these

factors. Social psychology research examines the relationships between group processes and structures (social context) and individual characteristics such as perceptions, attitudes and beliefs as both social and cognitive processes are seen as influencing and determining voluntary behavior or action. Therefore, changing the social context of an individual is also seen as changing the cognitive capacities of the individual (Kearl & Gordon, 1993).

A longstanding underlying assumption in behavioral research is that attitude leads to behavioral intent and is therefore a strong predictor of behavior. More recently, researchers have theorized that a particular behavior, such as smoking, can be attributed to many attitudes within the person and that behavior should be studied in terms of attitudinal trends rather than singular behavior (Fazio, Powell, & Williams, 1989). Attitudes toward smoking behavior have not been as widely researched as smoking behavior itself but have been shown to be linked through behavioral intent, which is measured in smoking prevention as susceptibility. Theoretically, positive attitudes toward smoking would increase the likelihood of behavioral intent to smoke and increase the likelihood of uptake of smoking behavior. Susceptibility combines 'intentions' and 'expectations' around future behavior and thus can identify those with a cognitive predisposition to smoking initiation. Several studies have supported the construct of susceptibility. A longitudinal study by Jackson (1998) indicated that susceptibility is a strong predictor of smoking experimentation, exceeding even the influence of social group smokers in the environment. Distefan, Gilpin, Choi, and Pierce (1998) found that among 'never smokers', baseline susceptibility predicted smoking experimentation within four years in a large (N = 4149) longitudinal study in the United States. A recent study by Filice, Joseph, Hannan, and Lando (2003) found that susceptibility among ninth-grade students increased from 31% in October to 47% in May of the school year, suggesting an increased period for susceptibility over a relatively short period of time. Susceptibility was also seen to decrease in the later grades, highlighting the importance of smoking prevention in early adolescence when susceptibility may be higher than in later adolescence.

There is a growing body of literature on the social influences on smoking as a behavior but social influences on the attitudes toward smoking, rather than the behavior, also need to be more closely examined. The theoretical approach utilized in this study is guided by the smoking prevention research as discussed in the preceding paragraphs. The directional effect suggested in the model is based on social psychological theory (see Figure 1). The behavioral effect cannot

be empirically supported by the data in this study, which is limited to examining social influences and attitude toward the behavior.

Figure 1. Relationship between Social Factors and Behavior

Social Factors→Attitudes→Thinking(Modeling,(Beliefs/Values)(Behavioral Intent)Messaging,Relationships)

This study focuses on three components that have been shown to influence adolescent attitudes to smoking behavior; social modeling, parental anti-smoking messaging and the quality of the relationship with parents. Empirically, the social smoking groups identified in the model, mother, father, brother, sister, girlfriend/boyfriend and best friend have all been identified in the literature as influential in predicting adolescent smoking behavior (Conrad, Flay, & Hill, 1992).

Parenting factors have also been included in smoking prevention research as influential in predicting smoking onset in adolescents (USDHHS, 2001). The research supports parental antismoking messaging as significant in smoking prevention (Jackson & Dickinson, 2002). Darling and Cumsille (2003) suggested that the most important effects of family influence on adolescent smoking might be in the ability to moderate the influence of other contexts, such as the influence of peer smoking. The quality of the parental relationship as a moderating factor between social group smoking and adolescent smoking behavior has been theorized in the literature but has not yet been empirically tested. Avenevoli and Merikangas (1998) suggested examining impaired parenting as a moderating factor in adolescent smoking. Impaired parenting was defined as inconsistent monitoring and discipline, and a lack of response and warmth.

In relation to smoking attitude and behavior, positive attitude toward smoking has been found to be strongly associated with increased risk of smoking behavior, (Conrad, Flay, & Hill, 1992; Brownson, Jackson-Thompson, Wilkerson, Owens, & Fisher 1992; USDHHS, 2001). Attitude change from more negative to more positive attitude would theoretically increase an adolescent's intent to initiate smoking behavior. The linkages between concepts for the model for this study were derived from the literature reviewed associating social factors with smoking behavior (See Figure 2). Understanding which social factors have the most influence on attitudes toward tobacco use may help researchers gain a deeper understanding of how adolescents increase or decrease their susceptibility by forming intent to smoke or not to smoke. In a review of the literature relating to smoking prevention, the predominant theory currently utilized that includes modeling, messaging, and relationships is Bandura's Social Cognitive Theory. This theory emphasizes the inter-relationships of social modeling, messaging from the social environment, attitudes and beliefs, as well as the importance of the quality of the relationship with others in the social environment in terms of uptake of behavior. Social Cognitive Theory helps to inform the theoretical approach used in this study as Bandura suggests that the behavior of others in the social environment can influence an individual's behavior by both 'modeling' and 'instruction' through messaging. The central tenets of this theory and its applicability to attitudes toward smoking are discussed below.

Social Cognitive Theory

Bandura's Social Cognitive Theory (SCT) explains human behavior as continuous reciprocal interactions, or feedback loops, between three influences; cognitive, behavioral, and environmental. (Bandura,1986). The sources of influence are not seen as equal in strength and they are not seen as occurring simultaneously. The cognitive-behavior interaction involves the idea that thoughts, beliefs, personality characteristics, and factors such as ethnocultural diversity and gender shape behavior; behavior then affects thoughts. Bandura included the concept of anticipatory thought or expectations of the behavioral outcome before the behavior was performed. Included in one's beliefs is the idea of self-efficacy, or belief in one's capability of successfully performing the behavior. The belief in capability of successfully not smoking would be expressed as intent, which is subsequent to formation of attitudes about smoking.

A second interaction is that between the environment, or social context, and cognition. Social influences through the environment are seen as conveying information and evoking emotional responses through instruction, modeling and social persuasion. Instruction would be the specific message given to direct the behavior. Modeling of behavior includes imitation of the behavioral actions. Bandura theorized that people are most likely to model behaviors of people

that they associate and identify with the most. In other words, those they feel closest to and are most like themselves. If an adolescent girl identified more closely with her peers than her parents, a smoking peer would increase the likelihood of initiating smoking through modeling. Conversely, a close relationship with a non-smoking parent would decrease the likelihood of smoking uptake. Social persuasion refers to the internal and external pressure that a person experiences related to behavior. External pressure would be offers of cigarettes from peers and family while internal pressure would be the perception of a social norm of smoking.

The third interaction is that between behavior and the environment. A person's behavior is seen as determining their exposure to their environment and the environment influences their behavior. By exhibiting preferences and competencies, humans choose whom they will interact with and the time and setting of the interactions. As such, people are seen as constantly shaping and being shaped by their environment. Thus, smoking behavior will be shaped and reinforced by an environment in which the smoking behavior of others is present. The environment influences which forms of behavior are developed, activated, and maintained (Bandura, 1986).

Programs based on Social Cognitive Theory are currently being utilized in both school and community settings in smoking prevention programs (Vancouver Coastal Health, 2004). However, recent research suggests that theoretical frameworks for predicting smoking progression need to be further developed and tested. Collins and Ellickson (2004) developed an integrated model for adolescent smoking utilizing predictors from the Theory of Planned Behavior, Social Cognitive Theory, Social Attachment Theory, and Problem Behavior Theory. They found that, while each theory had important constructs that were independent predictors of smoking behavior, the integrated model was a better predictor. Flay et al. (1994) utilized the Theory of Planned Behavior and Social Cognitive Theory to construct a model to test the relative influence of parental smoking and friends' smoking on adolescent initiation. The factors tested for interactions were friends' approval of smoking, perceived parental approval of smoking, refusal self-efficacy, and intention to smoke or not to smoke. Their results indicated that having smoking friends influenced smoking initiation in both an indirect (norm) and direct (modeling) manner and that friend or peer smoking had a stronger influence than parental smoking.

Similarly, McGahee, Kemper, and Tingen (2000) developed a theoretical model for smoking prevention using Social Cognitive Theory and the Theory of Reasoned Action. Their

model included socio-demographics, internal factors (attitudes, norms), external factors (parental attitudes), and smoking behaviors (intention and actual behavior). However, further testing of this model is not apparent in the published literature. Wilkinson and Abraham (2004) also constructed an integrated model of the antecedents of adolescent smoking that included both personal and social factors. They found that parental support had an indirect influence on the other variables, suggesting a moderating effect.

The studies by Flay et al. (1994), Collins and Ellickson (2004), McGahee, Kemper, and Tingen (2000), and Wilkinson and Abraham (2004) have attempted to integrate and refine theoretical frameworks for application in the prediction of smoking behavior. Currently, it is apparent that no single theory addresses all of the complex interactions that lead to initiation of smoking. Although there is now a considerable body of literature and empirical knowledge on prediction of smoking behavior, prevention of the behavior is proving to be more difficult than prediction. Many current school-based smoking prevention programs utilize Social Cognitive Theory and it has been seen as particularly important to teach refusal skills in response to peer pressure to smoke (Vancouver Coastal Health, 2004). However, there is recent empirical evidence to suggest that this approach may not be particularly effective. A large study conducted from 1984 to 1999 followed 8,388 children from grade 3 to grade 12. The purpose of the study was to determine the long-term impact of a theory-based social influences smoking prevention program. The social influences program used strategies to help children recognize social influences to smoke, enhance skills to resist social pressures to smoke, and gain awareness of tobacco-free social norms. The researchers found no significant differences in smoking prevalence between children who had received the smoking prevention program and those who hadn't. The research findings were consistent with previous smaller studies, suggesting that the social influences approach may not be effective in preventing smoking among youth (Peterson, Kealey, Mann, Marek & Sarason, 2000).

Summary

While much research has been done on the influences and antecedent factors related to smoking uptake in adolescents, there are still many questions related to relationships between social factors and non-smokers' attitudes about smoking. It is of particular importance to examine social factors and non-smoking adolescent females' attitudes toward smoking as adolescent females may be more influenced by their social environment than males and have many gender specific health risks related to tobacco use. Knowledge about the factors influencing attitudes that in turn shape health behaviors will be key in the development of appropriate and relevant policies and programs for tobacco use prevention in adolescents (Mills, Stephens & Wilkins, 1994).

Although overall smoking rates are down among youth in British Columbia (McCreary Centre Society, 2003), and the majority of adolescents do not now smoke and will not smoke in their lifetime, all adolescents are at risk for smoking initiation during adolescence and therefore at risk for significant future morbidity and mortality as a direct consequence of smoking behavior. Smoking prevention is important to nursing as nurses are not only directly involved in caring for patients who are hospitalized with smoking related diseases, but they also deliver many school and community-based smoking prevention programs. Gaining insight into social factors related to attitudes related to smoking may assist nurses in their health promotion initiatives and may help to reverse the current upward trend in adolescent female smoking initiation.

Figure 2. Model for Social Modeling, Parental Messaging, Quality of Relationship with Parents, And Positive Attitude toward Smoking



CHAPTER 2: LITERATURE REVIEW

The purpose of this literature review is to describe the current state of knowledge in the published literature on social and parenting factors related to smoking attitudes and behavior in non-smoking female adolescents. The databases MedLine, CINAHL, PsycINFO, and Academic Search Elite were searched using the following search terms: smoking and social context. As the results were sparse, the search strategy was expanded by using the terms, smoking, tobacco, adolescent female, smoking prevention, parental monitoring, parental control, and social influences, with a limitation to studies published from 1980 to 2005. This search generated over four hundred articles from the disciplines of psychology, sociology, nursing, medicine, and addictions research. Articles related to adult smoking and evaluations of smoking prevention and cessation programs were excluded for the purposes of this literature review and those articles examining the influences on adolescent attitudes and behaviors related to tobacco use and related health behaviors were included. Although the majority of the published literature was American, efforts were made to include non-American studies, which have been identified as such.

As positive attitude toward smoking has been found to be strongly associated with increased risk of smoking behavior, (Conrad, Flay & Hill, 1992; Brownson, Jackson-Thompson, Wilkerson, Owens, & Fisher 1992; USDHHS, 2001), and smoking behavior has been more comprehensively researched than attitudes toward smoking, studies were included that examined social influences on smoking behavior. The review begins with an overview of the current trends in smoking prevention literature and continues with a discussion of adolescence including characteristics of this developmental age. The literature on social influences on adolescent smoking behavior will then be critiqued. In addition, a review of the research on parental messaging and the quality of the relationship with parents in relation to adolescent smoking attitudes and behavior will be included. The literature related to attitudes toward smoking and differences between females and males in terms of attitudes, influences and smoking behavior is then discussed. An examination of the strengths and limitations of the research will be provided as well as a summary of the literature to date.

17[.]

Trends in the Literature

Several trends in smoking prevention science are apparent from the review of the current literature. The first trend in the research is a focus on attitudes, values, and beliefs relating to the behavior, rather than the smoking behavior itself. It is apparent from the literature that the process of becoming a smoker can be viewed along a continuum with a change in attitude toward the behavior seen as the first stage of change from a non-smoker to a smoker. Understanding the various influences and strengths of these influences on attitudes may prevent progression along this continuum. Researchers are now re-conceptualizing smoking experimentation and continuation as separate behaviors with different timing and determinants. Smoking behavior may be viewed along a tobacco trajectory rather than a person being viewed as a 'smoker' or 'non-smoker'. Several studies have found that the relative strength of various predictors, particularly psychosocial predictors, may differ for experimentation versus escalation in smoking behavior (Distefan, Gilpin, Choi, & Pierce, 1998; Flay, Hu, & Richardson, 1998). Research with 'experimenting' smokers indicates that social motives and context (who is smoking around them) are influential to their smoking while 'confirmed smokers' tend to stress the importance of mood control (Baker, Brandon, & Chassin, 2004).

The second trend is research interest moving away from examining adolescent smoking as an individual behavior and instead looking at adolescent behavior within the multiple social contexts that are part of adolescent life. As adolescents grow and spend increasing amounts of time in the larger social world, the relative influences of social factors need to be closely examined. Family, school, peers, and the community all have influence and may protect against, or increase risk for, adolescent health risk behavior. Psychosocial risk and protective factors have been strongly associated with variances in adolescent risk behavior, including smoking (Jessor et al., 2003). Peer influence has long been assumed to be the strongest social influence on smoking initiation but parental factors such as control, closeness, and anti-smoking messages are now being seen as increasingly important. Particularly, researchers have become interested in protective factors as moderating or buffering agents in relation to the impact of risk factors. For example, if a child lives with smokers, a risk factor, then the effect of social behavioral modeling on the development of the child's smoking may be buffered by a high level of parental closeness, a protective factor.

A third trend involves acknowledgment that policies and programs in prevention need to be based on sound theoretical frameworks. Smoking initiation factors have now been clearly established but many of associations and interactions between these factors have not yet been comprehensively researched in order to guide specific interventions. Social Cognitive Theory is currently the predominant theory being utilized in adolescent smoking prevention. However, characteristics of adolescence are important considerations in the application of behavioral theories that were developed for the adult population as these theories may need to be refined or new theories developed that are specific for the adolescent population.

A final trend in the literature is the emphasis on development of gender specific theory and interventions. The body of research suggests that smoking initiation may be a different experience for girls than for boys in terms of individual characteristics as well as the influence of a girl's social context (USDHHS, 2001). Although there are female specific prevention approaches such as "Beauty from the Inside Out", a one-day social influences smoking prevention workshop offered through community health (Vancouver Coastal Health, 2004), gender specific approaches to smoking prevention are not yet well established. In a recent Delphi study on best prevention practices for female adolescents, there was acknowledgment among the substance use professionals that there are differential risk factors for girls but the researchers cautioned that more research needs to be undertaken before specific prevention practices for adolescent females can be developed and implemented (Davis et al., 2004).

Characteristics of Adolescence

The stage of adolescence, beginning with puberty at generally 10-12 years old and ending at 18 or 20 years old, is a time of major physical, emotional, and cognitive growth and change. Adolescence may be divided into early, (11-14 years), middle, (15-17 years), and late, (18-21 years) stages (Steinberg, 2005). The transition into adolescence is defined by the physical changes of puberty, school changes from an elementary to a high school environment, cognitive changes with increased ability to understand cause and effect and abstract thought, and changes in family relationships as adolescents seek more independence from parental supervision (Lewis, 1991).

Although physical growth and sexual maturation are often rapid during adolescence, cognitive development may be delayed behind physical development. As children progress

through the stages of adolescence, their abilities to think about and interact with their environment change and grow. They are able to understand factors affecting health and illnesss, influences on health status, and ideas related to health promotion (Bastable, 2003). However, recent research suggests that an adolescent's brain may not be fully developed in terms of cognition until late adolescence, or over the age of 18 years (Huebner, 2000). Although early and mid- adolescents may be aware and profess an understanding of the future implications of a health behavior such as smoking, the adolescent's focus is on the present and thus they may be unable to apply a potential outcome, such as lung cancer, to themselves.

So, although the adolescent may appear almost adult in physical appearance and imitate behaviors perceived as adult such as using tobacco, alcohol, and engaging in sexual behavior, their cognitive development may be such that they cannot yet comprehend the implications of their behavior. This limited cognitive ability, combined with lack of previous experience in making similar decisions about health behaviors, increases the vulnerability of this population. Cognitive vulnerability is also increased during this period as adolescents have been shown to have decreased perceptions of the personalized risks of smoking and decreasing values on health as an outcome (Baker et al., 2004). Adolescents may also display inconsistent, illogical and impulsive actions, emotions and judgments as part of the process of individual identity formation (Huebner, 2000). An adolescent may profess a belief, such as 'smoking is bad for you', and may still experiment with that behavior. The lack of logical reasoning between attitudes and behavior and attitudinal ambivalence in adolescence limits the application of behavioral theories that were developed for the adult population (Baker et al.).

Additionally, studies on adolescents have shown that they can possess a feeling of invulnerability that lowers their perception of personal risk when engaging in health risk behaviors (Bastable, 2003). An adolescent female might think that other people would be at risk for developing a tobacco dependence due to smoking but she may be unable to fully comprehend that this could happen to her. Unfortunately, the damage from tobacco use as a health risk behavior often does not arise until many years after initiation of a smoking habit, making the linkage between smoking behavior and subsequent disease difficult to comprehend for adolescents.

During childhood, a young person spends much of his or her time with family. Health behaviors such as good diet, adequate rest, and personal hygiene are usually taught and

monitored by parents. In most families, unhealthy behaviors such as substance use are discouraged. Initially, parents are the persons who introduce children to the rest of society through the process of socialization. Socialization may be defined as the process by which, through contact with other human beings, one becomes a self-aware, knowledgeable human being, skilled in the ways of a given culture and environment. Primary socialization occurs in infancy and childhood and represents an intense period of behavioral and cultural learning while secondary socialization takes place later in childhood and into adolescence and adulthood. Parents are the primary socializing agents during childhood, with siblings, peers, teachers, and media being secondary agents (Giddens, Duneier, & Appelbaum, 2003).

During adolescence, as part of the process of forming their own identity, adolescents often begin drawing away from their parents, rejecting parental values and beliefs and forming closer relationships with their peers (Lewis, 1991). As the child grows and begins to spend more time in the company of peers, the relative influence of family and peers changes. An American study examined 1725 children over a five year period when the children were between 11 and 17 years of age with the purpose of studying how the influence of the social environments of family, peers and school, changed over the adolescent period in relation to adolescent problem behaviors. The researcher found that the effect of school and friends grew during early adolescence, peaking by mid adolescence, and then declining (Jang, 1999). At 13 and 14 years old, peers were found to exert a greater influence on adolescents than parents. Parental influence remained steady throughout the stages of adolescence but was temporarily eclipsed by peer influence during mid adolescence. The strong peer influence during mid adolescence should not be seen as necessarily negative. This expansion of the social world is an important part of identity formation and is considered a key characteristic of adolescence (Darling & Cumsille, 2003).

According to Erikson (1968), the primary task during adolescence is to achieve ego identity and avoid role confusion. *Ego identity* is defined as knowing who you are and how you fit in to the rest of society. *Role confusion* is defined as an uncertainty about who you are and your place in society and the world. Erikson, coined the term "identity crisis" to refer to adolescence, referring to the period of confusion and anxiety when young people must choose from among a variety of alternatives and make commitments to a specific set of goals and values. Young people who lack the stability or self-awareness to solve their identity conflicts risk

a state of *identity diffusion*, an inability to make defining choices about themselves, which can later block their psychosocial development as they reach adulthood.

Adolescents seek to define their role and identity through questioning and experimenting. Experimentation with clothing, hairstyles, attitudes, and behaviors in adolescence is an important part of forming relations with oneself, groups, and the opposite sex (Lewis, 1991). Unfortunately, adolescents may experiment with behavior, such as smoking, much as they might try a new hair colour or style of shoes, and become quickly addicted to tobacco. Adolescents may not even be aware that they are dependent on tobacco until they are unable to stop smoking (Johnson, Bottorff, Moffat, Ratner, Shoveller, & Lovato, 2003).

Adolescents are often preoccupied with what they appear to be in the eyes of others as compared with what they feel they are (Erikson, 1950). Peer relationships are particularly important to adolescents as they seek groups other than their parents to identify with. Peers help adolescents find answers to the question "who am I?" as they depend strongly on social feedback to guide their identity formation (Lewis, 1991). Thus, young people are particularly attuned to messages from their social world and strongly influenced by people whom they seek to emulate. As peers are the people whom many adolescents identify with most strongly, if an adolescent has peers who smoke then experimentation with smoking behavior is strongly suggested (Ellickson, Bird, Orlando, Klein, & McCaffrey, 2003). Once an adolescent has started even experimenting with smoking, smoking may become a key social symbol (Eckert, 1983) that clearly delineates one group, 'smokers', from another, 'non-smokers'. Thus, it may be very difficult for young people to change their social identity by stopping experimental smoking behavior without alienating themselves from their peer group.

Smoking Initiation Factors

Smoking initiation risk factors are many and varied. Conrad, Flay and Hill (1992) reviewed 27 prospective studies of cigarette smoking onset and found close to 300 measures of predictors of smoking onset with 74 % of them providing support for predictors previously identified from empirical studies and theory. Predictors included;

1. socioeconomic status

2. peer, school and family bonding

- 3. social learning variables including peer and parental smoking and approval
- 4. refusal skills self efficacy
- 5. knowledge, attitudes and intentions
- 6. indicators of self esteem

Many efforts have been made to categorize smoking risk factors in order to guide theoretical framework development. Petraitis, Flay and Miller (1995) suggested that the risk factors could be divided into type of influence and level of influence. The types of influence include social (belief, attitudes, behaviors), cultural (social norms), and personal (personality traits, behavioral skills). The levels of influence are seen as impacting the direction and strength of the type of influence and are defined as ultimate (broad-not strongly predictive), distal (indirect-predictive), and proximal (precursors of behavior-predictive).

Faucher and Carty (2001) categorized smoking risk factors as modifiable or non-modifiable. Being white and having smoking peers and parents were examples of non-modifiable risk factors for smoking initiation while modifiable risk factors were described as personal attributes such as self esteem, beliefs and attitudes, susceptibility to peer influence, and smoking-specific socialization factors including parental monitoring and accessibility to tobacco.

The National Institute on Drug Abuse (2003) describes individual potential for substance use in terms of factors as risk and protective factors within five domains or settings. The domains are individual, family, school, peer, and community. Risk factors are associated with greater potential for substance use while protective factors are associated with reduced potential. Risk factors include early aggressive behavior, lack of parental supervision, peer substance use, substance availability and poverty. Protective factors include impulse control, parental monitoring, academic competence, anti-substance use policies, and positive community involvement. Protective factors decrease the likelihood of health risk behaviors by providing behavioral models, personal and social controls against the behavior, and a supportive environment. By contrast, risk factors increase the likelihood of risk behaviors by behavioral modeling of the risky behavior, greater opportunity, and greater personal vulnerability (Costa, Jessor & Turbin, 1999).

Although ethnocultural risk factors, often conflated with race, are discussed in relation to smoking behavior in the published literature, the exact mechanisms of the influence of

ethnocultural diversity and socioeconomic status on smoking behavior are not yet clearly established. Lynam (2005) suggests that it is not the ethnic background that creates health inequalities, but factors such as poverty and marginalization that contribute to differences in health status between social groups. Congruent with viewing health as a socially mediated process, Lynam advocates improving social conditions that limit health behavior choices rather than focusing on individual health behaviors. The influence of ethnocultural diversity on health behavior is multi-faceted and it is still largely unknown how processes related to racialization, culture, and community interact to influence smoking behavior.

It has been recognized that various factors may be influential at different times in the adolescent's life and in different stages of the acquisition process of smoking behavior. A recent development in smoking prevention research is to examine predictors for different stages of smoking. Several studies have supported that smoking initiation factors may be different than the factors that influence adolescents to continue to smoke. Flay et al. (1994) found that friends' smoking had a stronger influence on initiation of smoking than on escalation of the behavior. De Vries et al. (in press), in a large study of 13 year olds in six European countries, found that the adolescents who had never smoked had more negative beliefs about smoking than those who had experimented. The never smokers also reported less smoking groups (parents, peers, siblings) in their environment than the experimenters. This research has important considerations for theory development in the area of prevention as different interventions may need to be developed that target different stages of smoking acquisition. Although it is beyond the scope of this thesis to discuss all of the factors associated with the different stages of smoking, it is clear from the literature that social factors including exposure to other smoking groups in the immediate environment, parental factors, and attitudes have been consistently identified as significant considerations in initiation of smoking behavior.

Researchers are placing increasing importance on the role of social factors in relation to adolescent health risk behaviors, such as smoking. For adolescent girls, social factors that have been identified as consistently linked to an increased risk of smoking in this population are having a friend who smokes, having a parent who smokes, being more attached to their friends than their parents, and having a positive image of smoking (BCCEWH, 2001). However, it is less clear how the relative strength of these factors may impact adolescent girls' positive

attitudes to smoking. Findings from the body of research on social factors associated with smoking initiation are mixed and are discussed in greater detail below.

Peer Smoking

Peer smoking has been consistently identified as a predictive risk factor in adolescent smoking in many studies over the past 20 years (USDHHS, 2001). Conrad, Flay, and Hill (1992) reviewed 16 longitudinal studies and found that peer smoking was predictive of smoking in 15 of the 16 studies. In terms of social factors in smoking initiation, their review indicated that peer smoking and approval was more strongly supported than parental smoking and that approval and intention to smoke was a stronger predictor than attitude or knowledge. Recent studies have also researched the influence of peer smoking in relation to other social group smoking.

Beal, Ausiello, and Perrin (2001) studied the relative influences of parental versus peer social influences on adolescent health risk behaviors in a cross-sectional survey and found that peer and peer group behavior was a stronger influence on adolescent health risk behavior than parental social influences. Parental social influence was measured by parental disapproval of the behavior, parental modeling, and parental monitoring. The effect of peer influence was supported by Chopak, Vacary, and Crockett (1998) who examined adolescent perception of risk and the behavior and attitudes of parents and peers in relation to tobacco use. They found that peer tobacco use was a stronger predictor of tobacco use than parental use while perception of risk was not significant.

Flay et al. (1994) examined differential influences of parental smoking and friends' smoking on stages of smoking behavior and found that friends' smoking had a stronger effect than parental smoking on adolescent smoking behavior, particularly on initiation of smoking. Miller and Plant (2003) looked at the relative importance of parents and peers in predicting substance use in a large (N=2641) British study and found that peer influence showed the strongest association with subsequent substance use while parental monitoring and parental attitudes toward the behavior were also important factors. Rose, Chassin, Presson, and Sherman (1999) also found that peer influences were more significant than parental or sibling influences in smoking behavior.

The importance of peer influence was supported in a Dutch study that examined socioeconomic differences in smoking attitudes and behavior between high socio-economic (HSES) youth and low socioeconomic (LSES) youth. Both groups reported pressure to smoke from their social environment with the most pressure coming from friends and peers rather than parents. Several important differences were found including LSES youth reporting greater overall social influences to start smoking, a stronger social norm towards smoking from parents, and more direct pressure to start smoking from their peers (de Vries, 1995). In a study that specifically examined the changes in peer and parental influence over time, Hu, Flay, Hedeker, and Siddiqui (1995) also found that the effect over time of friends' smoking was stronger than the effect of parental smoking.

These findings on the dominant influence of peer smoking were supported by Avenevoli and Merikangas (1998) who reviewed 87 studies on familial influences on adolescent smoking and found that peer smoking showed greater association with adolescent smoking than did parental smoking or sibling smoking when reviewed across studies. Kobus (2003), in a critical review of current research on peer influences on adolescent smoking, found that adolescent peer relationships contribute significantly to adolescent smoking, although the mechanisms of peer influence seem to be more subtle than previously thought. Rather than overt peer pressure, adolescents reported an internal self-pressure to smoke if others around them were smoking. The research examined indicated that smoking initiation was linked to gaining social approval, facilitating social interactions, and achieving a sense of autonomy. Flay, Hu, and Richardson (1998) examined psychosocial predictors of different stages of smoking in an American longitudinal study. Friend's smoking and approval and smoking intentions were significantly correlated with the transition from trial to experimental smoking while parental smoking became a more important predictor in the transition from experimental to regular smoking.

In terms of best friend versus peer group influence, the studies to date indicate that best friend has a stronger influence than peer group in general. Johnson et al. (2002) examined smoking behaviors and predictors in a large (N=3,654) longitudinal study on fifth through eight graders. They found that the strongest correlate of smoking behavior in grade eight was having a best friend who smoked. These findings were supported by Greenlund and Johnson (1997) who found that having a best friend who smoked was a strong positive correlate of smoking experimentation. In a longitudinal study of 937 adolescents, Stanton, Currie, Oei, & Silva (1996) found that close friend smoking, girlfriend/boyfriend smoking, and having a majority of smoking people as daily contacts were all predictors of smoking status. Urberg (1992) also found

that a best friend rather than social crowd influence predicted change in smoking behavior over a one year period. Similarly, a study by Morgan and Grube (1991) found that best friend had more influence on adolescent smoking, particularly maintenance, than friend group and that the effect was greater for females than males. Fagan, Eisenberg, Stoddard, Frazier, and Sorensen (2001) found the opposite effect in that in their research indicated that best friend influences to smoke were more significant for boys than for girls. Urberg, Cheng, and Shyu (1991) also found that boys, rather than girls, were more influenced by their smoking friends.

There are several studies on peer smoking influence examining the specific impact of a boyfriend on adolescent smoking. In a longitudinal study, Akers, Skinner, Krohn, and Lauer (1987) found that adolescent girls were significantly influenced in smoking behavior by their boyfriends. Faucher and Carty (2001) also found that the smoking behavior of a boyfriend was associated with adolescent female smoking. Similarly, Wang, Fitzhugh ,Westerfield, and Eddy (1995) found that having a steady boyfriend who smoked was significantly associated with female adolescent smoking. No studies were found that examined girlfriend influence on female adolescents, other than as best friend influence, however it is reasonable to suggest that the influence might be similar to boyfriend influence.

Sibling Smoking

Studies on sibling smoking in relation to adolescent smoking have indicated that sibling smoking, like peer smoking, is a strong predictor for adolescent smoking. von Bothmer, Mattson, and Fridlund (2002) examined influences on 11-14 year old's smoking behavior in Sweden. They found that siblings' smoking status influenced the smoking habits of the subjects more than parental smoking. In support of these findings, Meier (1991) found that siblings had a strong effect on a child's attitude toward smoking while parents were not shown to have an effect.

Similarly, Conrad, Flay, and Hill (1992) reviewed the findings of 27 prospective studies of the onset of smoking and found a higher level of support for sibling smoking as a predictor of onset in comparison to parental smoking. In relation to peer influence, Rose, Chassin, Presson, and Sherman (1999) found similarities between siblings in their smoking behavior but peers were still the most influential group on smoking behavior. Ary and Biglan (1988) found that older sibling smoking did not have a significant influence on smoking status among younger
siblings. Wilkinson and Abraham (2004) found by contrast that older brother smoking predicted smoking in 13-14 year olds.

Most sibling smoking influence studies do not specify gender of the sibling although one study by Wang et al. (1995) suggested that the effect between same sex females (sister to sister) was greater than between different sex siblings. It is important to note that information such as sibling gender, number, age relative to the subject, and residential status are often not included in research on sibling smoking and limit research findings in this area (Darling & Cumsille, 2003).

Parental Smoking

Parental smoking has been directly linked to child smoking in a multitude of cross sectional and longitudinal studies (USDHHS, 2001). However, the research often does not differentiate between maternal and paternal smoking behavior in terms of the influence on the child. Additionally, the gender of the child is often not specified.

In a longitudinal study, Jackson, Hendricksen, Dickinson, and Levine (1997) found that parental modeling of smoking was significantly associated with both starting and becoming an established smoker. Engels, Vitaro, Blokland, de Kemp, and Scholte (2004) examined parental smoking as a moderating factor on the relationship between peer smoking and adolescent onset in a longitudinal study of 1565 adolescents. They found that parental smoking did not have a moderating effect on this relationship but also that adolescents with smoking parents were more likely to have smoking friends, suggesting an indirect effect on smoking acquisition. Biddle, Bank, and Marlin (1980) found that parental smoking influence on adolescent smoking was exerted primarily through norms or expected standards rather than modeling of smoking behavior.

A study by Chassin, Presson, Todd, Rose, and Sherman (1998) found that parental smoking was a more significant predictor of adolescent smoking than peer smoking and than parenting behaviors. However, Conrad, Flay, and Hill (1992) did not find that family smoking was strongly supported across 27 studies as a predominant predictor of smoking onset. The few studies reviewed that did differentiate between maternal and paternal smoking suggest that maternal smoking may have more of an effect on adolescents than parental smoking. Additionally, girls may be more affected by parental smoking than boys. Kandel and Wu (1995) examined a sample of 201 father, mother, and child triads and found that maternal smoking had a stronger effect than paternal smoking on adolescents and a stronger effect on daughters than sons. Winkelstein (1992) also found that female adolescents with mothers and sisters who smoked were more likely to be smokers than male adolescents with smoking female relatives. A qualitative study by Sequire and Chalmers (2000) examined the effect of parental smoking on adolescent females. They found that parental smoking made smoking look 'normal and expected' and that over half of the smoking female adolescents in their study (N=25) had one or more smoking parents.

There is recent research evidence to suggest that the effect of parental smoking may be modifiable and may be less of an influence than previously thought. A recent study found that the influence of parental smoking could be lessened by a strong anti-smoking norm message from the parents (Jackson & Dickinson, 2002). This may indicate that the parental modeling aspect of smoking initiation is moderated by parental messaging. This finding was supported by Kelley, Thomas, and Friedman (2003) who compared health risk behaviors of college female smokers and non-smokers and found that parental smoking history did not make a difference in smoking behavior between these two groups. The non-smokers also identified parental influence as one reason why they did not smoke.

Parental messaging

The messages that parents give their adolescents about smoking are important and currently under-utilized factors in smoking prevention. The research suggests that adolescents look to parents for guidance in avoidance of smoking behavior, although parents may not be aware of their level of influence. von Bothmer and Fridlund (2001) surveyed adolescents, parents and school staff to determine who each group felt should be responsible for deterring adolescent tobacco use. Interestingly, the adolescents indicated that this was the parents' responsibility; the parents indicated that it was the school's responsibility and the school staff indicated that health educators should do it. Subsequent research by von Bothmer, Mattson, and Fridlund (2002) found that adolescents valued their parents as information providers and norm-setters.

In a cross-sectional study by Komro, McCarty, Forster, Blaine, and Chen (2003), parental permissive attitudes toward smoking and decreased likelihood of parental punishing of smoking behavior were both found to be significantly associated with higher levels of smoking among adolescents. Chopak, Vary, and Crockett (1998), in a study of 548 rural adolescents also found

that parental disapproval of tobacco use was negatively correlated with adolescent use. Distefan, Gilpin, Choi, and Pierce (1998) also found that a strong parental anti-smoking norm message was a protective factor against smoking progression, along with a high level of parental communication. In support of this result, Sargent and Dalton (2001) found that adolescents who perceived that their parents would respond negatively if they smoked were less likely to smoke. Andersen, Leroux, Bricker, Rajan, and Peterson (2004) suggested that parental anti-smoking actions were associated with reduced smoking for children of both smoking and non-smoking parents. Castrucci ,Gerlanch, Kaufman, and Orleans (2003) supported this finding as they found that, in adolescents who valued their parents' opinions on smoking, there was a mediating effect on the influence of observing parents smoking. Chassin et al. (2005) also found that smoking-specific parenting practices, including discussion about smoking, influenced adolescent smoking. However, much of the research on parental messaging is difficult to interpret as details such as the content of the message and the identity of the person delivering the message (mother or father) are often not included.

Quality of Relationship with Parents

The role of the parent-adolescent relationship in preventing adolescent tobacco use has been receiving interested attention as researchers seek to refine their understanding of risk factors and child vulnerability. There is general agreement in the literature that adolescents' experiences within the family have a significant developmental impact. Recent research suggests that two aspects of parenting: parental acceptance, measured as nurturance, warmth and attachment, and parental behavioral control, measured as monitoring and consistent discipline, prospectively predict adolescent smoking (Chassin et al., 2005). However, much of the research to date on parenting and adolescent smoking behavior has both theoretical and methodological differences.

The literature on parenting in relation to adolescent smoking behavior includes studies utilizing variables described as parental monitoring, supervision, support, communication, control, involvement, attachment, bonding, closeness, interaction, style, parental attitudes toward smoking, and anti-smoking messaging. However, these variables are often used without clear, discrete, theoretical and operational definitions and well-defined conceptual links. Therefore, it is difficult to compare study results on the influence of parenting factors in relation to adolescent smoking attitudes and behavior. Additionally, parents may have several types of influence, (control, closeness, messaging) and the mechanisms and level of influence may change over the course of the child's adolescence and across the different stages of adolescent smoking behavior. In addition to the direct influences of the quality of the relationship with parents and parental messaging, the research suggests that parents also influence adolescents' peer choices and exposure, susceptibility and vulnerability, and health beliefs (Avenevoli & Merikangas, 2003).

Current research supports that close parental supervision lowers adolescent smoking (Radzisewska, Richardson, Dent, & Flay, 1996; Jackson, Hendricksen, Dickinson, & Levine, 1997). Kandel and Wu (1995) found that high levels of parental closeness, consistency of discipline, monitoring, and rule setting, correlated with low child smoking rates. One study found that parental supervision was shown to have a greater impact on female smoking rate than male smoking rate. The researchers postulated that females might be monitored more closely than males (Cohen, Richardson, & LaBree, 1994). Substance use prevention programs often seek to enhance parental involvement in the adolescent's life as this is seen having a positive, protective impact (NIDA, 2003). Parental factors that have been shown to have a protective influence against substance use include a strong bond between children and families; parental involvement; supportive parenting that meets financial, emotional, cognitive and social needs and clear limits; and consistent enforcement of discipline (NIDA, 2003).

Several other studies support a high level of parental monitoring as lowering the risk of tobacco use (Kosterman, Hawkins, Spoth, Haggerty, & Zhu, 1997; Kosterman, Hawkins, Haggerty, Spoth, & Redmond, 2001). This finding was supported by Faucher and Carty (2001) who found in their review that level of parental monitoring was a significant smoking-specific socialization factor for smoking in girls. DiClemente et al. (2001) examined the influence of parental monitoring on females' adolescent health risk behavior in a cross-sectional study. They found that females who perceived less parental monitoring had higher health risk behaviors, including sexual activity, antisocial behavior, substance use (tobacco, alcohol, drugs) and violence.

Olds and Thombs (2001) examined the relative influences of peer norms and parental involvement on adolescent tobacco use and found that perception of peer norm, or how much the adolescent thought that their peers smoked had a higher association with tobacco use than did parental involvement. Parental involvement was measured by examining grade expectations,

telephone monitoring, communication about alcohol tobacco and other drugs, and interaction with friends. They found that parental involvement as a protective factor in adolescent tobacco use was bound largely by parent-child interaction that occurred prior to grade seven and that parental influence may be limited during the adolescent years.

Jackson (2002) examined parenting style in relation to perceived parental authority related to smoking and alcohol use in adolescents and found a strong association between an authoritative parenting style and perceived parental authority regarding substance use. Parenting that was both highly responsive and highly demanding had children who acknowledged their parents as influential in terms of substance use. O'Byrne, Haddock, and Poston (2002) investigated whether parenting style was an independent risk factor of smoking experimentation and initiation They found that a more positive parenting style with high levels of intimacy and autonomy, as perceived by the child, was associated with lower smoking experimentation. Parenting style was seen to influence smoking experimentation in several ways including more perceived parental support, parents influencing the child's choice of non-smoking friends, and parenting style possibly moderating the relationship between peer smoking and adolescent smoking. By contrast, Jackson, Henriksen, Dickinson, Messer, and Robertson (1998) found in their longitudinal study on risk factors associated with smoking initiation that parental monitoring and communication as predictor variables were not significantly associated with smoking initiation.

In terms of the parent-adolescent relationship, it is important to consider the quality of the relationship as the relationship with parents may function as either a risk or protective factor for substance use (NIDA, 2003). The differential influences of various aspects of parenting on adolescent smoking behavior must be considered. For example, parental monitoring has been identified as a protective factor against adolescent smoking (NIDA, 2003). But, if the parental monitoring becomes a high level of parental psychological control as perceived by the child, then this protective factor could then become a risk factor for substance use and other problem behavior. Barber (1996) found that a high level of psychological control was a significant predictor of problem behavior in youth and that this type of control by parents appeared to be a consistently negative and inhibiting experience for youth. Individual characteristics of the adolescent such as aggressive behavior and poor impulse control are also risk factors for substance use (NIDA, 2003). These individual characteristics may influence how much

psychological control the child perceives being exerted by the parent. For example, an adolescent with these individual characteristics may perceive, and may also actually experience more parental control as the parent tries to influence the adolescent's health risk behavior.

Only two studies were found that examined parental control specifically, in relation to adolescent smoking. Wilkinson and Abraham (2004) included parental support and control in their integrated model on smoking. Parental support was measured by a 16 item perceived parental support scale. Parental control was measured by combining an 8 item perceived parental supervision scale with a 2 item perceived parental strictness scale. They found that higher levels of both parental support and parental control were significantly correlated with lower child smoking with the effect of parental control being greater. Their findings also suggested that the effects of parental support and control may be mediated by adolescent intentions and attitudes and specific norms related to smoking.

In the only other study found that specifically looked at parental control in relation to smoking, Chassin, Presson, Todd, Rose, and Sherman (1998) studied the effect of parental socialization practices on adolescent smoking. Parental control was measured by combining items from several scales to generate a 'mother's consistent discipline' scale. They found that a lower level of mother's consistent discipline was associated with a greater likelihood of adolescent smoking. In their study, maternal punishment of smoking buffered the risk associated with peer smoking.

In terms of parental closeness, the research indicates that a strong parent-child bond will decrease smoking while a strong peer-child bond will increase it (USDHHS, 2001). Conrad, Flay and Hill (1992) found in a review of nine longitudinal studies that close peer attachments predicted smoking experimentation. In support of this finding, a longitudinal study of pre-adolescents by Cohen, Richardson and LaBree (1994) found that children who reported high levels of interaction and communication with parents had lower rates of smoking initiation.

Attitudes and Beliefs about Smoking

The literature supports the importance of recognizing the role of attitudes in predicting smoking intent and smoking behavior in adolescents. Researchers currently view acquisition of smoking behavior as a process that develops over a variable time frame and involves both behavioral and cognitive change, from a non-smoker to a smoker. Smoking behavior is seen as

being preceded by a conscious decision, or intent, to smoke (Oei & Baldwin, 1992). According to the social psychology theorists, behavioral intention to smoke is influenced by the individual's attitude toward smoking. Attitudes are formed and modified in response to behavioral beliefs about the positive and negative aspects of smoking. Sherman, Rose, Koch, Presson, and Chassin (2003) found differences in attitudes toward smoking between smokers and non-smokers with non-smokers having more negative attitudes toward smoking.

Several studies have examined the relationship between attitudes toward smoking and behavioral intent. Barkin, Smith, and DuRant (2002) used a cross sectional design to examine social skills and attitudes associated with substance use in 2646 grade seven children. They found that those who reported a more positive attitude toward substance use were more likely to report anticipated use. Wilkinson and Abraham (2004) also found a correlation between affective attitude toward smoking and intention to smoke. Similarly, Castrucci et al. (2002) found that positive attitudes toward smoking were associated with several stages of smoking behavior; being a susceptible non-smoker, an experimenter, and a current smoker.

The research suggests that intention to smoke may be a more important predictor of smoking behavior than social factors. Eckhardt, Woodruff, and Elder (1994) studied correlates of smoking in a longitudinal analysis and found that intention to smoke was a stronger predictor of smoking behavior than peer smoking. Several other recent studies have suggested that susceptibility, or intent, is a strong influence of smoking experimentation among adolescents. In a longitudinal study of 4,500 adolescents, Pierce, Choi, Gilpin, Farkas, and Merritt (1996) found that baseline susceptibility, defined as lack of decision not to smoke, was a stronger predictor of smoking experimentation than exposure to social group smoking. Jackson et al. (1998) also found that susceptibility to peer influence was associated with persistent smoking behavior. Wilkinson and Abraham (2004) suggested that intention to smoke was a direct predictor of smoking six months later in a sample of 225 adolescents. Similarly, Johnson et al. (2002) found that intention not to smoke in fifth grade predicted non-smoking in eighth grade in a sample of 3,654 children.

Gender Specific Smoking Attitudes, Influences, and Behavior

There is currently considerable research interest in gender differences in smoking behavior in adolescents. Although this study did not examine gender differences, the literature supports the importance of examining the influence of social factors in relation to female adolescent smoking. The research suggests that differences between males and females exist, particularly in relation to beliefs and attitudes toward smoking and the influence of social factors.

Seguire and Chalmers (2000) found that fitting in, being part of a social network, and preventing social isolation were common reasons given for starting smoking in adolescent girls. This finding was echoed by Gittelsohn, Roche, Alexander and Tassler (2001) who found that females need to fit in with peers was the strongest influence on smoking behavior and that the social environment was an important factor in initiation but not for maintenance or continuation of smoking. Faucher and Carty (2001) conducted a recent literature review on reasons that adolescent girls start smoking. In support of previous findings, they found that social factors associated with smoking that were more specific for girls than for boys were social norms and peer pressure.

Flay et al. (1994) also found differences between boys and girls in relation to parental influences. While parental smoking had a stronger influence on girls than on boys, this influence was mediated by parental disapproval of smoking, but only among girls. Parental approval was also an important predictor in girls starting to smoke. Peer smoking may also have a stronger effect on girls than on boys, suggesting that social environment in general may be more important for girls than for boys in terms of smoking behavior. In a longitudinal study, Hu, Flay, Hedeker, and Siddiqui (1995) found that the effect of friends' smoking was stronger for girls than for boys. These findings were supported by Flay, Hu, and Richardson (1998) who studied predictors for smoking and found that friends' smoking significantly predicted 'trying smoking' only among females. However other studies have shown no gender differences in peer influences (Urberg ,1992) or that boys are more influenced than girls by peer smoking behavior (Urberg, Cheng, & Shyu, 1991).

The quality of the parental relationship may also be more important for adolescent females than males. MacDonald and Wright (2002) found in a cross-sectional analysis of a student survey that adolescent girls who smoke had oppositional, distanced relationships with significant adults and felt more powerless and alienated in their home and school lives than smoking boys.

Strengths and Limitations of the Current Literature

Currently there exists a large and growing body of research on psychosocial predictive factors in smoking in adolescence. Smoking initiation factors have been clearly identified in multiple, large studies and attempts have been made to categorize and rank them in order of significance. Both cross sectional and longitudinal studies have been conducted with sufficient scientific rigor in research design and sample sizes to inform and guide theoretical development for prediction of smoking behavior. Additionally, several social psychology theories have been identified as relevant to smoking initiation and attempts have been made (Collins & Ellickson 2004; Flay et al., 1994; Wilkinson & Abraham, 2004) to integrate and refine these theories to further explain the relationships between these psychosocial factors.

It is apparent from the literature that studies vary regarding which social factors are the strongest predictor for smoking behavior and that little is known about relative influence of social factors on attitudes toward smoking rather than smoking behavior. Although most studies to date indicate that peer influence is still the most consistent social modeling factor that is predictive of adolescent smoking behavior, this finding is not consistent across all of the studies with some studies suggesting that parental smoking has more influence on adolescent smoking behavior. A limitation in the research is evident in relation to attitudes toward smoking in non-smoking female adolescents. The research results to date are inconsistent with regard to relative influence of social factors and possible variations in influence across stage of smoking behavior for females. The influence of social modeling, parental messaging and the quality of the relationship with parents on 'attitude toward tobacco' as the first stage of smoking behavior among non-smoking girls remains largely unknown.

Many smoking prevention studies only identify the influence of social factors on initiation and continuation of smoking as opposed to attitude toward smoking. Some studies (Flay et al., 1998; Hu et al., 1995) suggest that peer smoking is most predictive of smoking initiation while other studies (Chassin et al., 1986) point to parental smoking as being the most significant factor in initiation, but only for females. Additionally, few studies have examined the relative influence of same sex smoking group behavior on adolescent females. It is suggested by some studies that maternal and same sex sibling smoking may be more predictive of smoking behavior in adolescent females than paternal and different sex sibling smoking. No studies were

found that specifically examined the relationships between these smoking groups and attitudes toward smoking in non-smoking adolescent females.

While it is apparent from the research to date that parental anti-smoking messages and the adolescent's relationship with parents may influence smoking behavior, and that this influence may be stronger for girls than for boys, it is not clear how these aspects of parenting might exert influence. The lack of consistency across studies in terms of measures of parenting make comparison difficult and limit the interpretation of the results. For example, the two studies reviewed that examined parental control in relation to adolescent smoking (Wilkinson & Abraham, 2004; Chassin et al., 1998), both utilized different 'parental control' scales that combined items from previously developed scales. Studies to date have not clearly identified how parental messaging and the quality of the relationship with parents might influence the association between social modeling factors and attitudes toward smoking in non-smoking female adolescents.

Summary

This chapter reviewed the current literature on social and parenting factors related to smoking attitudes and behavior in non-smoking female adolescents. The review included an identification of the current trends in smoking prevention literature, a discussion of characteristics of adolescence and a critique of the literature on peer, sibling, and parental smoking. Parental factors associated with adolescent smoking were also reviewed and the methodological differences in the research on parenting and adolescent smoking behavior were considered. The literature related to attitudes toward smoking in relation to subsequent smoking behavior and differences between females and males in terms of attitudes, influences and smoking behavior was discussed.

The strengths and limitations of the research were identified and several important gaps in knowledge were outlined. No previous studies were found that specifically examined the relationships between social modeling, parenting messaging, the quality of the relationship with parents, and attitudes toward smoking in non-smoking adolescent females. The review supports the importance of further research on the associations between these factors. The results may provide support and guidance for gender specific smoking prevention strategies, and further the development of an explanatory model for smoking initiation in this population.

CHAPTER 3: METHODOLOGY

This chapter outlines the research methodology utilized in this study and includes a description of the research design, setting and sample. Definitions of variables will also be presented and method of data analysis will be included.

Research Design

This research study involved a secondary analysis of data collected between October 2001 and May 2002 for the two-site, cross-sectional, school-based British Columbia Youth Survey on Smoking and Health (BCYSOSH). The BCYSOSH was undertaken to examine the association between socio-demographic factors (age, gender, ethnicity, region) and smoking prevalence in two regions of British Columbia (B.C.) and to provide a report on the prevalence of tobacco use in BC with an additional purpose of providing information toward developing a measure of tobacco dependency among adolescents. The BCYSOSH included measures of smoking history, pattern and dependency and attitudes towards smoking. Socio-demographic, psychological and social factors that may be related to tobacco use were also surveyed.

Survey Setting

The BCYSOSH was administered to a stratified random sample of grade 10 and 11 students in two different areas of British Columbia. These were Vancouver, and Prince George and area. Vancouver is British Columbia's largest city with a population at the time of the survey of 545,671 (Statistics Canada, 2002) while Prince George is considerably smaller with a population at the time of 72,406 (Statistics Canada, 2002). Several smaller communities in the northeastern part of the province, i.e. Mackenzie with a population at the time of 5,206 (Statistics Canada, 2002), were included as part of the Prince George school district. In addition to size, the two sites are also considerably different in terms of geographic location, socio-economic climate, and demographic characteristics of the population.

Situated in the Lower Mainland area of British Columbia, Vancouver is a large, economically thriving, port city with a median population age of 37.2 years and a median household income of \$42,026. It is one of Canada's largest financial centers with western offices for national companies, banks and a variety of industries. The city has considerable ethnocultural

diversity with 49% identified as being of a minority, mainly Asian and Chinese, and 1.9% being Aboriginal (Statistics Canada, 2003).

By contrast, Prince George is situated in the northern part of the province and has a median income of \$52,826 with a median population age of 34.5. The city's economy is largely reliant on the wood industry, with forestry, plywood manufacture, 12 sawmills and three pulp mills as major employers and customers. Only 5.3% of the population is identified as being of a minority, mainly South Asian, while 9.4 % are Aboriginal (Statistics Canada, 2003). As part of the more sparsely populated north of British Columbia, Prince George is included by the British Columbia Ministry of Health Services as an area needing support in order to improve access to health care (Rural Health, 2004).

Survey Sample

The two public school districts in Vancouver and Prince George were chosen for the original BCYSOSH survey due to regional differences in tobacco use prevalence and practice among adolescents. Power calculations for the BCYSOSH were based on previous smoking prevalence estimates of 10% for Vancouver Westside and 20% for Prince George with an error margin of +/- 2.5%. A 75% participation rate was achieved by Statistics Canada for their 1994 Youth Smoking Survey and by the McCreary Centre Society (1998) in their youth health survey using a similar data collection method. Accordingly, this participation rate was used to calculate sample size for the BCYSOSH.

Based on school populations in the relevant grades of 9,190 students in Vancouver and 3005 students in Prince George, the BCYSOSH planned to reach 4,500 students. The actual final sample size for the BCYSOSH was 3,280 students with a response rate of over 80%. For a representative sample, study participants were randomly selected for inclusion however, a different process was used in the two school districts due to structural and socio-cultural differences between the cities and school districts.

Thirteen schools in the two school districts were randomly selected for participation and an attempt was made to survey all students in the appropriate grade in the selected schools. For the Vancouver schools, the area was divided into two strata to accommodate socio-economic differences between the school communities. The Vancouver area was divided into two strata, Vancouver Eastside and Vancouver Westside; schools were then randomly selected within each stratum. This stratification approach has been utilized by the Vancouver School Board as well as by other researchers. Six of the eighteen secondary schools in the Vancouver sample participated in the BCYSOSH. Of these, two were Westside schools and four were Eastside schools. At most of the schools the data was collected during CAPP (Career and Personal Planning), English, or Guidance class although one school used an assembly time for the survey. Although the process varied between schools, it was consistent within schools.

In Prince George, grade 10 and 11 students were randomized separately as many grade 10 students attend junior high schools. Seven randomly selected schools in Prince George participated, however at two schools the survey did not include the entire grade. The students completed the survey either voluntarily, during class, or during assembly time. In both school districts, an attempt was made to survey all students in the relevant grades (grade 10 and 11). Most of the students were from these two grades although there were a small number from other grades.

The BCYSOSH participants completed a paper and pencil questionnaire while in their usual class groups during class time. Most of the participants took between 30-45 minutes to complete the questionnaire while under observation by a researcher. University of British Columbia, University of Northern British Columbia and the two school district's consent and ethical policies were followed. Both parental assent and participant consent was obtained, through either active or passive consent forms, and the participants were aware of the content and purpose of the study.

Study Sample

The thesis sample consists of any female respondent who answered 'NO' to the question "Have you smoked at least once in the past month?" and reported data on smoking groups (father, mother, sibling, boyfriend/girlfriend, best friend) in their immediate social environment. It is important to note that 'never smokers', 'non-regular smokers' and 'current non-smokers' are all included in this sample. This yielded an initial sample size of 1345 respondents.

Measures

In addition to collecting data on smoking behavior, the BCYSOSH survey also included sections entitled Smokers in your Environment; Your Thoughts about Smoking; More about You, Friends and Family, and Other Behavior. The data for this study is taken from several scales utilized in the survey as well as participant's self-reports of smokers in their environment. To control for other factors potentially confounding the association between social factors and positive attitude toward smoking, additional explanatory variables of age, ethnocultural diversity, and region were included in the analysis as factors that could contribute to differences in attitudes toward smoking. Participants were asked to report their age in years and to self-report their ethnic background by answering the question, "How would you describe yourself?" Respondents could select multiple categories. In the BCYSOSH, twelve categories of response were provided.

The control variables were chosen as, in the literature, all of these factors have been shown to influence attitude toward smoking or smoking behavior. In terms of age, the age range for the sample is 14-20 years and attitudes toward smoking have been shown to change and become more positive over the course of adolescence (Filice, Joseph, Hannan, & Lando 2003). Relating to the possible influence of region, smoking prevalence in adolescents was higher in Prince George (27.6%) than in Vancouver (12.8%) in the BCYSOSH, this was attributed to differences in age and ethnic composition (Johnson et al., 2004). Ethnocultural diversity has also been shown in the literature to influence smoking attitudes and behavior (Wallace, Bachman, O'Malley, Schulenberg, Cooper & Johnson, 1998; Taylor et al, 1999).

Social Modeling Variables

In Section A. Smokers In Your Environment of the BCYSOSH, all of the respondents were asked if various people in their environment, including mother, father, sister, brother, boyfriend/girlfriend, and best friend, smoked cigarettes. Possible responses on a 5 point Likert type scale included 'yes', 'no, they never smoked', 'no, they quit', 'I don't know' and 'does not apply'. Data from female non-smoker respondents who answered the question about the above smoking groups in their environment was included.

Parental Messaging Variables

The variables, 'my parents won't allow me to smoke' and 'my parents warned me about the dangers of smoking' were generated from the data on reasons why the sample respondents did not currently smoke. Respondents were asked the question "What are the reasons why you do not smoke now?" with a choice of 16 possible reasons. Respondents could indicate the reasons

"my parents won't allow me to smoke" and "my parents warned me about the dangers of smoking" as a mark in a tick box.

Quality of Relationship With Parents Variables

The variable, 'parental control' was generated by using data from 8 items on a 12 item scale used in the BCYSOSH survey in the *Family and Friends* section of the survey. The remaining 4 other items measure parental support, a related but different construct and, as such, were not included in the analysis. The 8 item *parental control* scale, entitled the Psychological Control Scale-Youth Self-Report (PCS-YSR), was developed by Barber in 1996 to measure psychological, versus behavioral, control by parents over youth. The degree of control is measured as perceived by the youth (Barber, 1996). Psychological control "refers to control attempts that intrude into the psychological and emotional development of the child , e.g., thinking processes, self-expression, emotions and attachment to parents " (Barber, p. 3296). The items include statements such as 'My parents change the subject whenever I have something important to say' and 'My parents blame me for other family members' problems'. Respondents in the original BCYSOSH survey were asked to rate the way that the parents (that they lived with) acted toward them. The responses on a 5-point Likert scale range from 'never' to 'always'. (See Appendix B).

Construct validity of the instrument was examined using principal component factor analysis. The single forced factor analysis identified one principal component (eigenvalue 7.074), explaining 88.4% of the total variance. Loadings for all of the eight scale items were positive and ranged from 0.99 to 0.79, all items were therefore retained in subsequent analysis. Individual item factor loadings are described in Table 1. An examination of the Cronbach's alpha of the eight scale items was 0.98, indicating a high level of inter-item correlation. For purposes of analysis, the items were summed to obtain a total 'parental control' score (N = 1313, M = 2.06, SD = 0.65)

Table 1

Factor Loadings for Parental Control Scale

Items	Factor Loadings
My parents	
are less friendly to me if I don't see things their way	0.83
blame me for other family member's problems	0.97
stop talking to me until I please them if I have hurt their feelings,	0.97
change the subject whenever I have something important to say	0.96
avoid looking at me when I disappoint them	0.96
bring up past mistakes when they criticize me	0.94
interrupt me	0.94
would like to be able to tell me what I think and feel	0.79

The variables, 'maternal closeness' and 'paternal closeness' were generated by using data from sample respondents who rated the overall closeness of their relationship with their mother and father. The responses on a 5-point Likert scale range from 'very close' to 'not applicable' (See Appendix C).

Positive Attitude Variable

The dependent variable, 'positive attitude' was generated by utilizing data from a scale in the section "Your Thoughts About Smoking". The questions asks the participant to respond on a 4 point Likert scale ranging from 'strongly disagree' to 'strongly agree' to 12 items indicating a positive attitude toward smoking. The items include statements such as 'smoking helps me relax' and 'smoking makes people look cool.' The only negatively worded item 'smoking is addictive' was reverse coded for consistency (See Appendix D). The items on the Positive Attitude Scale (PAS) were developed by the original BCYSOSH researchers and are consistent with the current research on attitudes toward smoking among youth (Castrucci et al., 2003; Faucher & Carter, 2001; USDHHS, 2001).

A factor analysis of these items was done to identify intercorrelations between items and provide validity evidence relating to the structure of the 'positive attitude' measuring instrument (Munro, 2001). The 12 items were analyzed using principal component extraction. The initial factor analysis identified a principal component explaining 29.2 % of the total variance, positive loadings for nine of the 12 scale items for this factor ranged from 0.660 to 0.789. The reverse coded item, 'smoking is addictive' was dropped from the scale due to negative loadings on several factors. The items, 'smoking makes people look more mature' and 'smoking makes people look cool', were eliminated from the analysis due to principal component loadings of 0.27 and 0.18, respectively. A subsequent single forced factor analysis of the remaining nine items resulted in a factor eigenvalue of 4.98, accounting for 55.3% of the total variance. The individual item factor loadings are described in Table 2.

As a newly developed measure, the PAS has not been tested in previous studies for internal consistency reliability. This type of reliability is defined as "consistency across the parts of a measuring instrument, with the "parts" being individual questions or subsets of questions. To the extent that these parts 'hang together' and measure the same thing, the full instrument is said to possess high internal consistency reliability" (Huck, 2000, p. 89). An assessment of internal consistency reliability was done on the items from the scale using Cronbach's alpha. The Cronbach's alpha results are expressed as a coefficient of reliability. If the inter-item correlations are high, this represents evidence that the items are measuring the same underlying construct, in this case attitude toward smoking. A Cronbach's alpha, or reliability coefficient, of lower than .60 for a scale is considered unwise as the implication is that the items do not correlate well with each other and may, in fact, be measuring different constructs (Pollit & Hungler, 1995). According to Munro (2005) "...items that form a strong factor in factor analysis generally yield acceptable alpha coefficients when grouped together in a scale, thus providing evidence of internal consistency reliability" (p.325). The Cronbach's alpha for the PAS was 0.80, indicating

a high level of inter-item correlation. For purposes of analysis, the items were summed to obtain a total 'positive attitude' score (N=1340, M=1.8, SD=0.48).

Table 2

Factor Loadings for Positive Attitude Scale			
Item	Factor Loadings		
Smoking helps people control their weight	0.83		
Smoking helps people control their feelings	0.79		
Smoking makes people feel popular	0.78		
Smoking helps people express themselves	0.77		
Smoking helps people control their appetite	0.76		
Smoking makes it easier to talk to people	0.72		
Smoking makes people feel lively and awake	0.71		
Smoking helps people fit in at school	0.66		
Smoking helps people relax	0.65		

Data Analysis

The data analysis began with a description of demographic characteristics of the sample including range, mean and standard deviation for age, and frequencies for region and ethnocultural diversity. Prior to the regression analysis, the explanatory variables were dummy coded to facilitate analysis. Dummy coding uses a system of 1s and 0s to indicate grouping (Munro, 2005). For the control variables, age, ethnocultural diversity, and region: age was

recoded as 14-15 yrs. = '0', 16-20 yrs. = '1', ethnocultural diversity was recoded as '0' = White and '1' = Not White, region was coded as '1' = Vancouver and '0' = Prince George.

For the social modeling variables, mother, father, sister, brother, boy/girlfriend and best friend smoking, 'yes' was recoded as '1' and all other responses ('no, they never smoked', 'no, they quit',' I don't know', 'does not apply') were recoded as '0'. For the parental messaging variables ('my parents won't allow me to smoke', 'my parents warned me about the dangers of smoking') a positive response was recoded as '1' and the absence of a positive response was recoded as '0'. For the parental closeness variables (maternal closeness, paternal closeness), 'very close' was recoded as '1', other responses ('somewhat close', 'not very close', 'I am not in touch with them') were recoded as '0'. 'Not applicable' was treated as missing data and excluded from the regression analysis.

After recoding of the variables, statistical analysis, using SPSS Graduate Pack Version 11.5 for Windows, was performed. Regression analysis is used to learn more about the relationship between several independent or predictor variables and a dependent or criterion variable (Huck, 2000). Multiple regression analysis can establish that a set of independent variables explains proportion of the variance in a dependent variable at a significant level and can establish the relative predictive importance of the independent variables. In the social sciences, multiple regression procedures have been widely used in research to attempt to predict social behaviors. More recently, nurse researchers have become interested in the role of multiple regression analysis with regard to health behaviors. If a strong predictor, or predictors, for a behavior, such as smoking, is suggested by the research, then policies and programs can be initiated or expanded that target these predictors. As discussed previously, the outcome variable of interest was not the behavior of smoking but the positive attitude toward smoking.

Inclusion of closely related independent variables will decrease the power to detect any effects (Kraemer & Thieman, 1987). The independent social modeling variables (smoking others in the adolescent female's social environment) are closely correlated with each other as well as with the dependent variable (positive attitude toward smoking). People who have smoking parents may be more likely to associate with a smoking peer group, have smoking siblings, and have a more positive attitude toward smoking than those who are surrounded by non-smokers. However, even a small effect size may be detected by a large enough sample. The recommendation is to have at least 10 to 20 times as many respondents as one has variables;

otherwise the estimates of the regression line may be very unstable and unable to be replicated (Multiple Regression, 2004). With that criterion, 60-120 respondents would be needed and the sample size (N=1223) would be considered sufficient in size.

A hierarchical multiple regression analysis to examine the associations between the social modeling variables, the parental messaging variables, the quality of relationship with parents variables, and the positive attitude toward smoking variable, was performed. List-wise deletion of cases with missing values yielded a final sample size of 1223. This method of dealing with missing data is appropriate with a sufficiently large sample if the amount of missing data is small (Munro, 2005). This method reduced the sample size from 1345 to 1223, an acceptable reduction of 9% of initial sample size.

The independent variables were entered in four blocks (models) to the regression. Age, ethnocultural diversity, and region were entered in the first model. According to Huck (2000) "...independent variables that are entered first correspond with things the researcher wishes to control. After they are allowed to explain as much variability in the dependent variables as they can, then the other variables are entered to see if they can contribute above and beyond the independent variables that went in first" (p. 584-5).

All other independent variables were entered as blocks in order of theoretical importance. Accordingly, the social modeling variables, (mother smoking, father smoking, sister smoking, brother smoking, boy/girl friend smoking and best friend smoking) were entered as a second block of variables. The parental messaging variables ('my parents won't allow me to smoke', 'my parents warned me about the dangers of smoking') were then entered as a third block of variables. The quality of relationship with parents variables (maternal closeness, paternal closeness, parental control) were then entered as a fourth and final block of variables.

An independent variable may have a main effect on the dependent variable and may also interact with the other independent variables. A moderator is a variable that is hypothesized to affect the direction and/or strength of the relationship between an independent variable and a dependent variable (Baron & Kenny, 1986). In the conceptual model for this study (see Figure 2) it was theorized that parental messaging and the quality of the relationship with parents variables may influence the association between the social modeling and positive attitude toward smoking variables. To test for moderator, or interaction effects of these variables, interaction terms for the parental messaging variables ('my parents won't allow me to smoke', 'my parents warned me about the dangers of smoking') and the quality of relationship with parents variables (maternal closeness, paternal closeness, parental control) were created and the interaction effects were examined for statistical significance.

Adjusted R^2 and changes in adjusted R^2 were also reported for each step of the regression model. Adjusted R^2 "indicates the degree to which variability in the dependent variable is explained by the set of independent variables included in the analysis" (Munro, 2005, p.587). As each block of variables is entered, change in adjusted R^2 indicates how much additional variance in the dependent variable can be attributed to the newly added bock of variables. As such, the influence of the variables on the variance in the dependent variable is limited to a discussion of the contribution of the 'block' of variables, rather than each individual variable.

Underlying assumptions of the data for regression analysis include normal distribution of the variables being correlated, equal variance, and a linear relationship between the variables (Munro, 2005). For the regression model, assumptions of normal distribution were assessed by examining the residuals histogram, the residual being the difference between the actual and predicted score The histogram for the residuals approximated the normal curve with minimal skewness and kurtosis, satisfying the assumption of normal distribution. The assumption of linearity was assessed by examining the tolerance of each variable, tolerance is the proportion of the variable that is not accounted for by the other independent variables (Munro, 2005). Tolerances for each of the four steps of the regression analysis were high, ranging from 0.66 to 0.99. A tolerance less than 0.20 indicates a problem with multicollinearity (Multiple Regression, 2004). The assumption of equal variance was assessed by examining the residuals scatterplot for the regression model. The plotted values fell close to the regression line, indicating a normal distribution.

CHAPTER 4: FINDINGS

The purpose of this chapter is to provide a description of the findings of a study examining social modeling, parental messaging, and quality of relationship with parents in relation to non-smoking adolescent females' attitudes toward smoking. The chapter is divided into six sections. First, the demographic characteristics of the adolescent females in the study sample are described. Second, the characteristics of the non-smoking adolescent females' social environments in terms of identity and number of 'smoking others' is described. The next section discusses the descriptive characteristics of the parental messaging and relationship variables.

This is followed by a description of the associations between the social modeling variables of mother, father, sister, brother, best friend and boy/girlfriend smoking, and positive attitude toward smoking and any statistically significant associations between variables are identified. This is repeated for the associations between the parental messaging variables and positive attitude. The testing of interaction effects of two parental anti-smoking socialization messages, 'my parents warned me about the dangers of smoking' and 'my parents do not allow me to smoke' on the association between the social modeling variables and non-smoking female adolescents' positive attitude toward smoking are then described.

A description of the associations between the quality of the relationship with parents variables and positive attitude is then provided. Next, testing for interaction effects of maternal and paternal closeness, and parental control, as measures of quality of relationship with parents , on the association between the social modeling variables and non-smoking female adolescents' positive attitude toward smoking are described. Finally, a summary of the pertinent findings is provided.

Characteristics of the Study Sample

Table 1 includes demographic information that pertains to the study sample. The majority of the sample was either 15 years old or 16 years old with a respondent age range from 14 to 20 years (M= 15.8, SD= 4.0). In relation to region, the majority of the respondents were from Vancouver with less than one quarter of the sample being from Prince George and area. Regarding ethnocultural diversity, almost 90% of the sample reported being of either White/Caucasian or Asian ethnocultural background. Over half of the respondents identified

themselves as Asian while over one third were White/Caucasian, only a small number of the sample were Aboriginal.

<u>Age</u> ^a	Frequency	<u>(%)</u>
14-15	634	(47.1)
16-20	708	(52.7)
Ethnocultural Diversity ^b		
White/Caucasian	. 429	(39.0)
Asian	557	(50.7)
Aboriginal	25	(2.3)
Other	80	(7.2)
Region		
Vancouver	1029	(76.5)
Prince George	316	(23.5)

Demographic Characteristics of the Study Sample (N = 1345)

Table 3

^a 3 missing cases

^b 11 missing cases

In Table 4, characteristics of the non-smoking adolescent female's social environment are outlined. In terms of number of smokers in their environment, over half of the respondents did not have any smokers in their environment, one quarter had 1 smoker, and a minority had 2 or more smokers in their immediate social environment. Regarding the smoking status of people around them, the majority of the respondents did not report living with smoking family members, nor did they report having smoking best friends or boy/girlfriends. Slightly less than one quarter of the sample reported having a smoking father while only 12.3% reported having a smoking mother. Smoking status for siblings indicated little gender difference with under 10% of the

sample having either a sister or a brother who was a smoker. Rates for smoking in best friend or boy/girlfriend were also under 10%.

Table 4

Characteristics of Immediate Social Environment

	Frequency	(%)
Cumulative Number of Smokers in Adolescent	Female's Immediate So	cial Environment
No Smokers	770	(57.2)
1 Smoker	348	(25.9)
2 Smokers	149	(11.1)
3 or more Smokers	79	(5.9)
		<u></u>
Mother	166	(12.2)
Father	166 314	(12.3)
Mother Father Sister	166 314 88	(12.3) (23.3) (6.5)
Mother Father Sister Brother	166 314 88 96	 (12.3) (23.3) (6.5) (7.1)
Mother Father Sister Brother Boy/Girlfriend	166 314 88 96 111	 (12.3) (23.3) (6.5) (7.1) (8.2)

As depicted in Table 5, only about half of the respondents reported that the specific parental anti-smoking messages 'parents won't allow me to smoke' and 'parents warned me about the dangers of smoking' were reasons why they did not currently smoke. In terms of quality of relationship with parents, almost half of the adolescent females in the sample reported having a 'very close' relationship with their mothers while less than one third of them had the same level of closeness with their fathers.

Table 5

Characteristics for Parental Messaging and Parental Relationship

Variable	Frequency	(%)	
Parental Messaging			
My Parents Won't Allow Me to Smoke	609	(45.3)	
My Parents Warned Me About the Dangers of Smoking	644	(47.9)	
Quality of Relationship With Parents ^{a, b}			
Very Close to Mother	541	(49.2)	
Not Very Close to Mother	525	(47.8)	
Very Close to Father	309	(28.1)	
Not Very Close to Father	705	(64.1)	

^a 33 'not in touch' or 'not applicable' mother closeness

^b 85 'not in touch' or 'not applicable' father closeness

To answer the research questions, a hierarchical multiple regression analysis was conducted to examine the associations between the social modeling variables, the parental messaging variables, the quality of relationship with parents variables, and the positive attitude toward smoking variable.

Step 1

Age, ethnocultural diversity, and region were entered as a first 'block' of variables in the regression model as control variables. As shown in Step 1 of Table 6, none of these variables were significantly associated with a more positive attitude toward smoking. The adjusted R^2 for Step 1, was .00, indicating that these variables did not appreciably contribute to any variance in positive attitude toward smoking.

Step 2

The second step in the regression analysis was conducted by adding the social modeling variables, (mother smoking, father smoking, sister smoking, brother smoking, boy/girlfriend smoking and best friend smoking) to the regression model. An ANOVA test for fitness of the regression model indicated a significance level of p < 0.01.

53

In answer to the first research question, "After controlling for age, ethnocultural diversity, and region, are social modeling factors (mother, father, sister, brother, boy/girl friend, best friend smoking) associated with non-smoking adolescent females' positive attitude toward smoking?", three of the six social modeling variables were associated with positive attitude toward smoking. As shown in Step 2 of Table 6, smoking by the father, boy/girlfriend, and best friend were significantly associated with positive attitude. In terms of variance, addition of the social modeling variables (mother smoking, father smoking, sister smoking, brother smoking, boy/girlfriend smoking and best friend smoking) accounted for 2% of the variance in positive attitude toward smoking.

Step 3

5.

6.

In the third step of the regression analysis, the two parental anti-smoking messages, 'my parents won't allow me to smoke' and 'my parents warned me about the dangers of smoking' were added as a third block of variables to the regression model. An ANOVA test for fitness of the regression model indicated a significance level of p < 0.01.

In answer to the second research question, "After controlling for age, ethnocultural diversity, region, and social modeling factors, is parental messaging ('my parents won't allow me to smoke', 'my parents warned me about the dangers of smoking') associated with non-smoking adolescent females' positive attitude toward smoking?", both of the parental messages were associated with positive attitude toward smoking. As shown in Step 3 of Table 6, the 'my parents warned me about the dangers of smoking' message was associated with a decreased positive attitude toward smoking 'message was associated with a decreased associated with a more positive attitude toward smoking.

In answer to the third research question, "After controlling for age, ethnocultural diversity, and region, does parental messaging influence the association between social modeling and non-smoking adolescent females' positive attitude toward smoking?", when the

parental messages were added to the model, best friend smoking and boy/girl friend smoking retained significance while smoking by the father became insignificant. This indicates that the parental messaging does influence the association between the social modeling variables and non-smoking adolescent females' attitudes toward smoking. Interaction effects for the parental messaging ('my parents won't allow me to smoke', 'my parents warned me about the dangers of smoking') variables were tested for by creating interaction terms for the social modeling (mother, father sister, brother, boy/girlfriend, best friend smoking) variables and parental messaging ('my parents won't allow me to smoke', 'my parents warned me about the dangers of smoking') variables. The interaction terms were then entered into the model and examined for statistical significance. However none of the interactions were significant and therefore the results have not been reported.

In terms of variance, the addition of the parental messaging variables ('my parents won't allow me to smoke', 'my parents warned me about the dangers of smoking') accounted for an additional 2% of the variance in positive attitude toward smoking. The social modeling variables and the parental messaging variables together accounted for 4% of the variance in positive attitude.

Step 4

The quality of relationship with parents variables (maternal closeness, paternal closeness, ,parental control) were added as a fourth block of variables to the regression model. An ANOVA test for fitness of the regression model indicated a significance level of p < 0.05. The fourth research question asked "After controlling for age, ethnocultural diversity, region, social modeling, and parental messaging, is the quality of relationship with parents (maternal closeness, paternal closeness, parental control) associated with non-smoking adolescent females' positive attitude toward smoking?" As displayed in Step 4 of Table 9, of the three variables, only parental control was significantly associated with positive attitude toward smoking. Maternal and paternal closeness did not show an association with positive attitude toward smoking.

In answer to the fifth research question, "After controlling for age, ethnocultural diversity, and region, does the quality of the relationship with parents influence the association between the social modeling variables and non-smoking adolescent females' positive attitude

toward smoking?", in this step smoking by a boy/girl friend remained significantly associated with positive attitude while best friend smoking became non-significant. This indicates that the quality of the relationship with parents does influence the association between social modeling factors and non-smoking adolescent females' attitudes toward smoking.

Interaction effects were tested for by creating interaction terms for the social modeling (mother, father sister, brother, boy/girlfriend, best friend smoking) variables and quality of relationship with parents (maternal closeness, paternal closeness, parental control) variables. The interaction terms were then entered into the model and examined for statistical significance. None of the interactions were significant and therefore the results have not been reported.

In terms of variance, the addition of the parental messaging variables ('my parents won't allow me to smoke', 'my parents warned me about the dangers of smoking') accounted for an additional 1% of the variance in positive attitude toward smoking. The social modeling variables, the parental messaging variables, and the quality of the relationship with parents variables together accounted for 5% of the variance in positive attitude.

Table 6

Summary of Hierarchical Regression Analysis for Variables Influencing Adolescent Females' Positive Attitude Toward Smoking (N=1223)

Variable	Unstandardized	Std. Error	Standardized
	Coefficients B	В	Coefficients B
Step 1			
(Constant)	1.84	0.03	
Region	0.01	0.04	0.01
Age	-0.04	0.03	-0.04
Ethnocultural Diversit	y -0.01	0.03	-0.01

Step 2				
(Constant)	1.80	0.04		
Region	0.02	0.04	0.02	
Age	-0.04	0.03	-0.05	
Ethnocultural Diversity	-0.02	0.03	-0.02	
Mother Smoking	-0.04	0.05	-0.03	
Father Smoking	0.04	0.03	0.06*	
Sister Smoking	0.08	0.06	0.04	
Brother Smoking	0.10	0.05	0.05	
Boy/girlfriend Smoking	0.18	0.05	0.11 **	
Best friend Smoking	0.08	0.05	0.06*	
Step 3				
(Constant)	1.82	0.04		
Region	0.03	0.04	0.02	
Age	-0.05	0.03	-0.05	
Ethnocultural Diversity	-0.03	0.03	-0.03	
Mother Smoking	-0.04	0.05	-0.03	
Father Smoking	0.04	0.03	0.03	
Sister Smoking	0.08	0.06	0.04	
Brother Smoking	0.10	0.05	0.05	
Boy/girlfriend Smoking	0.17	0.05	0.10 **	
My parents won't	0.13	0.03	0.14**	
allow me to smoke				

My parents warned me -0.14

0.03

about the dangers of

smoking

Step 4	<u> </u>		· · · · · · · · · · · · · · · · · · ·	
(Constant)	1.74	0.06		
Region	0.02	0.04	0.02	
Age	-0.05	0.03	-0.06*	
Ethnocultural Diversity	-0.03	0.03	-0.03	
Mother Smoking	-0.05	0.05	-0.03	
Father Smoking	0.04	0.03	0.03	
Sister Smoking	0.07	0.05	0.06	
Brother Smoking	0.10	0.05	0.05	
Boy/girlfriend Smoking	0.16	0.05	0.09 **	
Best friend Smoking	0.07	0.05	0.05	
My parents won't	0.13	0.03	0.14**	
allow me to smoke	·			
My parents warned me	-0.14	0.03	-0.15**	
about the dangers of				
smoking				
Mother Closeness	0.20	0.30	0.21	
Father Closeness	-0.03	0.03	-0.03	•
Parental Control	0.04	0.02	0.06*	
		۱.		
* p< .05		· · · · · · · · · · · · · · · · · · ·		

Note Adj. R² = .00 for Step 1, Adj. R² = .02 for Step 2, Adj. R² = .04 for Step 3, Adj. R² = .05 for Step 4. Note. \triangle Adj. R² = .02 for Step 2, \triangle Adj. R² = .02 for Step 3, \triangle Adj. R² = .01 for Step 4.

Summary

In summary, this chapter presented the results of the descriptive findings conducted on data from 1345 non-smoking adolescent females. The descriptive statistics indicated that the majority of the sample were 15 or 16 years old. Most of the sample was White or Asian and the majority lived in Vancouver. Over 90% of the sample did not live or closely associate with any current smokers, but if there was a smoker in their social environment, it was most likely to be their father. Relating to closeness of parental relationships, more adolescent females reported a very close relationship with their mothers than with their fathers.

The hierarchical multiple regression analysis was performed on a sample size of 1223. In terms of the social modeling variables, non-smoking adolescent females were more likely to have a positive attitude toward smoking if they had a smoking father, boy/girl friend or best friend. Although only about half the sample, reported the parental anti-smoking messages, 'my parents won't allow me to smoke' and 'my parents warned me about the dangers of smoking' as reasons why they did not currently smoke, both of these messages were associated with positive attitude toward smoking. However, the effect of each message was opposite, with the 'warning' message associated with a less positive attitude while the 'not allowed' message was associated with a more positive attitude toward smoking. The quality of relationship with parents variables, maternal and paternal closeness, were not associated with positive attitude toward smoking while the quality of relationship with parents variable, parental control, was associated with positive attitude. Both the parental messaging variables and the quality of relationship with parents variables and the positive attitude toward smoking variables and the quality of relationship with parents variables had influence as 'blocks' of variables on the association between the social modeling variables and the positive attitude toward smoking variables.

CHAPTER 5: DISCUSSION

The purpose of the study was to examine whether social modeling, parental messaging, and the quality of the relationship with parents influenced non-smoking female adolescents' positive attitudes toward tobacco. An additional purpose was to examine whether parental messaging and the quality of the relationship with parents influence the associations between the social modeling and non-smoking female adolescents' positive attitudes toward tobacco. In this final chapter I discuss the significant findings of the study in relation to the published literature. As a cross-sectional study examining attitudes, this research did not examine linkages between influences and smoking behavior, as in most of the literature. However, the similarity in findings between this study, which examined influences on *attitudes* toward smoking, and previous studies examining influences on smoking *behavior*, lend support to the conceptualization of formation of positive attitudes about smoking as the first stage of smoking behavior (See Appendix A). A discussion of the research findings relating to support for Social Cognitive Theory is provided. Limitations of the research study, implications for nursing practice, recommendations for future research, and a conclusion are addressed.

Significant Findings

The results of this study are discussed in relation to social modeling, parental messaging and the quality of the relationship with parents. Although social modeling factors have been consistently shown to influence smoking behavior in adolescents, recent research has focused on further identifying and clarifying the salient aspects of parenting in relation to both adolescent smoking behavior and influence on other factors affecting adolescent smoking initiation. The findings of this study support much of what has been reported in the previously published literature in terms of social modeling. However, this study also adds to the emerging knowledge in several key areas relating to the parents' role in smoking prevention.

Social Modeling

A large body of research currently links social modeling factors to smoking behavior (USDHHS, 2001). The results indicated that the majority of the adolescent females in the study did not live or closely associate with smokers. Given the strong association in the literature

between social modeling factors and smoking behavior and the fact that most adolescents initiate smoking by early adolescence, it is more than likely that most of the adolescent females who were surrounded by smokers in their social environment had already started smoking by midadolescence, the age when the survey was completed.

It is interesting, therefore, that the results from this study support that social modeling factors are associated with positive attitude toward smoking in non-smoking adolescent females. If the adolescent females in this study were confirmed non-smokers, one would not expect to see an association between social modeling factors and positive attitude toward smoking. Many studies point to early adolescence as the time period of highest susceptibility to smoking initiation (Pickett et al., 2000; Marcus et al., 1993). However, Cairney & Lawrence (2002) recently found that 27% of Canadian post secondary students who were current smokers began smoking after the age of 17. Further research may identify a second period of heightened susceptibility during adolescent life in relation to smoking behavior.

Previous research has identified parental, sibling, and peer smoking as influential in the initiation of smoking by adolescents (Conrad et al., 1992). In this study, smoking by the father, boy/girlfriend and best friend were found to be associated with a positive attitude toward smoking in adolescent females. Smoking by the mother or either sibling was not found to be associated with attitude toward smoking in this study. Numerous studies have supported that parental smoking is associated with adolescent smoking (USDHHS, 2001), but many studies do not describe whether the parent is the mother or the father. Some researchers have found that maternal smoking has more of an effect on children than paternal smoking and that the effect was stronger on female as opposed to male children (Winkelstein, 1992; Kandel & Wu, 1995). However, the findings from this study indicated that smoking by the mother was not. The lack of association between maternal smoking and positive attitude toward smoking may be due to the fact that twice as many adolescent females in the study had fathers who smoked as compared to the number having mothers who smoked.

Smoking by a sibling was also not associated with positive attitude toward smoking. This finding is contrary to research that suggests that the effect of sibling smoking on adolescent smoking behavior is higher than the effect of parental smoking (Conrad et al., 1992; Wilkinson & Abraham, 2004). In one of the few studies reviewed that examined attitude toward smoking

rather than smoking behavior, Meier (1991) found that sibling smoking, as opposed to parental smoking, had a stronger effect on a child's attitude toward smoking. Wang et al. (1995) found that same gender sibling smoking had a stronger association with adolescent smoking than opposite gender smoking. The findings from this study do not support this previous research as smoking by neither a brother nor a sister was associated with a positive attitude toward smoking. This may have been due to a number of factors including the age of the sibling relative to the adolescent female and how close a relationship the siblings shared. This type of information may yield data that could influence research results but could not be obtained for this study due to the constraints of secondary analysis.

It is not surprising that smoking by a best friend was associated having a positive attitude toward smoking in adolescent females in this study. The literature clearly supports the strong association between peer group smoking and smoking behavior (Conrad, Flay & Hill, 1992; Flay et al., 1994) Having close friends who smoke has been shown to be one of the strongest risk factors for smoking in adolescents (Gritz et al., 1998). Additionally, research has shown that females' need to fit in with their peers is a significant reason to initiate smoking behavior (Gittelsohn et al., 2001).

The finding that having a smoking boy/girlfriend was associated with positive attitude toward smoking supports previous studies linking female adolescent smoking behavior with boyfriend smoking behavior (Akers, Skinner, Krohn, & Lauer, 1987; Wang et al., 1995; Faucher & Carty, 2001). The findings from this research study indicated a consistent significant association between smoking boy/girlfriend and positive attitude toward smoking. The strength of this association is highlighted by the fact that it was the only social modeling factor that was not moderated by either the parental messaging or quality of relationship with parents variables. This finding is worrisome in that the level of emotional attachment and influence between adolescent romantic partners may cause adolescents to engage in health risk behaviors such as smoking if the romantic partner smokes.

Parental Messaging

Previous research suggests that parental anti-smoking messaging is associated with a lower rate of adolescent smoking (Distefan, Gilpin, Choi, & Pierce, 1998; Andersen, Leroux, Bricker, Rajan, & Peterson, 2004; Chassin, Presson, Rose, Sherman, Davis, & Gonzalez, 2005).

As with social modeling factors, the results of this study support the literature relating to the association between parental anti-smoking messaging and smoking behavior. However, an interesting finding from this study that has not been previously reported in the literature is the differing effects of the two parental anti-smoking messages. The findings suggest that a warning message about the dangers of smoking is associated with a less positive attitude toward smoking, indicating a possible lower likelihood of subsequent smoking behavior, while the parents not allowing the adolescent to smoke was associated with a more positive attitude toward smoking. A more positive attitude toward smoking has been strongly linked to both intention to smoke and subsequent smoking behavior in several large recent studies (Barkin, et al., 2002; Castrucci, et al., 2002; Wilkinson & Abraham, 2004).

The association between the 'my parents warned me about the dangers of smoking' message and a less positive attitude toward smoking in adolescent females lends support to previous research suggesting that thoughts about the impact on their health was an important reason for not smoking for women (Brunswick & Messeri, 1983). As previously discussed, women face many gender-specific health risks due to smoking including reproductive and mental health problems (USDHHS,2001). A parental warning message that includes this type of gender-specific information, rather than a generic 'smoking is bad for you' message, might be more effective for adolescent females. Further research in longitudinal studies would be required to test this hypothesis.

The research finding that the parental message 'my parents won't allow me to smoke' was associated with a more positive attitude toward smoking was not an anticipated result of the study. Although details regarding the specific wording of parental anti-smoking messaging is absent from much of the published research on the topic, it is reasonable to assume that this would be a common message given by parents as part of an approach to deter their daughters from smoking. As previously discussed, adolescence is a time of life characterized by experimentation, risk taking and rejecting parental values and beliefs (Lewis, 1991). It is possible that a direct parental 'ban' on behavior that the adolescent perceives as risky and adult in nature, such as smoking, may increase the likelihood of uptake of that behavior. Also, individual personality characteristics of the adolescent, including rebelliousness and defiance of authority, may also have influence on the association between the parents not allowing a behavior and the attitude toward the behavior. An additional factor may be the quality of the

relationship between the adolescent female and the parent giving the messaging. If the adolescent female had an oppositional relationship with the parent giving the messaging then it is possible that the reaction to the message would be to initiate the behavior. The effect of this messaging is of particular concern for adolescent females as several studies have shown that smoking is more highly correlated in girls than boys with regard to characteristics such as rebelliousness, and rejection of parental rules and authority (USDHHS, 2001).

Another significant finding in this study relating to parental messaging is that the two specific parental anti-smoking messages examined were not reported as reasons for abstinence of smoking by the majority of the non-smoking adolescent females in this study. Less than half of the sample reported that the anti-smoking messages, 'my parents won't allow me to smoke' and 'my parents warned me about the dangers of smoking' from parents were among the reasons why they did not currently smoke. There are several possible explanations for this finding. It is possible that the parents did not communicate these specific anti-smoking messages to their adolescent daughters. Or, one or both parents could have communicated these anti-smoking messages but the messages could have been disregarded as not meaningful or relevant within their daughter's life. Therefore, other reasons for not smoking may have been more pertinent at the time of the data collection. However, as this data was collected at a single point in time, it is possible that these reasons could still be perceived as relevant in the future. Another possible explanation for the lack of parental messaging as perceived by the respondent relates to the perceived level of closeness to the parent who was giving the messaging. If the respondent were not particularly close to the parent giving the message, then the message could perhaps not be 'heard'. The data available for this secondary analysis did not allow for separating the parental messaging into maternal and paternal messaging.

In addition to a significant association with positive attitude toward smoking, the two parental anti-smoking messages also influenced the association between social modeling factors and positive attitude toward smoking in this study. Although the associations between boy/girl friend smoking, best friend smoking, and positive attitude toward smoking retained significance, the addition of the parental messaging influenced the strength of the association between father smoking and positive attitude, causing the association to become insignificant. This finding supports previous literature suggesting that parental anti-smoking messaging reduces rates of smoking, even when the parents smoke (Andersen et al., 2004; Castrucci et al., 2003). However
in a recent study, Chassin et al. (2005) found that the effects of smoking-specific parenting practices (discussion, punishment) were only associated with a lower smoking rate if the parents were non-smokers. These conflicting findings suggest that more research into parental factors and smoking behavior needs to be conducted.

Quality of the Relationship With Parents

In this study the relationship with parents was examined by including maternal and paternal closeness and parental control as measures of the quality of the adolescent female's relationship with her parents. The findings from this study support previous research suggesting that parental factors are important influences on adolescent smoking behavior (Chassin et al., 1986; Cohen et al., 1994). The literature has reported that a higher level of parental involvement and attachment deters smoking behavior in adolescents (USDHHS, 2001). As previously discussed, much of the research on parenting factors and smoking has been conducted with a variety of parenting factors including supervision, monitoring, involvement, communication, closesness, control, and attachment.

The results from this study did not demonstrate an association between level of closeness with either parent and positive attitude toward smoking. One explanation may be that parental closeness only becomes important in terms of the interrelationships with other factors. For example, perhaps maternal and paternal closeness becomes more significant when other parenting measures, such as monitoring are examined and included in the analysis. It is also possible that level of closeness is not the most salient parental factor to include as a measure of quality of parental relationship although more research should be done before this factor is excluded from future consideration.

Parental control in this study was measured using Barber's Psychological Control Scale-Youth Self-Report (PCS-YSR). This scale measures perceived psychological, versus behavioral, control by parents over youth. Barber was careful to distinguish between behavioral control, which includes parental behaviors such as monitoring and supervision, that attempt to control or manage the child's behavior, and psychological control. Psychological control "refers to control attempts that intrude into the psychological and emotional development of the child , e.g., thinking processes, self-expression, emotions and attachment to parents" (Barber, 1996, p. 3296). No previous research utilizing the PCS-YSR scale in relation to smoking behavior was found

during the literature search for this study although several studies examined parental control. Wilkinson and Abraham (2004) combined a parental supervision scale with a parental strictness scale to measure parental control. They found that parental control was associated with a lower smoking rate in adolescents. Chassin et al. (1998) also combined items from several scales to measure parental control as mother's consistent discipline. They found that a lower level of discipline was associated with a greater likelihood of adolescent smoking. Other studies have examined parental strictness and hostility, which may be constructs that are more similar to parental control as operationalized by Barber and have found conflicting results. Some studies have found correlations between parental hostility and strictness and adolescent smoking behavior while other researchers have found no association (USDHHS, 2001).

In this study, parental control, as a measure of the quality of the relationship with parents, was significantly associated with positive attitude toward smoking in adolescent females. Additionally, parental control moderated the influence of the social modeling variables on positive attitude such that the association between best friend smoking and positive attitude became non-significant. This finding supports previous research suggesting that the quality of the relationship with parents is influential in adolescent smoking prevention (Jackson, 2002; O'Byrne, Haddock, & Poston, 2002).

The results from this study support Barber's (1996) finding that a high level of parental psychological control is predictive of problem behavior, including smoking, in youth, given the relationship between attitudes and behavior. However, the research on parental control in relation to adolescent smoking behavior is difficult to compare across studies due to numerous conceptualizations of control, lack of clarity in differentiating between psychological versus behavioral control, and inconsistent methods and findings. In a recent research study, Chassin et al. (2005) point out that, although a parent may have a controlling style of parenting, this doesn't necessarily mean that the same level of control will be extended to the adolescent smoking behavior. Future research should attempt to extend the current knowledge base on parental factors and adolescent smoking by utilizing consistency in theoretical frameworks and constructs relating to parenting.

Support for Social Cognitive Theory

Bandura's (1986) Social Cognitive Theory informed this research study. This theory explains human behavior as continuous feedback loops between cognitive, behavioral and environmental influences and incorporates modeling, messaging and relationships. Several findings from this study lend credence to one component of Bandura's theory and support its use in smoking prevention strategies. As this study examined attitudes as an antecedent to behavioral intent, rather than behavior itself, no comment can be made with regard to support for the cognition-behavior and environment-behavior interactions. However, the findings provide considerable support for the environment –cognition component of Bandura's theory.

In the interaction between the environment and cognition, Bandura theorized that behavior was influenced through instruction, modeling and social persuasion. Instruction is the specific message given to direct the behavior. The study results support that instruction, via antismoking messaging, has an effect on positive attitude toward smoking. Although both parental messages, 'my parents won't allow me to smoke' and 'my parents warned me about the dangers of smoking' were associated with positive attitude toward smoking, only the warning message had the desired effect in that it was associated with a less positive attitude.

As previously discussed, the results from this study on the associations between social modeling factors and positive attitude toward smoking supported the results of previous studies on the association between social modeling factors and smoking behavior. Therefore, Bandura's theoretical construct of social modeling is supported by the study findings as the social modeling factors, smoking father, boy/girl friend and best friend were all associated with positive attitude. According to Banudra, people will model the behavior of those they feel close to or identify with the most. In mid-adolescence, peers, rather than parents and family, are often the group that adolescents identify with closest (Jang, 1999). The results from this study support this aspect of Bandura's theory in that the adolescent female's best friend and boy/girlfriend were significantly associated with positive attitude. Social persuasion, in the form of 'norm' messages was not examined in this study although previous smoking prevention research has suggested that norm messaging from the social environment is an important construct in smoking prevention research (Biddle, Bank, & Marlin, 2001).

Smoking prevention programs such as "Beauty from the Inside Out" and "Cool to the Core", based on Bandura's Social Cognitive Theory, are currently in use in schools and

community health settings (Vancouver Coastal Health, 2004). Approaches guided by Social Cognitive Theory may be particularly relevant for adolescent females as females have been shown to be more responsive to behavioral 'cues' from their social environment than males (USDHHS,2001). However, social influences programs may rely overmuch on the role of peer influence without taking into consideration parental messaging and the quality of the relationship with parents, which have been shown in this study to be significantly associated with positive attitude toward smoking. It is also important to note that social factors are but one of many types of factors that influence smoking behavior (USDHHS, 2001).

Implications and Recommendations

The results of this study included several findings that provide implications for nursing practice and directions for future research in smoking prevention in adolescent females. In nursing practice, nurses may be involved in smoking prevention in a variety of practice areas. In the community, nurses often deliver smoking prevention programs to children in both elementary and secondary schools. Nurses also regularly see adolescents in community and youth clinic settings. In hospitals, nurses are involved with children and adolescents on pediatric wards, out-patient clinics and mental health programs. On an administrative level, nurses may be employed as regional tobacco reduction coordinators, and may be involved in developing, implementing, and evaluating smoking prevention programs from the local to the international level. In terms of research, nurse researchers are involved in large multi-disciplinary smoking prevention research projects and are increasingly at the forefront of health behavior research.

Nursing Practice Implications

As smoking behavior is a significant and ongoing area of concern in health care, it is important that nurses are cognizant of, and integrate, current developments in smoking prevention science in their practice. Nurses should be aware of the theoretical basis behind social influences smoking prevention programs such as "Beauty From the Inside Out" and recognize the strengths and limitations of the social influences approach. Although this research study examined attitude toward smoking rather than behavior and thus no inferences can be made relating to subsequent smoking behavior, it is important that nurses incorporating smoking prevention into their practice recognize that attitudes toward tobacco are considered the first step toward uptake of smoking behavior and that a current recommendation is to monitor attitude toward smoking among children and adolescents (Vancouver Coastal Health, 2004). Nurses employed in elementary and secondary schools, and youth clinics are in an ideal position to monitor attitudes toward smoking as they regularly come into contact with the adolescent population. This information could then assist in development of effective smoking prevention programs.

The results of this study support that the social modeling influence of peers, in the form of father, boy/girlfriend, and best friend, influence adolescent females' attitudes toward smoking. Nurses, within the context of their everyday practice, can speak to adolescents, families of adolescents, and school personnel, about the increased risk of smoking uptake when there are smokers in an adolescent female's social environment. It is particularly important that adolescent females and their parents are aware of the increased risk if the adolescent female begins a relationship with a smoking romantic partner or if, in an already established relationship, the romantic partner begins to smoke. In this study, the consistent association between smoking boy/girlfriend and positive attitude toward smoking in adolescent females was not moderated by either the parental messaging or quality of parental relationship variables, which suggests that parents may not have much influence in this situation. A direct nurse-adolescent female approach focusing on the personal impact of smoking on the adolescent female's health might prove more effective than parental involvement.

The findings from this study also suggest that parental anti-smoking messaging is related to positive attitude toward smoking. Nurses employed in community settings can design pamphlets on effectively speaking with adolescents about smoking, hold informational workshops, and develop educational campaigns relating to parental messaging. However, it is important to note the conflicting results of the two anti-smoking messages included in this study. Nurses should be advised to teach parents that a message of warning and concern for the child's health might be more effective than a message that the child is not allowed to smoke. Nurses should also be aware that level of parental closeness, as well as content of the message, may impact the effectiveness of the anti-smoking messaging and therefore the messaging should be delivered by the parent who the child is closest to.

Within the context of their practice, nurses may have contact with parents who smoke and therefore they may have opportunities to share information about anti-smoking messaging.

Parents who smoke may not be aware of the current research linking parental anti-smoking messaging and decreased adolescent smoking and may feel that they have little or no influence or whether their child smokes, particularly as the parents themselves model smoking behavior. However, findings from this study indicate that parental anti-smoking messaging moderates the social modeling effect of having a smoking father. As the percentage of mothers (12.3%) who smoked were much lower than smoking fathers (23.3%) in this study, it is possible that the moderating effect of the messaging on mothers smoking would have been seen as well had the numbers of smoking mothers and smoking fathers been similar.

Nurses can support and encourage parents who smoke in delivering effective antismoking messages, rather than just 'not allowing' the child to smoke. Nurses can suggest that parents who smoke talk to their children about the dangers of smoking, actively seek to counteract the influence of peers by monitoring the smoking behavior of the peer group, maintain a close and communicative relationship with their child, and reduce their child's exposure to smoke by not smoking in the child's immediate environment.

Research Recommendations

Future research is needed to further develop and refine smoking prevention programs for use with adolescent females. Although the majority of adolescent females do not smoke, more research is needed to gain a deeper understanding of the influences of their attitudes toward smoking and intentions to smoke or not to smoke. From this study, several important recommendations for future smoking prevention research in adolescent females have emerged.

The results of this study support Bandura's Social Cognitive Theory as a useful basis for smoking prevention programs. Future research should attempt to refine and integrate the various theoretical frameworks currently guiding development of smoking prevention programs. Relating to research design, large longitudinal studies that examine not just smoking behavior, but also attitudes toward smoking, formation of intent to smoke or not, and decision making regarding smoking, are needed in order to identify causal relationships between predictive factors and outcomes. Mixed method research, employing both qualitative and quantitative data collection techniques, will enhance understanding of the variety and complexity of the factors influencing smoking uptake.

Findings from this study indicated that parental control, rather than maternal or paternal closeness, was associated with positive attitude toward smoking. However, emerging research suggests that disengaged parenting has been shown to increase risk of adolescent smoking onset (Chassin et al., 2005). Interpretation of the research to date on parenting in relation to smoking prevention has been hampered due to lack of consistency in measures of parenting. The quality of the relationship with parents needs to be more closely examined in terms of influence on smoking behavior as at present it is largely unknown which aspects of parenting may be most influential in the prevention adolescent smoking behavior.

Parenting anti-smoking messaging needs to be more comprehensively researched. Researchers should seek to clarify which specific parental anti-smoking messages are most effective in influencing attitudes when communicated to the adolescent. Who is delivering the messages is also important as results from this study indicated that adolescent females reported a lower level of closeness with their fathers than with their mothers. Factors such as maternal and paternal closeness and level and type of parental control may impact the adolescent's perceived meaning of the anti-smoking message and deserve further research exploration.

Limitations of the Study

In interpreting the results of this study, several limitations to the research must be considered. The first limitation relates to the cross-sectional design of the study. As such, the data was collected at a single point in time and can be interpreted only as an association between the variables of interest. Repeated measurements over time would considerably strengthen the research design and allow the analysis of trends in development of smoking behavior (Dempsey & Dempsey, 1996). Another limitation is that the data was collected by questionnaire and responses were limited to predetermined questions. With the questionnaire method, questions may be misinterpreted and accuracy of the data may be impacted (Brink & Wood, 1988). With regard to the Positive Attitude Scale, the scale was developed by the original BCYSOSH researchers and has not been previously tested for validity and reliability. It is important that the items in a measurement tool are a representative sample of content for that particular construct (Brink & Wood, 1998). It may be that there are other attitudes toward smoking that the respondents considered relevant but which were not included in the scale. The use of structured measuring instruments can result in loss of richness of data and may limit interpretation

(Dempsey and Dempsey, 1996). Another consideration is that the data is based upon self-report and the information given may not be accurate. Under-reporting of socially undesirable behavior, such as smoking, is a potential problem in behavioral research (Brink & Wood, 1988). However, the anonymity of the respondents in this study as well as lack of ongoing association with the researchers minimizes this concern.

It is also possible that some of the associations found between the social factors in this study and positive attitude toward smoking could be explained by other factors related to smoking, such as individual personality or cultural factors. This is supported by the fact that the variance in the four steps of the regression analysis was very low. The total variance explained by all of the variables examined was only 5%. This indicates that a minimal amount of the variance in the dependent variable, positive attitude toward smoking, can be attributed to social modeling, parental messaging, and the quality of the relationship with parents as measured in this study. At present, it is largely unknown how the influence of social factors on positive attitude toward smoking may wax and wane over the course of adolescence nor how they may be influenced by personality and cultural factors.

A geographical limitation exists in that the original BCYSOSH study gathered data from only two regions of British Columbia, inclusion of data from other regions of the province may have yielded different results. Similarly, data was limited to adolescent females between 14 and 20 years old. Some research indicates that attitudes toward smoking may be formed much earlier than this age and thus may be relatively 'set' by adolescence (Johnson et al., 2002). However, while the overall attitude to smoking may be stable, there may be considerable day-to-day variation and a single assessment of attitude cannot be interpreted as evidence of attitude over time. As previously discussed, adolescence is characterized by considerable cognitive and emotional change from early to late adolescence. Thus, there may be little predictive value in a one-time examination of attitudes toward smoking at mid-adolescence in terms of subsequent smoking behavior.

A further limitation is associated with constraints in the secondary analysis of previously collected data. The potential research questions were limited in that they had to be able to be answered by analysis of the available data. Some factors and measurements related to the research questions were absent due to the nature of the data collected for the primary study. For example, although maternal and paternal closeness were able to be operationalized as separate

variables, parental control was not, due to the nature of the data collected in the BCYSOSH study. As parental control was significantly associated with positive attitude toward smoking in this study, it would have been useful to know which parent was perceived by the respondent as exerting the control. As there were differences found in the level of closeness with mother and father, it would have been interesting to examine whether less perceived closeness with a specific parent was associated with a higher level of perceived control.

Conclusion

Examining attitudes toward smoking, as the first stage of smoking behavior is an important aspect of smoking prevention. Although this study has acknowledged limitations, the results contribute to the body of knowledge related to smoking prevention in adolescent females.

Results from this study indicate that smoking prevention programs may be more effective if a social influences approach is combined with educational campaigns targeted at parents. Parents need to be encouraged and supported in maintaining close relationships with their adolescent daughters, delivering effective anti-smoking messages, and avoiding harmful psychological control. Nurses must consider all adolescents 'at risk' for smoking initiation and be aware of the importance of social influences on attitudes toward smoking. Nurses are ideally positioned to monitor attitudes toward smoking in adolescents, deliver smoking prevention programs in schools and clinics, and share information with school personnel and parents as part of their nursing practice.

More research needs to be done in order to refine the theoretical development of smoking prevention programs to provide an integrated framework for use with the adolescent population. Researchers have identified the broad range of factors contributing to smoking uptake; however, more research is needed to explore how these multidimensional factors influence adolescent susceptibility to smoking uptake over the time period of adolescence. Future research examining influences on factors associated with smoking should be gender specific and should include longitudinal examinations of social factors, including specific antismoking parental messaging, and quality of the relationship with parents on attitudes toward smoking and behavioral intent to smoke. Unraveling the complex inter-relationships between factors that influence smoking behavior among adolescents needs to be a primary focus in population health research.

References

- Abernathy, T.J., & Bertrand, L.D. (1992). Preventing cigarette smoking among children: results of a four-year evaluation of the PAL program. *Canadian Journal of School Health* 83,(3), 226-229.
- Akers, R.L., Skinner, W.F., Krohn, M.D., Lauer, R.M. (1987). Recent trends in teenage Tobacco use: findings from a five-year longitudinal study. Sociology and Social Research, 71, (2), 110-4.
- Andersen, M., Leroux, B., Bricker, J., Rajan, K., & Peterson, A. (2004). Antismoking parenting practices are associated with reduced rates of adolescent smoking. *Archives of Pediatrics & Adolescent Medicine*, 158, (4), 348-352.
- Angus Reid Group (1997). *Tobacco use in British Columbia*, 1997. Vancouver, BC: Heart and Stroke Foundation of BC and Yukon. Retrieved October 1, 2004 from <u>http://www.healthplanning.gov.bc.ca/tobacrs/index.html</u>
- Ary, D.V., & Biglan, A. (1988). Longitudinal changes in adolescent cigarette smoking behavior:Onset and cessation. *Journal of Behavioral Medicine*, 11, (4), 361-381
- Avenevoli, S., & Merikangas, R. (2003). Familial Influences on adolescent smoking. Addiction, 98, (1), 1-20.
- Baker, T.B., Brandon, T.H., & Chassin, L. (2004). Motivational influences on cigarette smoking. *Annual Review of Psychology*, 55, 463-91.
- Band, P.R., Le, N.D., Fang, R., & Deschamps, M. ((2002). Carcinogenic and endocrine disrupting effects of cigarette smoke and risk of breast cancer. *The Lancet*, 306, (9339), 1044-49.

- Bandura, A. (1986). Social Foundations of Thought and Action. Englewood Cliffs, NJ: Prentice-Hall.
- Barber, B.K. (1996). Parental psychological control: Revisiting a neglected construct. *Child Development*, 67, 3296-3319.
- Barkin, S.L., Smith, K.S., & DuRant, R.H. (2002). Social skills and attitudes associated with substance use behaviors among young adolescents. *Journal of Adolescent Health*, 30, 448-454.
- Baron, R.M. & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.

Bastable, S.B. (2003). Nurse as educator. Sudbury, MA: Jones & Bartlett.

- Beal, A.C., Ausiello, J., & Perrin, J.M. (2001). Social influences on health-risk behaviors among minority middle school students. *Journal of Adolescent Health*, 28, 474-480.
- Biddle, B., Bank, B.J., & Marlin, M.M. (1980). Parental and peer influence on adolescents. Social Forces, 58, (4), 1057-1079.
- Brink, P., & Wood, M. (1988). *Basic steps in planning nursing research*.(3rd ed.). Boston,MA: Jones and Bartlett.
- British Columbia Centre of Excellence for Women's Health (2001). Teenage girls and smoking: a research agenda, workshop report. Vancouver, BC: Author

- Brownson, T., Jackson-Thompson, J., Wilkerson, J., Owens, N., & Fisher, E. (1992).
 Demographic and socioeconomic differences in beliefs about the health effects of smoking. *American Journal of Public Health*, 82, 99-103.
- Brunswick, A.F., & Messeri, P. (1983-4). Causal factors in onset of adolescents' cigarette smoking: a prospective study of urban black youth. *Advances in Alcohol and Substance Abuse*, (1-2), 35-52.
- Cairney, J., & Lawrence, K. (2002). Smoking on campus: an examination of smoking behaviours among post-secondary students in Canada. *Canadian Journal of Public Health*, 93, (4), 313-6.
- Canadian Cancer Society (2003). *Canadian Cancer Statistics 2003*. Retrieved October 1,2004 from <u>http://www</u>.bc.cancer.ca/ccs/internet/standard/0,3182,3278_14291
- Carvajal, S.C., Downing, R.A., Hanson, C., Coyle, K.K., & Pederson, L.L. (2004).
 Theory-based determinants of youth smoking: A multiple influence approach.
 Journal of Applied Social Psychology, 34, (1), 59-84.
- Castrucci, B.C., Gerlach, K.K., Kaufman, N.J., & Orleans, C.T. (2003). The association among adolescents' tobacco use, their beliefs and attitudes, and friends' and parents' opinions of smoking. *Maternal and Child Health Journal*, *6*, (3), 159-167.
- Chassin, L., Presson, C., Rose, J., Sherman, S.J., Davis, M.J., & Gonzalez, J.L. (2005).
 Parenting style and smoking-specific parenting practices as predictors of adolescent smoking onset. *Journal of Pediatric Psychology*, 30 (4), 333-344.
- Chassin, L., Presson, C., Sherman, S. J., Corty, E., Olshavsky, R. (1984). Predicting the onset of cigarette smoking in adolescents: a longitudinal study. *Journal of Applied Psychology*, 14, 224-43.

- Chassin, L., Presson, C.C., Sherman, S.J., Montello, D., & McGrew, J. (1986). Changes in peer and parental influence during adolescence: longitudinal versus cross-sectional perspectives on smoking initiation. *Developmental Psychology*, 22, (3), 327-34.
- Chassin, L., Presson, C.C., Sherman, S.J. (1990). Social psychological contributions
 To the understanding and prevention of adolescent cigarette smoking.
 Personality and Social Psychology Bulletin, 16, (1), 133-151.
- Chassin, L., Presson, C.C., Todd, M., Rose, J. S., & Sherman, S.J. (1998). Maternal socialization of adolescent smoking: The intergenerational transmission of parenting and smoking. *Developmental Psychology*, 34, (6), 1189-1201.
- Chopak, J., Vicary, J.R., & Crockett, L.J. (1998). Predicting alcohol and tobacco use in a sample of rural adolescents. *American Journal of Health Behavior, 22*, (5), 334-336.
- Clayton, S. (1991). Gender differences in pychosocial determinants of adolescent smoking. Journal of School Health, 61, (3), 115-120.
- Cohen, D.A., Richardson, J., LaBree, L.(1994). Parenting behaviors and the onset of smoking and alcohol use: a longitudinal study. *Pediatrics*, 94, (3), 368-75.
- Collins, R. L., & Ellickson, P L. (2004). Integrating four theories of adolescent smoking. Substance Use & Misuse, 39, (2), 179-209
- Conrad, K.M., Flay, B.R., & Hill, D. (1992). Why children start smoking cigarettes: predictors of onset. *British Journal of Addiction*, 87, (12), 1711-24.
- Costa, F.M., Jessor, R., & Turbin, M.S. (1999). Transition into adolescent problem drinking:The role of psychosocial risk and protective factors. *Journal of Studies on Alcohol, 60*, 480-490.

- Cunningham, R. (1996). Smoke &mirrors: The Canadian tobacco war. Ottawa, ON: International Development Research Center.
- Darling, N., & Cumsille, P. (2003). Theory, measurement, and methods in the study of family influences on adolescent smoking. *Addiction*, *98*, (1), 21-36.
- Davis, S., Huebner, A., Piercy, F., Shettler, L., Meszaros, P.S., & Matheson, J. (2004). Female adolescent smoking: A Delphi study on best prevention practices. *Journal of Drug Education, 34*, (3), 295-312.

Dempsey, P.A. & Dempsey, A.D. (1996). Nursing Research. New York: Little, Brown & Co.

- de Vries, H. (1995). Socio-economic differences in smoking: Dutch adolescents' beliefs and behavior. *Social Science Medicine*, 41, (3), 419-24.
- de Vries, H., Kremers, S.P., Wetzels, J., Muddle, A., Ariza, C., Duarte Vitoria, P., Rahman, J.,
 Dijk, F. (in press). Perceptions of smoking in boys and girls, are there great differences?
 Results of a 13 year old European sample. *Health Promotion International*.
- DiClemente, R.J., Wingood G., Crosby, R., Sionean, C., Cobb, B., Harrington, K. et al. (2001).
 Parental monitoring: Association with adolescents' risk behaviors. *Pediatrics*, 107, (6), 1363-9.
- Distefan, J.M., Gilpin, E.A., Choi, W.S., Pierce, J.P. (1998). Parental influences predict adolescent smoking in the United States, 1989-1993. *Journal of Adolescent Health*, 22, (6), 466-74.
- Doll, R., Peto, R., Wheatley, K., Gray, R., & Sutherland, I. (1994). Mortality in relation to smoking: 40 years' observations on male British doctors. *British Medical Journal*, 309, 901-911.

- Eckert, P. (1983). Beyond the statistics of adolescent smoking. American Journal of Public Health, 73, (4), 439-441.
- Eckhardt, L., Woodruff, S.I., & Elder, J.P. (1994). A longitudinal analysis of adolescent smoking and its correlates. *Journal of School Health*, 64, (2), 67-72.
- Ellickson, P.L., Bird, C.E., Orlando, M., Klein, D.J. & McCaffrey, D.F. Social context and adolescent health behavior: Does school-level smoking prevalence affect students' subsequent smoking behavior? *Journal of Health & Social Behavior*, 44, (4), 525-535.
- Engels, R.C., Vitaro, F., Blokland, E., de Kemp, R., & Scholte, R.H. (2004). Influence and selection processes in friendships and adolescent smoking behavior: the role of parental smoking. *Journal of Adolescence*, 27, (5), 531-544.

Erikson, E.H. (1950). Childhood and society. New York: Norton.

Erikson, E.H. (1968). Identity, youth and crisis. New York: Norton.

- Fagan, P., Eisenberg, M., Stoddard, A.M., Frazier, L., & Sorensen, G. (2001). Social influences, social norms, social support, and smoking behavior among adolescent workers. *American Journal of Health Promotion*, 15, (6), 414-421.
- Faucher, M.A., & Carter, S., (2001). Why girls smoke: A proposed community-based prevention program. Journal of Obstetric, Gynecologic, and Neonatal Nursing, 30, (5), 463-71.
- Fazio, R.H., Powell, M., & Williams, C. (1989). The role of attitude accessibility in the attitudeto-behavior process. *Journal of Consumer Research*, 16, 280-289.
- Filice, G.A., Joseph, A.M., Hannan, P.J., & Lando, H.A. (2003). A period of increased susceptibility to cigarette smoking among high school students. *Journal of School Health*, 73, (7), 272-9.

- Flay, B.R., Hu, F.B., & Richardson, J. (1998). Psychosocial predictors of different stages of cigarette smoking among high school students. *Preventative Medicine*, 27, A9- A18.
- Flay, B.R., Hu, F.B., Siddiqui, O., Day L.E., Hedeker, D., Petraitis, J., Richardson, J., & Sussman,S. (1994). Differential influence of parental smoking and friends' smoking on adolescent initiation and escalation of smoking. *Journal of Health and Social Behavior, 35*, 248-265.
- Flay, B.R., Petraitis, J., & Hu, F.B. (1999). Psychosocial risk and protective factors for adolescent tobacco use. *Nicotine & Tobacco Research*, 1, S59-S65.
- Galanti, M.R., Rosendahl, I., Post, A., & Gilljam, H. (2001). Early gender differences in adolescent tobacco use-the experience of a Swedish cohort. *Scandinavian Journal of Public Health*, 29, 314-317.
- Giddens, A., Duneier, M., & Appelbaum, R.P. (2003). *Introduction to Sociology* (4th ed.). New York: Norton.
- Gittelsohn, J., Roche, K., Alexander, C., & Tassler, P. (2001). The social context of smoking among African American and white adolescents in Baltimore city. *Ethnicity & Health, 6*, (3/4), 211-225.
- Global Youth Tobacco Survey Collaborating Group (2003). Differences in worldwide tobacco use by gender: Findings from the global youth tobacco survey. *Journal of School Health*, 73, (6), 207-215.
- Gritz, E.R., Prokhorov, A.V., Hudmon, K.S. Chamberlain, R.M., Taylor, W.C., DiClemente, C.C., Johnston, D.A., Hu,S., Jones, L.A., Jones, M.M., Rosenblum, C.K., Ayars, C.L., Amos, C.I. (1998). Cigarette smoking in a multiethnic population of youth: methods and baseline findings. *Preventative Medicine*, 27, (3), 365-84.

- Grandpre, J., Alvaro, E.M., Burgoon, M., Miller, C.H., & Hall, J.R. (2003). Adolescent reactance and anti-smoking campaigns: A theoretical approach. *Health Communication*, 15, (3), 349-366.
- Greaves, L., & Barr, V. (2000). *Filtered policy: Women & tobacco in Canada*. Vancouver, BC: BC Centre of Excellence for Women's Health.
- Greenlund, K.J., & Johnson, C.C. (1997). Cigarette smoking attitudes and first use among third through sixth grade students: The Bogalusa heart study. *American Journal Of Public Health*, 87, (8), 1345-1349.
- Health Canada (1996). Summary Highlights, *Youth smoking survey*, 1994. Ottawa,ON: Author. Retrieved September 15, 2004 from <u>http://www.hc-sc.gc.ca/hecs-sesc/tobacco/research/archive/survey94/yss.html</u>
- Health Canada (1998). *Deaths in 1998*. Ottawa, ON: Author. Retrieved February 21, 2005 from <u>http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/mortal/1998/index_e.html</u>
- Health Canada (2003). Smoking in Canada: an overview. Retrieved October 22, 2004 from http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc/fs-if/2003/2003-smok-fum_e.html
- Hobbs, F., Ferrence, R., Pope, M., Poland, B., Ashley, M. J., & Pederson, L., (1997). *Tobacco and women's health: Influences on smoking cessation in women*. Toronto, ON:
 Ontario Tobacco Research Unit.
- Hollenbach, K. A., Barrett-Connor, E., Edelstein, S. L., & Holbrook, T. (1993). Cigarette smoking and bone mineral density in older men and women. *American Journal of Public Health*, 83, (9), 1265-70.

- Hu, F.B., Flay, B.R., Hedeker, D., Siddiqui, O., & Day, L.E. (1995). The influences of friends' and parental smoking on adolescent smoking behavior: the effects of time and prior smoking. *Journal of Applied Social Psychology*, 25, (22), 2018-47.
- Huebner, A. (2000). Adolescent growth & development. Family and Child Development,# 350-850, Petersberg, VI: Virgina Cooperative Extension. VI.

Huck, S.W. (2000). Reading statistics and research (3rd ed.). New York: Longman.

- Jackson, C. (1998). Cognitive susceptibility to smoking and initiation of smoking during childhood. *Preventative Medicine*, 27, (1), 129-34.
- Jackson, C. (2002). Perceived legitimacy of parental authority and tobacco and alcohol use During early adolescdence, *Journal of Adolescent Health*, 31, (5), 425-432.
- Jackson, C., & Dickinson, D. (2003). Can parents who smoke socialize their children against smoking?: Results from the smoke-free kids intervention trial. *Tobacco Control*, 12, 52-59.
- Jackson, C., Hendricksen, L., Dickinson, D., & Levine, D.W. (1997). The early use of alcohol and tobacco: its relation to children's competence and parents' behavior. *American Journal of Public Health*, 87, (3), 359-64.
- Jackson, C., Henriksen, L., Dickinson, D., Messer, L., & Robertson, S.B. (1998). A longitudinal study predicting patterns of cigarette smoking in late childhood. *Health Education & Behavior*, 25, (4), 436-447.
- Jairath, N., Mitchell, K., & Filleon, B. (2003). Childhood smoking: the research, clinical and theoretical imperative for nursing action. *International Nursing Review*, 50, 203-214.

- Jang, S.J. (1999). Age-varying effects of family, school, and peers on delinquency: A multilevel modeling test of interactional theory, *Criminology*, *37*, (3), 643-686.
- Jessor, R., Turbin, M.S., Costa, F.M., Gong Q., Zhang, H., & Wang, C. (2003). Adolescent problem behavior in China and the United States: a cross-national study of psychosocial protective factors. *Journal of Research On Adolescents*, 13, (3), 329-360.
- Johnson, C.C., Li, D., Perry, C., Elder, J.P., Feldman, H.A., Kelder, S.H., & Stone, E. (2002). Fifth through eighth grade longitudinal predictors of tobacco use among a racially diverse cohort: CATCH . *Journal of School Health*, 72, (2), 58-65.
- Johnson, J.,L., Bottorff, J.L., Moffat, B., Ratner, P., Shoveller, J.A., & Lovato, C.Y. (2003). Tobacco dependence: adolescents' perspectives on the need to smoke. *Social Science & Medicine*, 56, 1481-1492.
- Johnson, J.L., Tucker, R., Ratner, P., Bottoroff, J.L., Prkachin, K.M., Shoveller, J., & Zumbo, B. (2004). Socio-demographic correlates of cigarette smoking among high school students. *Canadian Journal of Public Health*, 95, (4), 268-271.
- Kandel, D.B., & Wu, P. (1995). The contributions of mothers and fathers to the intergenerational transmission of cigarette smoking in adolescence. *Journal* of Research on Adolescence, 5, (2), 225-252.
- Kauffman, S.E., Silver, P., & Poulin, J. (1997). Gender differences in attitudes toward alcohol, tobacco, and other drugs. *Social Work, 42*, (3), 231-241.
- Kearl, M., & Gordon, C. (1993). Social Psychology: Shaping identity, thought, and conduct. Boston, MA: Allyn & Bacon.

- Kegler, M., Cleaver, V., & Kingsley, B. (2000). The social context of experimenting with cigarettes: American Indian "start stories". *American Journal of Health Promotion*, 15, (2), 89-92.
- Kelley, F., Thomas, S., & Friedman, E. (2003). Health risk behaviors in smoking and non-smoking young women. Journal of the American Academy of Nurse-Practitioners, 15, (4), 179-184.
- Kobus, K. (2003). Peers and adolescent smoking. Addiction, 98, (1), 37-55.
- Komro, K.A., McCarty, M.C., Forster, J., Blaine, T.M., & Chen V. (2003). Parental, family, and home characteristics associated with cigarette smoking among adolescents. *American Journal of Health Promotion*, 17, (5), 291-299.
- Kosterman, R., Hawkins, J.D., Spoth, R., Haggerty, K.P., & Zhu, K. (1997). Effects of a preventative parent-training intervention on observed family interactions: proximal outcomes from preparing for the drug free years. *Journal of Community Psychology*, 25, (4), 337-352.
- Kosterman, R. Hawkins, J.D., Haggerty, K.P., Spoth, R., & Redmond ,C. (2001). Preparing for the drug free years: session specific effects of a universal parent-training intervention with rural families. *Journal of Drug Education*, 31, (1), 47-68.
- Kraemer, H., & Thiemann, S. (1987). *How many subjects? Statistical power analysis in research*. Newbury Park, CA: Sage Publications.
- Lewis, J. (1991). The physiological and psychological development of the adolescent. Yale-New Haven Teacher's Institute. Retrieved September 14, 2004 from <u>http://www.yale.edu/ynhti/curriculum/units/1991/5/91.05.07.x.html</u>

- Lynam, M.J. (2005). Health as a socially mediated process: Theoretical and practice imperatives emerging from research on health inequalities. *Advances in Nursing Science*, 28, (1), 25-37.
- Marcus, S.E., Giovino, G.A., Pierce, J.P., & Harel, Y. (1993). Measuring tobacco use among adolescents. *Public Health Rep, 108*, 20-4.
- Markham, W. A., Aveyard, P., Thomas, H., Charlton, A., Lopez, M.L., & De Vries, H. (2004).
 What determines future smoking intentions of 12-13 year old UK African- Caribbean,
 Indian, Pakistani and white young people? *Health Education Research*, 19, (1), 15-28.
- Matt, G.E., Quintanta, P.J.E., Hovell, J.F. Bernet, J.T., Song, S., Novianti, N., Juarez, T.,
 Floro, J., Gehrman, C., Garcia, M., & Larson, S. (2004). Households contaminated
 by environmental tobacco smoke: sources of infant exposures. *Tobacco Control*, 13, (1): 29-37.
- McCreary Centre Society (2003). Healthy youth development: Highlights from the 2003 adolescent health survey. Vancouver, BC: Author
- McDonald.M., & Wright N. (2002). Cigarette smoking and the disenfranchisement of adolescent girls: A discourse of resistance? *Health Care for Women International*, 23, 281-305.
- McGahee, T.W., Kemp, V., & Tingen, M. (2000). A theoretical model for smoking prevention studies in preteen children. *Pediatric Nursing*, 26, (2), 135-40.
- Meier, K.S. (1991). Tobacco truths: The impact of role models on children's attitudes toward smoking. *Health Education Quarterly*, 18, (2), 173-182.
- Merriam –Webster Online (2005). Retrieved February 15, 2004 from <u>http://www.m-w.com/cgi-bin/dictionary?book=Dictionary&va=attitude&x=15&y=12</u>

- Michell, L., & Amos, A. (1997). Girls, pecking order and smoking. Social Science & Medicine, 44, (12), 1861-9.
- Miller, P., & Plant, M.(2003). The family, peer influences and substance use: findings from a study of UK teenagers. *Journal of Substance Use*, *8*, 19-26.
- Mills, C., Stephens, T., & Wilkins, K. (1994). Workshop report: Summary report of the workshop on data for monitoring tobacco use. *Chronic Diseases in Canada*, 15, (3), 105-110.

Morgan, M., & Grube, J.W. (1991). Closeness and peer group influence. *British Journal of Social Psychology*, 30, 159-169.

- Multiple Regression. Retrieved September 10, 2004, from http://www.statsoft.com/textbook/stmulreg.html
- Munro, B.H. (2005). Statistical methods for health care research (5th ed.) Philadelphia: Lippincott.
- National Cancer Institute of Canada (2003). *Canadian cancer statistics 2003*. Toronto,ON: Author.
- National Institute on Drug Abuse (2003). *Preventing drug abuse among children and adolescents*. (2nd ed.). Maryland: National Institutes of Health.
- O'Byrne, K.K., Haddock, K. & Poston, W.S.C. (2002). Parenting style and adolescent smoking. *Journal of Adolescent Health*, 30, 418-425.
- Oei, T. P., & Baldwin, A.R. (1992). Smoking prevention and education: A developmental model. *Journal of Drug Education*, 22, (2), 155-181.

- Olds, R.S., & Thombs, D.L. (2001). The relationship of adolescent perceptions of peer norms and parent involvement to cigarette and alcohol use. *Journal of School Health*, 71, (6), 223-228.
- Owen-Smith, V., Hannaford P.C., Warskyj, M., Ferry, S., & Kay, C.R. (1998). Effects of changes in smoking status on risk estimates for myocardial infarction among women recruited for the Royal College of General Practitioners' oral contraception study in the U.K. Journal of Epidemiology and Community Health, 52, 420-4.
- Peterson, A.V., Kealey, K.A., Mann, S.L., Marek, P.M., & Sarason, I.G. (2000).
 Hutchinson smoking prevention project: Long-term randomized trial in school based tobacco use prevention-results on smoking. *Journal of the National Cancer Institute*, 92, (24), 1979-1991.
- Petraitis, J., Flay, B.R., & Miller, T.Q. (1995). Reviewing theories of adolescent substance use:organizing pieces in the puzzle. *Psychological Bulletin*, 117, (1), 67-86.
- Pickett, W., Koushik, A., Faelker, T., & Brown, K.S. (2000). Estimation of youth smoking behaviors in Canada. *Chronic Diseases in Canada, 21*, (3). Retrieved September 14, 2004 from http:// <u>www.tobaccolaw.org/documents/english/literature/Estimation</u>
- Pierce, J.P., Choi, W.S., Gilpin, E.A., Farkas, A.J., & Merritt, R.K. (1996). Validation of susceptibility as a predictor of which adolescents take up smoking in the United States. *Health Psychology*, 15, (5), 355-61.
- Polit, D.F., & Hungler, B.P. (1995). Nursing Research: Principles and methods. (5th ed.)Philadelphia, PA: Lippincott.
- Proescholdbell, J., Chassin, L., & MacKinnon, D.P. (2000). Home smoking restrictions and adolescent smoking. *Nicotine & Tobacco, 2*, 159-167.

- Radziszewska, B., Richardson, J.L., Dent, C.W., Flay B.R. (1996). Parenting style and adolescent depressive symptoms, smoking and academic achievement: ethnic, gender, and SES differences. *Journal of Behavioral Medicine*, 19, (3), 289-305.
- Ragon, B.M., & Mouzon, L.T. (1999). Attitudes and beliefs of adolescents toward to use of tobacco: A 16 year follow-up. *The International Electronic Journal of Health Education, 2*, (3), 120-126.
- Rose, J., Chassin, L., Presson, C.C., & Sherman, S. (1999). Merrill-Palmer Quarterly, 45, (1), 62-84.
- Rural Health (2004). BC Ministry of Health Services. Retrieved February 25, 2005 from http://www.healthservices.gov.bc.ca/rural/index.html
- Sargent, J.D., & Dalton, M. (2001). Does parental disapproval of smoking prevent adolescents from becoming established smokers? *Pediatrics*, 108, (6), 1256-63.
- Sequire, M., & Chalmers, K. (2000). Late adolescent female smoking. Journal of Advanced Nursing, 31, (6), 1422-1429.
- Shadel, W.G., Shiffman, S., Niaru, R., Nichter, M., & Abrams, D.B. (2000). Current models of nicotine dependence: what is known and what is needed to advance understanding of tobacco tetiology among youth. *Drug and Alcohol Dependence*, *59*, (1), 9-21.

Sherman, S.J., Rose, J.S., Koch, K., Presson, C.C., & Chassin, L. (2003). Implicit and explicit attitudes toward cigarette smoking: The effects of context and motivation. *Journal of Social and Clinical Psychology*, 22, (1), 13-39.

- Simons-Morton, B.G., & Haynie, D.L. (2003). Psychosocial predictors of increased smoking stage among sixth graders. *American Journal of Health Behavior*, 27, (6), 592-602.
- Single, E., Robson, L., Xie, X., & Rehm, J. (1996). The costs of substance abuse in Canadahighlights. Ottawa, ON: Canadian Centre on Substance Abuse. Retrieved October 1, 2004 from http://www.ccsa.ca/docs/costhigh/htm
- Stanton, W., Currie, G.D., Oei, T., Silva, P. (1996). A developmental approach to influences on adolescents' smoking and quitting. *Journal of Applied Developmental Psychology*. 17, (3), 307-319.

Statistics Canada (2003). Community profiles. Statistics Canada.

Stein, J.R., Haddock, C.K., O'Byrne, K.K., Hymowitz, N., & Schwab, J. (2000). Pediatrician role in reducing tobacco exposure in children. *Pediatrics*, 106,(5),p.e66. Retrieved October 1, 2004 from <u>http://pediatrics.aappublications.org/cgi/content/full/106/5/e66</u>

Steinberg, L. (2005). Adolescence. (7th ed.). New York: McGraw-Hill.

- Taylor, W. C., Ayars, C.L., Gladney, A.P., Peters, Jr. R.J., Roy, J.R., Prokhorov, A.V., Chamberlain, R.M., & Gritz, E.R. (1999). Beliefs about smoking among adolescentsgender and ethnic differences. *Journal of Child and Adolescent Substance Abuse*, 8, (3), 37-55.
- Urberg, K.A., (1992). Locus of peer influence: social crowd and best friend. Journal of Youth and Adolescence, 21, (4), 439-50.
- Urberg, K.A., Cheng, C-H., Shyu, S-J. (1991). Grade changes in peer influence on adolescent cigarette smoking: a comparison of two measures. *Addictive Behaviors*, 16, (1-2), 21-8.

- U.S. Department of Health and Human Services. (2001). Women and smoking: a report of the Surgeon General. Rockville MD: U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General, 2001.
- U.S. Department of Health and Human Services (1998). Preventing tobacco use among young people: A report of the Surgeon General. Public Health Service, Center for Disease Control, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking And Health; Atlanta GA.
- Vancouver Coastal Health (2004). Tobacco reduction strategy: Targeting a smoke free future. Retrieved January 27, 2005 from <u>http://www</u>.vch.ca/health_ services/public_health/VCHA%20Draft%20Tobacco%20Strategy2004.pdf
- von Bothmer, M., & Fridlund, B. (2001). Promoting a tobacco-free generation: Who is responsible for what? *Journal of Clinical Nursing*, 10, (6), 784-93.
- von Bothmer, M., Mattson, B., & Fridlund, B. (2002). Influences on adolescent smoking behavior: siblings' smoking and norms in the social environment do matter. *Health and Social Care in the Community*, 10, (4), 213-220.
- Wallace, J.M., Bachman, J.G., O'Malley, P.M., Schulenberg, J.E., Cooper, S.M., & Johnson, L.D. (2003). Gender and ethnic differences in smoking, drinking, and illicit drug use among American 8th, 10th and 12th grade students, 1976-2000. *Addiction, 98*, 225-234.
- Wang, M.Q. (2001). Social environmental influences on adolescents' smoking progression. American Journal of Health Behavior, 25, (4), 418-26.

- Wang, M.Q., Fitzhugh, E.C., Westerfield, R.C., & Eddy, J.M. (1995). Family and peer influences on smoking behavior among American adolescents: an age trend. *Journal of Adolescent Health*, 16, 200-203.
- Wilkinson, D., & Abraham, C. (2004). Constructing an integrated model of the antecedents of adolescent smoking. *British Journal of Health Psychology*, *9*, 315-333.
- Winkelstein, M.L. (1992). Adolescent smoking: influential factors, past preventative efforts, and future nursing implications. *Journal of Pediatric Nursing*, 7, (2) 120-127.

World Health Organization (2000). *World health report 2000*. Retrieved October 1, 2004 from <u>http://www.who.int/whr2001/2001/archives/2000/en/</u>

Appendix A

5 Key Stages in Tobacco Initiation and Use

1. The formation of attitudes and beliefs about smoking

2. First trying tobacco

3. Continuing experimentation with tobacco

4. Regularly using tobacco

5. Becoming addicted to tobacco

U.S. Department of Health and Human Services (1998). *Preventing tobacco use among young people: A report of the Surgeon General*. Public Health Service, Center for Disease Control, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking And Health; Atlanta GA.

Appendix B

Parental Control Scale

For each of the following statements, decided which answer most closely describes the way the parents that you live with (or parent/stepparents/foster parents/guardians) act towards you...

My parent(s)...

1. change the subject whenever I have something important to say

2. Avoid looking at me if I disappoint them

3. Interrupt me

4. Are less friendly to me if I do not see things their way

5. Would like to be able to tell me how I feel or think about things

6. Blame me for other family members' problems

7 .Bring up my past mistakes when they criticize me

8. If I hurt their feelings, stop talking to me until I please them again

Psychological Control Scale Youth Self Report (PCS-YSR)

From Barber, B.K. (1996). Parental psychological control: Revisiting a neglected construct. *Child Development*, 67, 3296-3319.

Appendix C

Parental Closeness

Overall, how would you describe your relationship with your....

<u>Mother</u>	Very close	Somewhat close	Not very close	I am not in touch with them	Not applicable
<u>Father</u>	Very close	Somewhat close	Not very close	I am not in touch with them	Not applicable

Appendix D

Positive Attitude Scale

Please indicate how strongly you agree or disagree with the following statements...

a. Smoking makes people feel lively and awake

* b. Smoking is addictive

c. Smoking helps people relax

d. Smoking helps people control their appetite

e. Smoking makes it easier to talk to people

f. Smoking makes people look more mature

* g. Smoking makes people look cool

h. Smoking helps people control their weight

i. Smoking makes people feel popular

j. Smoking helps people fit in at school

k. Smoking helps people express themselves

1. Smoking helps people control their feelings

* Items b,f,g eliminated after factor analysis