The Role of Gender in Staying Smoke-Free in Adolescence: Using a Theory of Planned Behavior Approach

A Thesis

Submitted to the Faculty of Education

In Partial Fulfillment of the Requirements

for the Degree of

Master of Applied Health Services Research

University of Prince Edward Island

Heather C. Diamond

Charlottetown, PE

March, 2008

SIGNATURE PAGE

2

REMOVED

Your file Votre référence
ISBN: 978-0-494-49829-3
Our file Notre référence
ISBN: 978-0-494-49829-3

Dedication

For my parents, who gave me the tools and the confidence to use them… and my children who strengthened my resolve when it wore thin.

Abstract

Adolescents in grades 5 through 9 (ages 10-15) are most likely to first experiment with tobacco use. The ability to identify factors that contribute to adolescent *smoke-free* behaviour is critical to tobacco control initiatives. Further, examining potential gender differences in smoke-free behaviour may be beneficial to identifying and supporting smoking prevention initiatives tailored to male and female adolescents.

This thesis is a secondary analysis of data collected in Prince Edwards Island intermediate schools. Regression analyses were used to determine whether the theory of planned behavior (TPB) explained significant variation in smoke-free intentions and behavior among adolescents, and whether any of these relationships were moderated by gender. The relationship of gender-specific beliefs as they inform being smoke-free were also examined. Two samples of intermediate school students (500 students, grades 7-9) were analyzed and compared. Students completed a theory of planned behavior questionnaire to identify their beliefs about staying smoke free; thirty days later, students completed a follow-up questionnaire which measured actual smoke-free behavior.

Study results supported the predictive ability of the TPB, with self-efficacy emerging as a significant predictor of smoke-free intentions for all adolescents. Some significant gender differences were found; the smoke-free intentions of male students were significantly related to grade level, while those of females were not. Further, smoke-free behaviour was significantly more strongly predicted by PBC for some female students than for males. One major application of the findings, given areas of divergence and of similarity with earlier studies, is the need for further research on gender differences in remaining smoke-free.

Acknowledgements

I owe special thanks to Donna Murnaghan and Chris Blanchard, my co-supervisors, for giving me the benefit of their resourceful and painstaking patience, encouragement and knowledge.

Table of Contents

List of Appendices

List of Figures

List of Tables

CHAPTER ONE

Introduction

Tobacco use is the number one preventable cause of debilitating illness and premature death in Canada (Chen, 2003; Heart and Stroke Foundation, 2006; Madarasová Gecková et al., 2005; Makomaski Illing & Kaiserman, 2004; Shields, 2004) and in Prince Edward Island (Van Til, 2006). Cigarette smoking is the most common form of tobacco use, and causes 22% of all deaths in Canada (Makomaski Illing & Kaiserman, 2004), including nearly 30% of all fatal cancers (Health Canada, 2007a). It is a major cause of lung cancer, one of the most preventable cancers (Health Canada, 2007a) and the top cause of adult smoking-related death (Makomaski Illing & Kaiserman, 2004). Despite decreasing smoking rates in recent years, almost 5 million Canadians, or close to one in five individuals aged 15 or older, are self-reported smokers (Health Canada: Tobacco Control Programme, 2006a). According to Health Canada, 19% of adolescents in grades 5 through 9 have tried smoking cigarettes (Health Canada: Tobacco Control Programme, 2006b).

The characteristics of adolescents are unique, and may significantly contribute to their tobacco use. Adolescents typically underestimate the addictiveness of tobacco and the effects of tobacco use on their health. Moreover, adolescents are often reluctant to identify themselves as smokers, and subsequently are less attentive to the consequences of their behaviour and less committed to quitting (Milton et al., 2004). Although smoking cessation programs and prevention initiatives have shown some success in recent years, the dangerous health effects from smoking and its addictive properties warrant discouraging tobacco uptake entirely. This is particularly true for young

adolescents, where smoking uptake and risk-taking behaviours in general are especially prevalent. Attention should be focused on identifying and supporting the characteristics which sustain *smoke-free* behaviour.

Smoke-free behaviour is characterized as being entirely abstinent from tobacco smoking, which most often means cigarettes. Health Canada defines non-smokers, or those who are smoke-free, as 'former smokers and never-smokers combined' (Health Canada, 2007b). For this project, being smoke-free indicates that adolescents remained abstinent from cigarette smoking for a 30-day period. In 2004-05, according to the Youth Smoking Survey (YSS), 81% of Canadian adolescents in grades 5 through 9 reported having never tried smoking cigarettes (Health Canada: Tobacco Control Programme, 2006b). Researchers suggest that new research should seek to understand the factors underlying the maintenance of smoking abstinence in adolescence, so as to reinforce this positive behaviour (Côté, Godin, & Gagné, 2004; Manske, Brown, & Cameron, 1997).

The ability to identify factors that contribute to adolescent smoke-free behaviour might enhance prevention initiatives during this critical age for smoking onset (Noar & Zimmerman, 2005; Petraitis, Flay, & Miller, 1995; Tyas & Pederson, 1998). Many health determinants, including physical, social, and cognitive factors, influence adolescents' decisions to begin using tobacco. A comprehensive theoretical approach may help identify and link these determinants to intervention strategies that corroborate the characteristics of being smoke-free. The approach chosen to guide this study is the theory of planned behaviour (TPB; Ajzen, 1991), which integrates factors of social influence, smoking attitudes, and perceived control. Because TPB variables have been found to explain much of the variance in smoking behaviour, it is implied that the very

factors associated with smoking behaviour can influence or protect against the uptake of smoking (Engels, Knibbe, & Drop, 1999).

Potential gender differences in smoke-free behaviour among adolescents have not been examined. Prevention strategies which recognize that smoke-free behaviour may be explained differently for males and females may enhance prevention outcomes. An underlying concept of the TPB suggests that an intervention should ultimately change the beliefs that guide each particular behaviour (Ajzen, 1991). Understanding the influence of gender difference on smoke-free behaviour may be beneficial to identifying smoking prevention initiatives tailored to the needs of adolescents.

This study uses the theory of planned behaviour to examine smoke-free intentions and behaviour, as well as the underlying beliefs which inform them, for adolescents living in Prince Edward Island. Particular attention is focused on identifying potential gender differences which might contribute to improved smoking prevention strategies for this vulnerable group.

Background to the Problem: Issues of Adolescent Smoking

The direct healthcare costs attributable to smoking among all ages in Canada exceeded $2.6 billion in 1992 (Single, Robson, Xie, & Rehm, 1996). By 2002, these costs had risen to more than $4.3 billion, with a further $12.4 billion in associated productivity losses (Rehm et al., 2006). The negative health and economic consequences to Canadians from tobacco use is an escalating and unacceptable burden, one which will not diminish without significant and sustained efforts to reduce the number of smokers in Canada (Madarasová Gecková et al., 2005). The gap in life expectancy between smokers and non-smokers has been widening over the past few decades (Shields, 2004).

Moreover, the number of deaths ascribed to smoking continues to climb in line with the increasing and ageing population. It can be expected that large numbers of aging "Baby Boomers" will continue to die over the next few decades from smoking-related causes (Madarasová Gecková et al., 2005; Makomaski Illing & Kaiserman, 2004). Even if the prevalence of tobacco use continues its downward trend, it is at the point of tobacco uptake, most often during adolescence, where a focus on smoke-free initiatives might be expected to influence the substantial costs of tobacco use for Canadians.

Lifestyle behaviours are largely developed during adolescence (World Health Organization, 2002). In Canada, 66% of smokers have their first cigarette by age 15 (Health Canada: Tobacco Control Programme, 2003). Adolescents in grades 5 through 9 (roughly ages 10-15) are most likely to first experiment with tobacco use (Health Canada: Tobacco Control Programme, 2006b; Heart and Stroke Foundation, 2006). The greatest relative increase in beginning smoking in Canada is between 10 and 12 years of age (Health Canada: Tobacco Control Programme, 2005). The mean age of smoking a whole cigarette for the first time has remained relatively stable since 1994, at between 11 and 12 years (Health Canada: Tobacco Control Programme, 2005; Health Canada: Tobacco Control Programme, 2006b; Heart and Stroke Foundation, 2006).

Smoking prevalence tends to increase through the teen years. The Canadian Youth Smoking Survey (2002) found smoking rates increased progressively from grade 5 through grade 9 for both males and females. Rates of those who tried smoking escalated from 7% of grade 5 students to 51% of grade 9 students (P. Smith, Begley, O'Loughlin, & Snider, 2005). On Prince Edward Island, 2002 rates of occasional or daily smokers in secondary schools climbed from 4% of students in grade 7 to 16% of those in grade 9 and

24% by grade 10 (Prince Edward Island Department of Health and Social Services, 2002).

The potential health consequences of becoming a daily smoker at an early age have been clearly shown. People who start smoking in early adolescence are much more likely to develop a smoking-related disease such as cancer, cardiovascular or respiratory disease, and rheumatoid arthritis (Chen, 2003). They are also more likely to experience early diagnosis with chronic diseases than are non-smokers (Chen, 2003; Shields, 2004). From a population health perspective, the implications are substantial: prevention of smoking, especially in adolescence, may significantly delay the onset of these and other disabling or fatal diseases (Chen, 2003). Also of great concern are indications that those who begin smoking in their youth smoke more than those who begin later in life, and are less likely to quit (Shields, 2004; Tyas & Pederson, 1998).

People who begin using tobacco at an early age are also more likely to develop more severe levels of nicotine addiction than those who begin when they are older. Like other drug addictions, nicotine dependence is a chronic condition with the potential for relapse throughout one's life. Typically, people become addicted to nicotine when they increase the frequency of tobacco use, though dependence may begin very early for some. While most adolescents do not become nicotine dependent until after 2-3 years of tobacco use, addiction can occur after smoking as few as 100 cigarettes (Milton et al., 2004).

Smoking is detrimental to physical fitness in terms of both performance and endurance; it is particularly compromising to a young person's rate of lung growth and to his/her level of maximum lung function. The resting heart rate of teen smokers is 2-3

beats per minute faster than that of non-smokers, and they experience increased frequency of coughing and more severe respiratory illnesses (Milton et al., 2004). Moreover, 59% of those who try smoking also try other tobacco products such as cigars, pipes, and chewing tobacco (P. Smith et al., 2005). Perhaps most importantly, adolescents who smoke are three times more likely than non-smokers to use alcohol, and are at risk for substantially greater levels of marijuana and cocaine use. Other risk behaviours like fighting and having unprotected sex are also more common among adolescents who smoke regularly (Milton et al., 2004).

In 2006, among Canadians aged 12 to 19 years (inclusive) who report they currently smoke, 11.9% are male and 12.3% female; this is a decrease from 20.9% male and 23.5% female in 1994-95 (Statistics Canada, 2006). The prevalence of adolescents in grades 5 through 9 trying any tobacco product also continues to fall. Adolescents of this age were 50% less likely to experiment with tobacco in 2004-05 than in 1994. In 2004, only 2% of adolescents in this age group reported they are currently cigarette smokers, compared with 3% in 2002, and 7% in 1994 (Health Canada: Tobacco Control Programme, 2006b).

In keeping with the lower prevalence of adolescent smoking rates in Canada, fewer adolescents in grades 5 through 9 view smoking as a positive activity than in the mid-1990s (Kaiserman & McDonald, 2005). However, although most believe that tobacco is addictive (88%) and that it can harm the health of non-smokers (87%), those who have tried tobacco are more likely to perceive benefits from smoking. Many adolescent smokers believe that smoking helps you stay thin, helps relieve boredom, is 'cool', and that it takes many years of smoking before health is undermined (Health

Canada: Tobacco Control Programme, 2006b). Even when both smokers and non-smokers are queried, 29% of adolescents in Canada believe that smokers can quit anytime, and 36% believe that smoking helps people to relax (Chaiton, Cohen, Kaiserman, & Leatherdale, 2005). The impact of role models on adolescent smoking trends is also significant. The perceived influence of 'popular kids', close friends, parents who smoke, and siblings who smoke remains a key reason for tobacco use in this age group (Kaiserman & McDonald, 2005).

It is clear that significant improvements have occurred in smoking prevalence in Canada, and some of this is attributable to tobacco control initiatives such as cessation programs and public campaigns to deter smoking uptake. Tobacco control activities such as legislation and regulation, as well as national tobacco control strategies (e.g.: Tobacco Demand Reduction Strategy, TDRS, 1994–1997; Tobacco Control Initiative, TCI, 1997–2002; Tobacco Control Strategy, TCS, 1999), have benefited many Canadians. In fact, one study showed that young adolescents in Canada exhibit the lowest smoking rates among the five Western countries surveyed (Australia, Canada, Scotland, UK, US) (Health Canada: Tobacco Control Programme, 2005).

However, despite the success of cessation strategies and prevention campaigns, the reasons underlying those improvements remain obscure. It is difficult to replicate and enhance the results, and to identify exactly how and for whom a particular initiative has worked. Certainly, as most studies have examined adult smoking behaviour, it is difficult to generalize interventions to other target populations, especially adolescents. What works for one population may not work in another, and adolescents in particular, may exhibit unique complexity.

It is obvious that preventing tobacco use before it begins is preferable to tackling the problem once negative health effects and addiction have been established. Moreover, because adolescence is the period during which most tobacco uptake commences, it seems the ideal intervention point at which to focus smoke-free initiatives. The argument for smoking prevention among adolescents is based on the observation that, if smoking does not start during adolescence, it is unlikely ever to occur (Tyas & Pederson, 1998).

Research Approach

Tobacco uptake is a complex and ambiguous process. Concepts such as smoking-specific beliefs and attitudes, modeling and tolerance of tobacco use in the social environment, and personality characteristics and affective states have emerged as possible contributors to smoking behaviour (Petraitis et al., 1995). However, not enough research has examined these predictors within a coherent theoretical framework. Many theorists suggest a well-defined theoretical basis is important to meaningfully translate empirical analysis into useful applied knowledge, and that a lack of theoretical bases has been a general weakness of studies reported in the literature (Chassin et al., 1981; McGahee, Kemp, & Tingen, 2000; Tyas & Pederson, 1998; Wiium, Breivik, & Wold, 2006; Wilkinson & Abraham, 2004). Researchers suggest more study is needed on the reasons for smoking abstinence (Côté et al., 2004; Manske et al., 1997) and this research should be based on theory (Milton et al., 2004; Tyas & Pederson, 1998). Further, Wilkinson & Abraham (2004) suggest that intervention strategies which utilize a theory or theoretical model can better relate the intervention back to the antecedents of smoking behaviour.

For this study, the theory of planned behaviour (TPB; Ajzen, 1991) has been identified as the most useful theory to understand the predictors of remaining smoke-free. While the usefulness of the TPB for understanding smoking intentions and behaviour in adolescents is supported in previous research, only a few studies have investigated the predictive ability of the theory as it relates to choosing not to smoke or remaining smoke-free (Côté et al., 2004; Moan & Rise, unpublished; Murnaghan et al., in press).

Numerous researchers have proposed that the addition of determinants to the TPB model can significantly increase its predictive capacity after having controlled for the influence of other theoretical variables (Armitage, Norman, & Conner, 2002; Conner & & Armitage, 1998; Cooke & Sheeran, 2004; Godin & Kok, 1996; Godin, Conner, & Sheeran, 2005). The potential importance of gender as a moderating variable on intention and behaviour has been noted by several researchers (Armitage et al., 2002; Conrad, Flay, & Hill, 1992; Flay, Hu, Siddiqui, Day, & Hedeker, 1994; Hagger, Chatzisarantis, Nikos L. D., & Biddle, Stuart J. H., 2002; Hanson, 1999; Hausenblas, Carron, & Mack, 1997; Hoffman, Sussman, Unger, & Valente, 2006; Smith, Bean, Mitchell, Speizer, & Fries, Elizabeth A., 2007). However, no study has yet looked at gender differences as they relate to smoke-free behaviour.

Prevention strategies which recognize that smoke-free behaviour may be explained differently for males and females may enhance outcomes. Further, the smoking beliefs which inform TPB variables may vary by gender. Underlying gender-specific beliefs may point to a need for distinctive prevention strategies for males and females. Understanding the influence of gender difference on non-smoking behaviour may be beneficial to identifying smoking prevention initiatives tailored to the needs of

adolescents who say they want to remain smoke-free, but are likely to engage in smoking during adolescence.

Research Questions

The purpose of this study was to: (1) identify how the predictive concepts of the TPB influence smoke-free intentions and behaviour in intermediate school students, and whether these potential effects are impacted by gender; (2) examine the relationships of gender-specific beliefs as they inform being smoke-free. Specific research objectives were to:

1) determine whether the TPB explains significant variation in smoke-free intentions and behaviour among adolescents, and whether any of these relationships are moderated by gender;

(2) examine the association of gender specific beliefs as they inform being smoke-free.

Significance of the Research

Tobacco use is an international problem that affects global health and creates a significant financial burden for many populations. In general, smoking cessation and prevention programs have made a positive impact on the prevalence of tobacco use; however, the negative effects of past smoking behaviour will be experienced for several decades to come. The number of deaths from tobacco use in Canada continues to rise each year because the population is growing and ageing. Moreover, the top three causes of death (cancer and diseases of the circulatory and respiratory systems) remain strongly related to tobacco use (Makomaski Illing & Kaiserman, 2004). Future success in the reduction of smoking and its consequences might be achieved through initiatives directed

toward decreasing or preventing the uptake of smoking. Because smoking uptake is significantly associated with adolescence, it is this group from which attributes associated with smoke-free intentions and behaviour should be discerned.

In this study, the theory of planned behaviour (TPB) was used to extract the significant attitudes, and social norms, and the degree of perceived control which contribute to smoke-free intentions and behaviour in adolescence. The TPB has been identified as the most useful theory to further extend the work of Cote (2004) to better understand the predictors of staying smoke-free. Staying smoke-free can be a difficult challenge for adolescents who are vulnerable to choosing risky health behaviours such as cigarette use. Investigating such a positive choice is essential to understanding the characteristics that support it.

As yet, there is no research which examines potential gender differences in smoke-free behaviour in adolescents. Some studies have suggested that components of the TPB may explain smoking intentions and behaviour differently for males and females. It has been found that both the degree of influence of attitudes (Jomphe Hill, Boudreau, Amyot, Dery, & Godin, 1997) and of significant others (Flay et al., 1994; Hanson, 1997) may vary by such demographics as gender, ethnicity, and age. Prevention strategies tailored to any gender differences in these behavioural predictors may enhance outcomes. It is hoped that increased awareness of the particular influences for male and female adolescents on staying smoke-free will allow determination of specialized strategies which can be utilized to reduce tobacco uptake.

CHAPTER TWO

Literature Review

The theoretical framework used in this study is the theory of planned behavior (TPB; Ajzen, 1991). It is a value-expectancy model that can be used to predict behaviour and explore the underlying motivations for engaging in that behaviour. The TPB presents a comprehensive collection of motivational factors within a straightforward arrangement, and has been proven effective in previous research on adolescent smoking behaviour.

Theory and Health Behaviour

Many social scientists have attempted to understand adolescent behaviour as it relates to substance use, resulting in numerous concepts emerging as possible contributors to such behaviour. Although research has identified distal risk factors such as smoking by valued others (Conrad et al., 1992; Hoffman et al., 2006; Tyas & Pederson, 1998) and lower socioeconomic status (Conrad et al., 1992; Côté et al., 2004; Wilkinson & Abraham, 2004) as being consistent contributors to smoking initiation, more research is needed to understand the underlying processes and pressures adolescents are exposed to in relation to smoking. Psychologists, focussing on more proximal determinants, have identified self-efficacy, attitudes, subjective norms, and intentions as some of the most important predictors of future smoking behaviour (Conrad et al., 1992; Côté et al., 2004; Tyas & Pederson, 1998; Wilkinson & Abraham, 2004). However, not enough research has examined these predictors within a coherent theoretical framework.

Theory serves as a guide for knowing what variables to measure, how to measure them, and how to combine them (Noar & Zimmerman, 2005). Many researchers and reviewers advocate that a well-defined theoretical basis is important for meaningfully

translating empirical analysis into useful applied knowledge (Côté et al., 2004; Moan & Rise, 2005; Tyas & Pederson, 1998), and that a lack of theoretical bases has been a general weakness of studies reported in the literature (Chassin et al., 1981; Conrad et al., 1992; McGahee et al., 2000; Tyas & Pederson, 1998; Wiium et al., 2006). Good theories can organize components to make sense out of their relationships, and contribute to prediction of future behaviours. The ability to predict behaviour consequently affords the formation of intervention strategies which might be expected to prevent the behaviour, or to create successful intervention programmes (Noar & Zimmerman, 2005; Petraitis et al., 1995; Tyas & Pederson, 1998). In particular, intervention strategies which utilize a theory or theoretical model can better relate the intervention back to the antecedents of smoking behaviour. "Understanding the antecedents of adolescent smoking is likely to facilitate the development of interventions that reduce uptake" (Wilkinson & Abraham, 2004, p.316).

In a meta-analysis of 27 prospective studies of the onset of cigarette smoking, Conrad, Flay & Hill (1992) found only one of the studies tested competing theoretical models, and few used any model or theory of relationships between predictors and smoking onset. A review by Tyas & Pederson (1998) also emphasized the need for research to be theory-driven, and further suggested that a range of factors should be considered, including social and personal factors. These researchers suggest that a key role for theory is to explain the developmental process and timeframe between the onset of the predictor variable and the onset of cigarette smoking.

Numerous theories have been developed which assemble the predictive factors of behaviour into coherent relationships; two of the more common types of theories include

stage theory and motivational theories. Many health behaviour theories or models focus on the motivational factors which precipitate an individual's decision to perform or not perform such behaviour. The best-known motivational models include the health belief model (Janz & Becker, 1984), protection motivation theory (Rogers, 1983), social cognitive theory (Bandura, 1986), and the theories of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), and planned behavior (Ajzen, 1985; Ajzen, 1988; Ajzen, 1991). The TPB is essentially an extension of the TRA. All of these models are based on subjective expected utility[1] and the expectancy-value tradition,[2] which assume that individuals seek to maximize their utility or level of satisfaction. These theories are categorized as cognitive or rational models; they emphasize individual cognitions which estimate the costs and benefits of a given behaviour. The SCT and the TPB are known as *social* cognitive models, because of their additional consideration of the behaviour of important others.

Motivational models specify variables that aim to determine whether an individual will view a health-protective action as more attractive than current behaviour. They assume that anticipation of a negative health outcome, and the desire to avoid this outcome or reduce its impact, creates motivation for self-protection, and that action can reduce the likelihood or severity of harm. Motivational models also presume that expected benefits of action must be weighed against expected costs. What these models predict is the relative likelihood of individual action (Weinstein, 1993). Most of the models include measures of perceived control (self-efficacy) and intention (i.e. protection motivation, health motivation) (Armitage & Conner, 2000), the most consistent proximal

predictors of smoking initiation and smoking cessation (Conrad et al., 1992; Sussman, 2002; Tyas & Pederson, 1998).

Stage theories, such as the transtheoretical model (Prochaska & DiClemente, 1982), match interventions to the stage of readiness of the individual. This model attempts to describe the process of changing a behaviour, indicating that this is not a single event but a cycle which may be repeated a number of times. It asserts that precautionary action and the decision to take it is not determined by a single decision or at a single point in time, and is most effective when personalized for each individual and their level of commitment to the change (Elder, Ayala, & Harris, 2007; Weinstein, 1993).

Meta-analyses and reviews of health behaviour theories suggest that no one model explains all health behaviour (Armitage & Conner, 2000; Glanz, Lewis, & Rimer, 1997; Petraitis et al., 1995). All of the theories mentioned have been widely used in the literature and supported by various researchers as to their explanatory power (Noar & Zimmerman, 2005). Researchers acknowledge that a single theory may not be appropriate across multiple behaviours. The theory of planned behavior (TPB) may better explain behaviours which are more rational in nature and where the intention-behaviour link is strong. A stage model such as the transtheoretical model (TTM) may be most applicable to deliberate behaviours such as exercise. More empirical work is needed on the issue of specific versus general theories; whether or not a single theory is appropriate across several behaviours, or if particular theories best explain certain behaviours (Noar & Zimmerman, 2005). Furthermore, some researchers suggest that integrating several motivational models or combining variables from motivational and

stage models would explain health behaviour better than any single existing model (Armitage & Conner, 2000; Hoffman et al., 2006; Petraitis et al., 1995; Rosen, 2000).

The Theory of Planned Behavior

The theory of planned behavior was developed by Isaac Ajzen (Icek Aizen) in 1991, from the theory of reasoned action (TRA). The TRA is a framework to explain volitional behaviour, and is based on the assumption that individuals will behave in a sensible and rational manner, by taking into account available information and considering the potential implications of their behaviour (Hausenblas et al., 1997). It was the first social psychological theory to suggest that the formation of behavioural intention is the immediate antecedent of action, and mediates the influence of other variables on behaviour (Fishbein & Ajzen, 1975). The TRA was designed to measure how hard people are willing to try in order to perform, or not perform, a behaviour. However, as Ajzen (1988) conceded, "The theory of reasoned action was developed explicitly to deal with purely volitional behaviours" (p. 127); i.e. simple behaviours where successful performance requires only the formation of an intention. Thus, to deal with behaviours that require control over behaviour in terms of personal resources or environmental barriers, Ajzen (1988) proposed an amendment to the TRA that addressed the problem of incomplete control. The TPB extends the TRA by including measures of perceived behavioural control (PBC), which Ajzen (1991) defined as a person's own perception of how easy or difficult it is to execute a behaviour. Therefore, the easier a behaviour is to perform, the more likely it is that one will intend to perform it.

The TPB (see Figure 1) identifies behavioural intention as the most proximal and important cognitive antecedent of behaviour. Intention refers to a person's decision to act

and is considered to reflect the effort he or she will exert towards the achievement of that behaviour. Behavioural intentions are a function of attitudes, subjective norms and perceived behavioural control (PBC).

Attitudes represent a person's overall evaluation of a given behaviour, and are derived from behavioural beliefs which describe the perceived likelihood of a particular outcome occurring, along with an evaluation of that outcome. Both one's affective (enjoyable/unenjoyable) and instrumental (beneficial/harmful) evaluations of performing a behaviour are considered.

Figure 1: *Theory of Planned Behavior*

Subjective norms (SN) are based on a person's beliefs about what significant others think he or she should do. Normative beliefs are posited as antecedents of SN, and are the product of perceived social pressure from valued individuals and motivation to comply with these significant others. Recent research has supported the importance of considering different forms of normative influence within the context of the TPB.

Researchers investigating other health-related behaviours (Godin & Kok, 1996; Rhodes & Blanchard, 2006; Rivis & Sheeran, 2003a) as well as smoking researchers (McMillan & Conner, 2003; McMillan, Higgins, & Conner, 2005; Smith et al., 2007; Wilkinson & Abraham, 2004) suggest that the subjective norm component is more explanatory of behavioural intentions when conceived as two distinct variables: a) an injunctive component as the more traditional measure of whether one believes their social network wants them to perform a behaviour; b) descriptive norms as a measure of the perceived smoking behaviour of this network.

The perceived behavioural control (PBC) component describes a person's appraisal of his or her ability to undertake a behaviour successfully. PBC may influence behaviour directly, as a perception of the extent the behaviour is within one's control, or indirectly through intention, as a perception of the ease or difficulty of the act. Because most behaviours are located at some point along a continuum that extends from total control to a complete lack of control (where constraints or barriers may affect adoption of the behaviour), the dual role of the PBC concept is warranted. Distinctive predictive ability for two separate PBC-related components has been shown in some studies, leading researchers to suggest that Ajzen's original PBC construct (measuring controllability) be complemented with self-efficacy (SE), a measure of confidence. Several health-related studies have shown the concept of self-efficacy to be a strong additional predictor to the concept of PBC-controllability (Armitage, Conner, Loach, & Willetts, 1999; Rhodes & Courneya, 2003; Trafimow, Sheeran, Conner, & Finlay, 2002).

Advantages of the Theory of Planned Behavior

The comparative advantage of the theory of planned behavior might be explained by several factors. In general, the TPB presents the most detailed descriptions of constructs, and offers the clearest predictions about relations among constructs. For example, Ajzen (1985) has specifically: a) insisted that 'attitudes' result from the combination of expectations and evaluations; b) dictated operationally how to define expectations and evaluation; c) presented formulas for deriving attitudes; and d) offered predictions about all of the possible relationships between attitudes, perceived norms, self-efficacy, decisions, and behaviours (Petraitis et.al, 1995). He has even discussed how to measure and compute variables. Additionally, Ajzen (2002) has specified that maximum predictive power is achieved when intention and behaviour measurements are matched with respect to four components: action, target, time, and context. For instance, if the aim is to predict being smoke-free over the coming 7 days, it might be appropriate to ask the following questions: "Do you intend to be smoke free over the next 7 days?" (intention) and "On how many days in the last 7 were you smoke-free?" (behaviour). The specificity and focus of the TPB appear to improve its predictive effectiveness and contribute to its reputation as a robust predictor of health behaviours.

The TPB is considered one of the most integrated theoretical models of social behaviour (Godin, Valois, Lepage, & Desharnais, 1992), and as a motivational model, accommodates both social learning theory[3] (Bandura, 1977) and self-efficacy theory[4] (Bandura, 1986). Ajzen (1991) describes his theory as incorporating some of the central concepts in the social and behaviour sciences (e.g. attitudes towards the behaviour, subjective norms with respect to the behaviour, and perceived control over the

behaviour), and defines these concepts in a way that permits prediction and understanding of particular behaviours in specified contexts (p. 206). The theory comprises the influence of personal evaluations, perceived social pressure, and perceived control in predicting the intention to perform a given behaviour (Maher & Rickwood, 1997). Despite its comprehensive make-up, the TPB at the same time exhibits relative parsimony: it offers a simple model of the proximal influences on intentions and behaviour (Hagger & Chatzisarantis, 2005; Norman, Conner, & Bell, 1999).

Another strength of the TPB is its broad applicability across multiple disciplines, such as nursing, information technology, social policy, and sociology (Armitage & Christian, 2003). Meta-analytic reviews of the theory and its constructs in the realm of health behaviour have shown it to be a dominant model in health psychology (Armitage & Conner, 2001; Godin & Kok, 1996; Hagger et al., 2002; Hausenblas et al., 1997). In the study of health behaviours, TPB components have regularly been important predictors of behavioural intentions (Armitage & Conner, 2000; Garcia & Mann, 2003; Sheeran & Taylor, 1999; Smith & Stasson, 2000) and of behaviour (Armitage & Conner, 2000; Maher & Rickwood, 1997). In their meta-analytic review of the efficacy of the theory, Armitage & Conner (2001) found that it consistently exhibited moderate predictive ability (mean $R^2 = 0.39$ for intention; mean $R^2 = 0.27$ for behaviour).

One further advantage of the TPB is in its explicit incorporation of social influence, which has been shown to play an important role in relation to smoking initiation and cessation (Conrad et al., 1992; Sussman, 2002; Tyas & Pederson, 1998). Tyas & Pederson's review (1998) showed consistent findings of the importance of social influence on adolescent smoking, as a key reason why this component should be part of

any model or theory used in this research (p.416). The TPB is the only motivational model that incorporates a social influence concept which considers both the individual's social network and his or her motivation to comply with the behaviour that network expects. Some reviews of the TPB have found the social norm (SN) component often to be less important in the prediction of behavioural intention than either attitude or perceived behavioural control (PBC) (Armitage & Conner, 2001; Godin & Kok, 1996). Other researchers of adolescent behaviour point to the importance of SN for this group (Côté et al., 2004; Ellickson, Bird, Orlando, Klein, & McCaffrey, 2003; McMillan et al., 2005; Moan & Rise, 2005; Murnaghan et al., in press; Schofield, Pattison, Hill, & Borland, 2001; Smith et al., 2007; Wiium et al., 2006).

Factors believed to explain the process of adolescent smoking are mainly psychosocial factors that are: personal (e.g. smoking-specific beliefs and attitudes, self-esteem); environmental (e.g. modeling and tolerance of tobacco use in the social environment); behavioural (e.g. school factors, lifestyle); and socio-demographic (e.g. gender, ethnicity, family income) (Engels et al., 1999; Tyas & Pederson, 1998). In the field of health education, there is optimism about the evidence available for such variables predicting smoking-related behaviour. In particular, factors comprising the TPB, including peer influences, smoking attitudes, and self-efficacy are commonly addressed in theoretically based prevention programs for adolescents. As these variables have been found to explain much of the variance in smoking behaviour, it is implied that these same variables, the very factors associated with smoking behaviour, can cause or protect against the uptake of smoking (Engels et al., 1999).

In terms of behavioural prediction, TPB variables provide an improvement on the health belief model, the protection motivation theory and the social cognitive theory based on some studies that have directly compared the models (see (Petraitis et al., 1995; Smith & Stasson, 2000). Support for the TPB has typically been widespread, with several meta-analyses and narrative reviews providing support for the model's general use (Ajzen, 1991; Armitage & Conner, 2001; Sheppard, Hartwick, & Warshaw, 1988), and for the prediction of health behaviours (e.g. condom use, alcohol and marijuana use, exercise) in particular (Albarracin, Johnson, Fishbein, & Muellerleile, 2001; Downs & Hausenblas, 2005; Godin & Kok, 1996; Hagger et al., 2002). Some researchers have found the TPB a superior predictor of intentions and behaviour (Armitage & Conner, 2000; Armitage et al., 2002; Weinstein, 1993), and thus a more comprehensive resource of knowledge as to the underlying factors contributing to that behaviour. Meta-analyses measuring the variance explained by the TPB in intention and behaviour in terms of effect sizes show them to be large (Ajzen, 1991; Armitage & Conner, 2001; Godin & Kok, 1996) compared with similar analyses of the other motivational models, which typically account for small-to-medium proportions of the variance in behaviour (Armitage & Conner, 2000). In the domain of health behaviour, the TPB has consistently demonstrated a significant capacity for predicting intention and behaviour.

The TPB has also been used to account for smoking behaviours; several researchers have found it provides robust predictions of smoking intentions and behaviour (Conner, Sandberg, McMillan, & Higgins, 2006; Godin et al., 1992; McMillan & Conner, 2003; McMillan et al., 2005; Spijkerman, van den Eijnden, Vitale, & Engels, 2004). Godin and Kok (1996) found that the TPB explains addictive behaviours (avg.

R^2=.41) to a greater extent than it does other health-related behaviours (e.g. exercise, clinical screening, healthy eating; avg. R^2=.34). Selection of the TPB framework to inform smoke-free behaviour in this study is based on the considerable success the theory has exhibited with respect to health behaviours, and especially its demonstrated ability to explain addictive and smoking-related behaviour.

Efficacy of the Theory of Planned Behavior

The TPB has been found to exhibit strong predictive utility for such health-based behaviours as exercise (Blue, 1995; Hagger et al., 2002; Hausenblas et al., 1997), condom use (Albarracin et al., 2001; Armitage et al., 2002; Sheeran & Taylor, 1999; Smith & Stasson, 2000), healthy eating and weight loss (Conner, Norman, & Bell, 2002; Netemeyer, Burton, & Johnston, 1991), alcohol use (Armitage et al., 1999; Armitage et al., 2002; McMillan & Conner, 2003; Norman & Conner, 2006; Spijkerman, van den Eijnden, Vitale, & Engels, 2004), and cannabis and tobacco use (Armitage et al., 1999; Godin et al., 1992; Maher & Rickwood, 1997; McMillan & Conner, 2003; McMillan et al., 2005).

The theory has performed especially well in its ability to explain addictive behaviour, describing 39% to 88% of intention and 17% to 60% of behaviour in research on smoking, drinking and cannabis use (Armitage et al., 1999; Godin & Kok, 1996; McMillan & Conner, 2003; Norman & Conner, 2006; Spijkerman et al., 2004). In fact, the core constructs of the model are not only among the most consistent predictors of experimental substance use, but are also the constructs through which many more distal factors exert their influence (Petraitis et al., 1995). Consequently, despite its very

proximal focus, the theory can describe much of the influence brought to bear in these types of behavioural decisions.

Although limited TPB research has investigated smoking-related behaviour, findings have supported the usefulness of the theory for understanding smoking initiation (Chassin, Presson, Sherman, Corty, & Olshavsky, 1984; Conner et al., 2006; Conrad et al., 1992; deVries, Backbier, Kok, & Dijkstra, 1995; Harakeh, Scholte, Vermulst, deVries, & Engels, 2004; Smith et al., 2007) the stages of smoking acquisition (Bricker, Peterson, Sarason, Andersen, & Rajan, 2007; Jomphe Hill et al., 1997; Tucker, Ellickson, & Klein, 2003/4) and smoking cessation (Norman et al., 1999).

The TPB and Smoking

Although the TPB has been successfully applied to the prediction of a wide range of health-related behaviours, its application to smoking has been limited. Still, several studies have confirmed the basic assumptions of the TPB for the prediction of smoking intentions and behaviour (deVries et al., 1995; Godin et al., 1992; Harakeh et al., 2004; Higgins & Conner, 2003; Maher & Rickwood, 1997; McMillan & Conner, 2003; McMillan et al., 2005; van den Eijnden, Spijkerman, & Engels, 2006; Wiium et al., 2006; Wilkinson & Abraham, 2004). Of those studies which reported explanatory power, attitude, social norms and PBC together explained between 0.14 (McMillan & Conner, 2003) and 0.52 (McMillan et al., 2005) of the variance in intentions. Across studies, attitude and PBC emerged as the principal predictors of smoking-related intentions, and were generally able to explain a significant percentage of variation in smoking intentions.

Attitude has typically been shown to have a moderate to strong relationship with intention across health behaviours (Armitage & Conner, 2001; Hagger et al., 2002;

Hausenblas et al., 1997; Rivis & Sheeran, 2003b; Sheeran & Taylor, 1999). Smoking studies have also revealed that attitude contributes consistently and significantly to the prediction of behavioural intention (Jomphe Hill et al., 1997; Maher & Rickwood, 1997; Smith et al., 2007). Some have found it to be the strongest predictor among young-to-middle adolescents, demonstrating correlations with intention of up to 0.67 (McMillan et al., 2005; Wiium et al., 2006).

Beliefs about smoking are normally developed during socialization with reference groups, such as friends. For young people this is enhanced because of their particular sensitivity to societal pressures from adults and peers during their early stages of development (Wiium et al., 2006). Having a positive attitude towards smoking, or alternately a positive attitude towards remaining smoke-free, can be a significant factor in the likelihood of adolescents' intending to try smoking (Smith et al., 2007). Studies also suggest that adolescents' positive perceptions of smoking increase with their transition to becoming more frequent smokers. This favourable attitude could be the result of the perception of there being more advantages than disadvantages in regards to smoking cigarettes. One study showed that girls who smoked occasionally associated this behaviour with such positive consequences as control of body weight, relaxation, relief of nervous tension and easier concentration (Jomphe Hill et al., 1997)

TPB studies generally have found subjective norm (SN) to be the weakest predictor of intention (Armitage & Conner, 2001), and smoking studies have found the variable either a weak or insignificant predictor of intention (deVries et al., 1995; McMillan et al., 2005; Wiium et al., 2006) and behaviour (deVries et al., 1995; Jomphe Hill et al., 1997). Maher & Rickwood (1997), however, found SN (path estimate = .33)

to be a superior predictor to attitude (.24) in their study on adolescent smoking. D. A. Murnaghan (personal communication, January 10, 2008) also reported that SN was significant, and found it exhibited a moderately large association with intention to be smoke-free. Some researchers propose that a weak SN-intention association may indicate that the norms of significant others may have influence through attitude rather than directly (deVries et al., 1995; Wiium et al., 2006). This suggests that the smoking behaviour and expectations of important others in a given social environment may contribute to the formation of smoking-related attitudes, and not directly to the SN component of intention formation. A widespread tendency has also been identified, particularly among smokers, to overestimate the prevalence of smoking within both adolescent and adult populations (Chassin et al., 1981; Conrad et al., 1992; Ellickson et al., 2003; McMillan et al., 2005; Smith et al., 2007; Tyas & Pederson, 1998). The contribution of subjective norms to the explanation of smoking intentions and behaviour can fluctuate over the course of smoking uptake (Bricker et al., 2007; Jomphe Hill et al., 1997). Overall, it seems that family, particularly parents' behaviour and approval, plays only a small and inconsistent role in early adolescent smoking intentions and behaviour (Conrad et al., 1992; Flay et al., 1994; Meijer, Branski, Knol, & Kerem, 1996). However, Chassin et.al. (1984) suggest that the roles of parents and older siblings have more importance for smoking initiation than those of peers. Further, Bricker et.al. (2007) found parents' smoking behaviour a consistent influence throughout adolescence. Findings generally, though, assert that friends' smoking behaviour has a stronger influence on smoking during early adolescence, and that peers may impact smoking initiation to a greater degree than other important influencers (Flay et al., 1994; Tyas &

Pederson, 1998; Wilkinson & Abraham, 2004). In fact, for adolescents, the number of their friends who smoke is consistently shown to be significantly related to behavioural intentions to smoke throughout adolescence, but with larger correlations for younger teens (Chassin et al., 1981). Leatherdale et.al. (2005) also found that young adolescents who attended a school with a higher prevalence of older smokers were more likely to adopt the behaviour. It seems that exposure to such a high-risk environment transforms the behaviour into one which is more normative, acceptable, and prestigious. Smoking is a dynamic phenomenon and the influence of significant others may vary across stages of the processes of initiation and escalation. Additionally, the influence of the smoking behaviour of significant others on adolescents has been suggested to vary by gender, ethnicity, and age (Flay et al., 1994; Hanson, 1997).

TPB research has frequently determined that perceived behavioural control (PBC) may be as important as attitude in explaining health-related intentions and behaviour (Downs & Hausenblas, 2005; Godin & Kok, 1996; Trafimow et al., 2002). Similarly, several studies in the smoking domain have found that PBC exhibits superior predictive ability for intention (Higgins & Conner, 2003; McMillan & Conner, 2003) and smoking behaviour (McMillan & Conner, 2003; McMillan et al., 2005; Wilkinson & Abraham, 2004). These smoking studies measured PBC correlations with intention to smoke in a range between 0.38 and 0.45, and for smoking behaviour between 0.49 and 0.55. Self-efficacy appears to play a powerful role in predicting smoking (Côté et al., 2004; deVries et al., 1995). In fact, some researchers suggest that PBC, but not intention, explains a significant portion of non-smoking behaviour (Godin et al., 1992; Murnaghan et al., in press). Hill et.al. (1997) found that as the acquisition of smoking behaviour progresses,

the perception of having the control to not smoke is lowered. Both internal (addiction to nicotine, agreeable feelings) and external (difficult not to smoke in the presence of peers who smoke, ease of getting cigarettes) PBC factors have greater influence on the ease or difficulty of performing the behaviour. It appears that behavioural intention in this domain is translated into action only if a high-intentioned individual also perceives that he or she has a sufficient level of control on the adoption of the action. If this is not the case, the habit or addiction will predominate and the individual will continue to smoke. For non-smokers, increased self-efficacy to not smoke, perhaps because of having a heightened perception of the difficulty in quitting smoking once addicted, has been shown to be associated with decreased intentions to try the behaviour (Smith et al., 2007).

Most health-related meta-analytic reviews confirm the basic premise of the TPB, that intention is the most powerful predictor in explaining present and future behaviour (Albarracin et al., 2001; Armitage & Conner, 2001; Godin & Kok, 1996; Hagger et al., 2002; Hausenblas et al., 1997; Notani, 1998; Rivis & Sheeran, 2003b). In their review of TPB applications across various health-related domains, Godin & Kok (1996) additionally suggest that intention-behaviour and PBC-intention correlations vary according to the type of behaviour under study. Smoking studies have found the ability of intention to predict behaviour to be inconsistent, perhaps because of its addictive nature. While some found it the best predictor of actual smoking behaviour (deVries et al., 1995; Flay et al., 1994; Harakeh et al., 2004; Maher & Rickwood, 1997; Wilkinson & Abraham, 2004), others found PBC components better predictors (Conner et al., 2006; McMillan & Conner, 2003; McMillan et al., 2005). Godin et.al. (1992) found PBC a superior predictor because of the perception of control needed to not smoke. The general

pattern of findings is consistent with the notion that a firm intention not to smoke offers some level of protection against the risk of future smoking (Armitage et al., 1999; Wakefield et al., 2004).

Gaps in the Research

While the usefulness of the TPB for understanding smoking behaviour is supported in previous research, only a few studies have investigated the predictive ability of the theory as it relates to choosing not to smoke or remaining smoke-free (Côté et al., 2004; Moan & Rise, unpublished ; Murnaghan et al., in press). While the influences that affect smoking onset and escalation have been examined through use of the theory, the TPB framework and its applicability to adolescents opting not to smoke should be explored. Just as in smoking initiation, the complexity of the nature of smoking abstinence can depend on a group of variables and their interactions (Côté et al., 2004). When variables which contribute to adolescent smoke-free behaviour are understood, intervention strategies aimed at strengthening and/or influencing these components may effectively facilitate non-smoking behaviour during this critical age for smoking onset.

Numerous researchers have proposed that adding determinants to the TPB model can significantly increase the predictive capacity of intention after having controlled for the influence of other theoretical variables (Armitage et al., 2002; Conner & Armitage, 1998; Cooke & Sheeran, 2004; Godin & Kok, 1996; Godin et al., 2005). Some have suggested that specific socio-demographic variables such as age, gender, and race may affect the predictive ability of the theory across various behaviours (Armitage et al., 2002; Bagozzi, Lee, & VanLoo, 2001; Chassin et al., 1984; Engels et al., 1999). Ajzen and Fishbein (1980) acknowledge that the relative influences of the TPB cognitions will

change according to behaviour and sample, which invites the presumption of a moderating influence of sample characteristics such as gender, age, and socioeconomic status (Hagger et al., 2002). The potential importance of gender as a moderating variable on intention and behaviour has been noted by several researchers (Armitage et al., 2002; Conrad et al., 1992; Flay et al., 1994; Hagger et al., 2002; Hanson, 1999; Hausenblas et al., 1997; Hoffman et al., 2006; Smith et al., 2007). However, no study has yet looked at gender differences as they relate to smoke-free behaviour.

A few studies have examined gender as a possible moderator between the TPB and adolescent smoking (Chassin, 1986; Chassin et al., 1981; Chassin et al., 1984; Côté et al., 2004; Flay et al., 1994), although analysis has been partial and results variable. Using gender as a moderating variable allows determination of whether TPB variables explain variation in intention and behaviour differently for males and females. Despite the findings of Côté (2004) that gender was not a significant factor in protecting maintenance of smoking abstinence, there is some indication of variation in smoking-related behaviour by gender. Hoffman et al. (2006) deduced from their theoretical review that gender does moderate the association between influences to smoke and the smoking status of an adolescent.

Smoking behaviour may serve different functions for males and females over the course of adolescence, particularly as it relates to social norms. Existing literature suggests some gender differences in social influences; meaning the influence of family and peers through modelling, direct pressure, and normative beliefs may impact smoking behaviour uniquely for males and females. Tyas & Pederson (1998) found a gender difference in the relative importance of parent and sibling smoking. Adolescent females

are suggested to be more susceptible to parental influences than males (Chassin, 1986; Chassin et al., 1981; Flay et al., 1994; Tyas & Pederson, 1998). Additionally, Chassin et.al. (1984) found female never-smokers in middle schools to be influenced by smoking among siblings to a greater extent than males, although Chassin et.al. (1981) found no consistent pattern. Some evidence also supports the notion that females are more generally at risk concerning a smoking social environment; those who report that more of their closest friends smoke are more likely to smoke themselves (Chassin et al., 1981). Conversely, Hoffman et.al. (2006) in their theoretical review, found that males exhibited a stronger association between social influences and smoking. Two studies in particular (Chassin et al., 1984; Wang, Fitzhugh, Turner, & Fu, 1997) found that males have fewer smoking friends than females, suggesting that males are more susceptible to being influenced by friends who are smokers. Results have also been inconsistent regarding associations between perceived friends' approval. Chassin et.al. (1986) reported that females perceived their friends as having more positive attitudes towards smoking behaviour, while Chassin et.al. (1984) found females to perceive their friends with more negative smoking attitudes than males (Hoffman et al., 2006). Differentiation in the influence of subjective norms by gender implies that an understanding of such differences can inform better prediction and intervention techniques.

Little association has been found between gender and an adolescent's attitude towards smoking (Chassin et al., 1981; Flay et al., 1994; Tyas & Pederson, 1998), although Pederson et.al. (1997) found young adolescent females more likely to believe that smoking is harmful to health. Loken (1982) showed that adolescent girls who smoke occasionally associated the behaviour with such positive consequences as control of body

weight, relaxation, relief of nervous tension, and easier concentration (cited in Jomphe Hill et.al., 1997). Amos & Bostock's (2007) study of 15-year-old girls suggested heightened smoking behaviour as a way to calm down when upset or angry, and also recognized smoking as a form of weight control.

Few researchers have investigated whether gender differences exist between the TPB component of PBC and smoking. However, some do suggest that adolescent females have lower perceived overall control over smoking (Wilkinson & Abraham, 2004) and stronger intentions to smoke in future (Chassin et al., 1984; Flay et al., 1994; Wilkinson & Abraham, 2004), although Smith et.al. (2007) reported males display greater likelihood to intend to smoke, and Chassin et.al. (1981) found that predictions of behavioural intentions did not vary by gender. While these findings are helpful, any effect of gender on attitude, subjective norm and perceived behavioural control is only partially apparent.

The smoking beliefs which inform TPB variables may vary by gender, although few studies have examined this. Chassin et.al. (1981) reported that girls had more anti-smoking normative beliefs. Wilkinson & Abraham (2004) were unable to tap key beliefs underlying attitude using purely health-related beliefs, and agree with Flay et.al. (1994) that utilizing a more affective attitude measure (i.e. enjoyable/unenjoyable, pleasant/unpleasant) may be key to determining smoking intention. Smoking prevention initiatives tailored to the needs of adolescents should consider any disparity in beliefs between males and females as these relate to non-smoking behaviour. An underlying concept of the TPB suggests that an intervention should ultimately change the beliefs that guide each particular behaviour (Ajzen, 1991).

Summary

Adolescents are influenced to begin smoking by many physiological, social, and cognitive determinants. A comprehensive theoretical approach may help uncover these determinants, and link them to intervention strategies that corroborate the characteristics of being smoke-free. Several conceptual theories or models have proven helpful in explaining health behaviour and predicting behaviour change. Major motivational models; such as the health belief model (HBM), protective motivation theory (PMT), social cognitive theory (SCT), and theory of planned behavior (TPB); emphasize individual, rational cognitions in weighing the potential costs and benefits of performing a behaviour. The SCT and TPB additionally consider the potential social influence of important others. The TPB has demonstrated strong competency in explaining smoking behaviour. However, little research has investigated the predictive ability of the theory as it relates to remaining smoke-free (Côté et al., 2004; Moan & Rise, unpublished; Murnaghan et al., in press). For this study, the TPB has been identified as the most useful theory to further extend the work of Côté (2004) to better understand the predictors of remaining smoke-free.

Potential gender differences in smoke-free behaviour in adolescents have not been examined. Prevention strategies which recognize that smoke-free behaviour may be explained differently for males and females may enhance outcomes. Further, the smoke free beliefs which inform TPB variables may vary by gender. When we are able to identify and enhance the importance of gender-specific predictors of remaining smoke free, we can conceivably develop programs which decrease smoking initiation during adolescence.

CHAPTER THREE

Method

This study provides a secondary analysis of data collected in 2004 from students attending intermediate schools in Prince Edward Island, Canada. The sampling design was a convenience, stratified random sampling of students from participating schools. The primary analysis was extended by looking for gender differences in smoke-free intentions, behaviour and beliefs.

Sample and Setting

The target population for this research was students attending intermediate schools (grades 7 through 9) in Prince Edward Island. These students range in age from 12 to 16 years, which represents a formative period for lifestyle beliefs and behaviours. For this study, two sets of data were examined and contrasted. The first study sample included students attending four (two urban, two rural) intermediate schools (study 1). The second sample of students attended a single intermediate school with a mix of students from urban and rural areas (study 2).

Eligibility criteria for inclusion of schools specified that they be:

a) publicly funded;

b) consent to the use of class time for students to participate in surveys and interviews;

c) comprise a socio-economic status that is representative of the PEI school population.

Eligibility criteria for student participation required:

a) a cross-section of students from each grade level (7-9);

b) the ability to speak and write English;

c) residence in Canada for a minimum of one year prior to the study.

To ensure appropriate predictive power for underlying TPB beliefs, it was determined that at least 240 students were required for each study. This was determined using the G-power estimation program with 15 belief predictors (i.e. 5 behavioural, 5 normative, 5 control beliefs), power = 80, alpha = 0.05, and a moderate effect size (R^2 = 0.30). For study 1, this meant that 60 students were required from each of the four schools. Therefore, to ensure a sample representative of each school, a randomly selected sample class was chosen from each grade level within each school. A final total of 286 students comprised the study 1 sample. To ensure a representative sample for study 2, three randomly selected classes from each of grades 7 and 9, and two classrooms selected randomly from grade 8 comprised the sample. The final sample was made up of 214 students. The concurrent timing of several school-level activities (e.g. band trip, sporting activities) meant that classroom attendance and thus study participation was below study 2 projections.

Procedure

Ethical approval for this secondary analysis was obtained from the UPEI Research Ethics Board. The original study received ethical approval from the University of Prince Edward Island and from the appropriate school boards, principals, parents and students. This secondary analysis of the data is consistent with the original ethics applications.

For both data sets, the primary research team administered the TPB questionnaire in each of the selected classes. The same procedure was followed 30 days after the original survey, when students completed a follow-up questionnaire that measured actual smoke-free behaviour. The 30-day period is consistent with the timeframe used for

behavioural measures taken from the Youth Risk Factor Surveillance Survey (2003). All data were collected within the same one-month period in 2004.

Anonymity of the students was assured. Only cleaned data files with identifiers removed were used in this secondary analysis. The data files were cleaned and validated by the primary research group, the Comprehensive School Health Research Team (CSHRT). Individual participant files are being maintained by the CSHRT per original UPEI Research Ethics Board approval (November 17, 2003).

Measures

Measurement Characteristics

Demographic. The information utilized in these analyses included age, gender, grade level and race. Both survey instruments used the same items to determine these demographic measures. Students were asked to identify their age from a 5-point scale ranging from 1 (12 years old or younger) to 5 (16 years old). Gender was ascertained by asking "What is your sex?"; 1 = Female, or 2 = Male. Students selected from three grade choices consisting of: 1 = Grade 7, 2 = Grade 8, and 3 = Grade 9. On survey instruments, race was identified as 1 (Aboriginal), 2 (Asian), 3 (Black or African-American), 4 (Hispanic), 5 (White or Caucasian), or 6 (Other). For the purposes of this secondary analysis, two categories for race were analyzed; "White", and "Other". The modified category "Other" reflects the relatively small percentage (20.6% and 11.7 % of students in studies 1 and 2, respectively) of Prince Edward Island adolescents who are not Caucasian.

Attitude. As suggested by Ajzen (2006), the measurement of attitude using a semantic differential scale should measure both the instrumental (good/bad;

harmful/beneficial) and affective (enjoyable/unenjoyable) components of attitude. The overall attitude score was attained by calculating the mean of the two item scores which pertained to attitude.

This variable was assessed in the same way for both study samples according to the recommendations of Ajzen (1991). Instrumental attitude was measured using the item "During the next 4 weeks, for me to be smoke-free will be …", and rated on a 7-point semantic differential scale from 1 (extremely good) to 7 (extremely bad). Affective attitude was assessed using the same scale with the item "During the next 4 weeks, for me to be smoke-free will be …" 1 (extremely unenjoyable) to 7 (extremely enjoyable). The coefficient of reliability used to compute internal consistency reliability for items measuring the TPB variables was Cronbach's alpha;[5] these values are reported in Table 1. Internal consistency for the attitude items for study 1 measured α =.52; α = .50 for male students, and α = .53 for females. For study 2, internal consistency for this scale was α = .76 (α = .74 for male students, and α = .77 for females). The particularly low alpha values for the aggregated attitude item for study 1 are not acceptable; therefore, the two items were analyzed separately in all analyses.

Table 1: *Cronbach's alpha values for TPB measures which consist of >1 item*

	# of items	**Study 1**		**Study 2**	
		Male	Female	Male	Female
Attitude	2	.50	.53	.74	.77
PBC	2	.55	.28	.78	.59
Intention	2	.76	.88	.74	.65

Subjective norm (SN). Subjective norms are concerned with the likelihood that important (to the student) referent individuals or groups approve or disapprove of performing a given behaviour. The strength of each normative belief is multiplied by the person's motivation to comply with the particular referent. For this analysis, one item was used to measure SN.

Measurement was according to the recommendations of Ajzen (1991), and by the same single item for each study. Students responded to the question "During the next 4 weeks, most people important to me (family, friends, etc...) think I should be smoke-free ...", rated on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Perceived behavioural control (PBC). The PBC component describes a person's appraisal of his or her ability to undertake a given behaviour successfully. Importantly, both measures of self-efficacy (easy/difficult; confident/not confident) and controllability (whether performing the behaviour is entirely up to them) were measured. Again, the means of the two item scores were summed to produce the perception of behavioural control (PBC).

This variable was measured by two items (Ajzen, 2006). The first was rated from 1 (strongly disagree) to 7 (strongly agree) and asked "During the next 4 weeks, it is completely up to me whether or not I will be smoke-free...". The second item was measured on the same scale and assessed the self-efficacy component of PBC. It asked "During the next 4 weeks, how confident am I that I can be smoke-free...?", and was rated from 1 (extremely not confident) to 7 (extremely confident). Internal reliabilities for PBC items were $\alpha = .42$ ($\alpha = .55$ for male students, and $\alpha = .28$ for females) for study 1, and $\alpha = .67$ ($\alpha = .78$ for males and $\alpha = .59$ for females) for study 2. The extremely low

alpha values for the items which measured PBC for study 1 (especially for females) dictate that individual items rather than aggregated values be used to better discover the contribution each component makes to the prediction of intention and smoke-free behaviour.

Intention. Intention refers to a person's decision to act and is considered to reflect the effort he or she will exert towards the achievement of that behaviour. The mean of the two intention items was calculated to determine intention for this analysis.

Intention was assessed, as suggested by Ajzen (1991, 2006), using two items. They were: 1) "During the next 4 weeks, I intend to be smoke-free..." rated on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree), and 2) "During the next 4 weeks, I intend to be smoke-free (insert a number from 0 and 7) ___ days per week". Internal reliabilities measured $\alpha = .82$ ($\alpha = .76$ for male students and $\alpha = .88$ for females) for intention items for study 1, and $\alpha = .71$ ($\alpha = .74$ for males and $\alpha = .65$ for females) for these items for study 2.

Behavioural / Normative / Control Beliefs. One of the mechanisms of Ajzen's theory is that these key context-specific beliefs, which underlie the TPB variables of attitude, subjective norm and perceived behavioural control, must be elicited from a sample of respondents who are representative of the research population (1991, p. 192). Using a TPB perspective (Ajzen, 1991), the survey instrument used for study 1 was tested, revised and analyzed by the primary research team to identify the key predictors of smoke-free beliefs from students who were representative of the study sample. The research team developed an interview guide based on the TPB framework prior to administering it in the main study. This was pilot tested by interviewing nine male and

nine female students (three from each grade), and revised appropriately following student feedback. Content analysis and further pilot testing confirmed the questions were representative of the student population. The procedure generated six behavioural beliefs, four normative beliefs, and six control beliefs.

Underlying TPB beliefs, as well as students' perceptions of barriers and facilitators within their school environment, were accessed in the study 2 sample by conducting focus groups. A preliminary focus group guide based on the TPB framework (Ajzen, 2002) was developed by the research team. It was revised and pilot tested using two focus groups (one male and one female). After further revision, four focus groups, using representative students (a mix of gender, age, grade level, and smoking status) were conducted according to the method outlined by Krueger (1994).[6] Content and thematic analyses of generated smoke-free beliefs and social domain items were then performed, and the questionnaire again pilot tested for language and comprehension. The final TPB questionnaire for study 2 contained six behavioural beliefs, seven normative beliefs and six control beliefs (see Table 2).

As recommended by Ajzen (2006), the strength of the behavioural beliefs was rated on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree) following the stem "Being smoke-free during the next 4 weeks will… ". The strength component of the normative beliefs was also rated on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree) and was preceded by the statement "Each of the following people thinks I should be smoke-free during the next 4 weeks..."

Table 2: *Key Underlying Beliefs for Students in Studies 1 and 2*

Study 1	*Study 2*
Behavioural (N = 286)	**Behavioural (N=214)**
"Being smoke-free during the next 4 weeks will… "	
Prevent yellow teeth and fingers	Prevent yellow teeth and fingers
Help me achieve better health	Help me achieve better health
Let me play sports at best of my ability	Let me play sports at best of my ability
Prevent gross lungs	Prevent gross lungs
Make it easier to make new friends	Make it easier to make new friends
Allow more physical activity	Allow more physical activity
Normative (N=286)	**Normative (N=214)**
"Each of the following people thinks I should be smoke-free during the next 4 weeks..."	
My parents/guardians	My parents/guardians
My brother or sister	My brother or sister
My teacher	My teacher
My friends	My 5 closest friends
	Other friends I hang out with
	The kids in my school
	Tobacco companies
Control (N = 69)	**Control (N = 27)**
"Would it be more easy or more difficult for you to be smoke-free during the next 4 weeks if …"	
You think smoking looks gross	You think smoking looks gross
You get suspended if caught smoking	You get suspended if caught smoking
You get sent to the office if caught smoking	You get sent to the office if caught smoking
You are not allowed to smoke on school property	You are not allowed to smoke on school property
You see anti-smoking TV commercials	You see anti-smoking TV commercials
It is expensive to smoke	It is expensive to smoke

Finally, the strength of control beliefs was rated on a 7-point scale from 1 (extremely easy) to 7 (extremely difficult) and was preceded by the statement "Would it be more easy or more difficult for you to be smoke-free during the next 4 weeks if …". All beliefs were analyzed separately as suggested by the TPB (Ajzen, 1991).

Smoking behaviour. This variable was measured using follow-up questionnaires, administered 30 days after the original survey. It was assessed with a single item. For study 1, the item was developed by the research team using Ajzen's recommendations (2002), and authored by Blanchard (Murnaghan et al., in press). The item used was "On how many days in the past 30 days were you smoke-free? Place a number between 0 and 30 in the blank." The item used for study 2 was taken from the School Health Action Planning and Evaluation System (SHAPES)[7] (Brown & Cameron, 1997; R. Cameron et al., 2007), a standardized instrument developed by researchers at the University of Waterloo for the surveillance of adolescent smoking (R. Cameron et al., 1999). The item asked "Think about the last 30 days. Did you smoke a cigarette, even just a few puffs?" rated on a scale from 1 (every day) to 5 (not at all). The mean kappa value[8] for this item, as measured by the SHAPES project team, was 0.72.

Instrument Administration

Once the final survey instruments were developed, they were administered under research conditions. The instruments were self-report questionnaires for both samples and at both time periods. Teachers provided alternative activities for students who did not consent to participate. First, the TPB questionnaire was administered to obtain baseline data. This questionnaire determined the smoke-free attitudes, subjective norms, perceived behavioural control, and smoke-free intentions for students, as well as the

underlying behavioural, normative, and control beliefs accessed from the elicitation study. Two follow-up questionnaires to measure actual smoke-free behaviour were administered 30 days later; the Comprehensive School Health Research Project questionnaire, developed by the research team using Ajzen's recommendations (2002), and authored by Blanchard (Murnaghan et al., in press) for study 1, and the tobacco module of the School Health Action Planning and Evaluation System survey (SHAPES) (Brown & Cameron, 1997; R. Cameron et al., 2007) for study 2.

Data Analysis

Missing Data

A total of 286 students in study 1 and 181 in study 2 returned questionnaires at follow-up. Analysis of study 1 data determined that smoke-free data were missing at random (MAR)[9] from students who were lost to attrition (they were absent when the follow-up questionnaire was administered). For study 2, $\chi 2$ analysis and one-way ANOVA were performed to compare the adherers and the dropouts. Results showed no differences on either the demographic or the baseline TPB variables. Missing values for both studies were imputed using LISREL 8.8 (Joreskog & Sorbom, 1996). Because preliminary analyses showed that the TPB global constructs and various beliefs were significantly skewed for study 2 data, all skewed and kurtotic variables that fell outside of the >2 cut-point range, were transformed using the normalization procedure in LISREL 8.8, prior to imputing the data (Joreskog & Sorbom, 1996).

Preliminary Analyses

For this secondary analysis, both sets of data were analyzed using SPSS 11.5 software (SPSS Inc., 1996). All analyses were conducted separately by gender.

Summary statistics for demographic data were calculated for both study samples; percentage totals, mean values and standard deviations were determined for the independent demographic variables of age, grade, and race. A chi-square analysis was then used to determine if the distribution of these variables was different based on gender.

Preliminary analyses next required that basic descriptive and zero-order correlations among TPB constructs be calculated and the means compared to determine the association among independent variables, and the relationship of these with the dependent variable of smoke-free behaviour. Means of the TPB constructs were compared using ANOVAs, and correlations via Pearson correlations. To compare male and female correlations with regard to TPB components, Fisher's-z[10] scores were compared.

Next, to identify potential demographic confounds[11] with smoke-free behaviour prior to the main analyses, a series of ANOVAs and zero-order correlations were performed. ANOVAs were used to compare categorical variables (grade, race), and zero-order correlations to compare age. Separate comparisons were made for males and females.

Main Analyses

The first main regression analysis was performed to discover whether the TPB explained significant variation in smoke-free intentions and behaviour. The order and

content of the steps was based on the tenets of the TPB and preliminary analyses (Ajzen, 1991).

For study 1, the demographic variable 'grade' was found to be a confounder, necessitating the construction of dummy variables to control for this in the main analysis. To do this, smoke-free intentions were regressed onto two dummy coded variables for grade (Step 1). The first dummy coded variable, 'Grade 7', was coded (0 = grade 7; 1 = grades 8 and 9), and the second, 'Grade 9', was coded (0 = grade 9; 1 = grades 7 and 8). This type of dummy coding allowed for comparison between Grade 8 and Grades 7 and 9 (Hardy, 1993). The second step to determining intention was adding attitude, subjective norm and PBC to the regression. Individual components of attitude (instrumental and affective) and PBC (controllability and self-efficacy) were used to contend with low alpha values for the aggregated attitude and PBC items. To determine smoke-free behaviour, dummy variables for grade were first regressed onto behaviour (Step 1). Subsequently, intention and PBC (again using individual items) were added in Steps 2 and 3, respectively. For comparison, predictors of smoke-free intentions and behaviour for males and females were analyzed separately.

There were no confounders found for study 2 in the preliminary analysis. Therefore, intention was determined by regressing attitude, subjective norm and PBC together onto intention. Intention and PBC were regressed in Steps 1 and 2, respectively, to determine smoke-free behaviour. Again, separate analysis of males and females allowed comparison between genders.

Research has yet to explore the potential of gender as a moderator[12] of each TPB variable relative to its ability to explain smoke-free intentions and behaviour in

adolescence. Therefore, moderation analysis was performed to determine whether any potential relationships between TPB variables and smoke-free intentions or behaviour were moderated by gender. Because the moderating influence of gender on smoke-free intentions and behaviour has not been previously studied, the null hypothesis was tested. Gender comparisons were made using unstandardized beta coefficients to discover any significant differences in the predictor variables for males and females. Coefficient comparisons were made using the procedure outlined by Baron and Kenny (1986) when analyzing a dichotomous moderating variable such as gender. Unstandardized betas and standard errors were computed to determine the 95% confidence interval (CI). If the CI range did not span zero, then the difference was considered significant.

To identify key behavioural, normative, and control beliefs associated with smoke-free behaviour, a series of correlations and regression analyses was performed to examine the smoke-free relationship for each belief. Again, analyses were conducted separately for male and female students and for each study sample. Specifically (Step 1), zero-order correlations between the beliefs and smoke-free behaviour were conducted and compared using Fisher-z transformations between gender groups. Next (Step 2), significant correlations within a given belief grouping were converted to z-scores to reduce non-essential multicollinearity (Tabachnick & Fidell, 1998) and were entered into a regression to predict being smoke-free. Finally, all significant beliefs from previous regressions were entered into a final regression model.

CHAPTER FOUR

Results

In this chapter, study results are presented in two sections. All data are reported separately for each of the two studies and for male and female students.

Preliminary Analyses

Demographics

Summary statistics for demographic data are presented in Table 3. The purpose of this data is to establish relationships between samples and between male and female students. Totals and percentages for the independent demographic variables of age, grade, and race are reported, along with mean values and standard deviations for student age. Student totals, as well as separate male and female data are given for each variable. Pearson chi square values (x^2) with their corresponding probabilities (p)[13] are shown at the right of the table under the heading 'Analysis'.

Age in both studies ranged from 12 to 16 years. The majority of students were 13 or 14 years of age (65.8%, = 13.6 for study 1 and 61.2%, = 13.5 for study 2). There was little difference in the mean ages between male and female students. The mean age for males was 13.7 for both studies; for females, the means were 13.6 and 13.4 for studies 1 and 2 respectively. For study 1, male and female students were distributed normally by age ($x^2 = 6.52$, df = 4, p = .16).

Table 3: *Descriptives – Sample Characteristics of Adolescents in Studies 1 and 2*

	Study 1	**Total (%)**	**Male (%)**	**Female (%)**	**Analysis**	
		N=286	*N*=141	*N*=145	x^2	p
Age	12 yrs or less	40 (14.0)	14 (9.9)	26 (17.9)		
	13 yrs	90 (31.5)	46 (32.6)	44 (30.3)		
	14 yrs	98 (34.3)	53 (37.6)	45 (31.0)		
	15 yrs	53 (18.5)	24 (17.0)	29 (20.0)		
	16 yrs	5 (1.7)	4 (2.8)	1 (0.7)		
	Total	**286 (100.0)**	**141(100.0)**	**145 (100.0)**	6.52	.16
		X = 13.63	X = 13.70	X = 13.55		
		SD = 1.00	SD = 0.96	SD = 1.03		
Grade	7	95 (33.2)	44 (31.2)	51 (35.2)		
	8	85 (29.7)	49 (34.8)	36 (24.8)		
	9	105 (36.7)	47 (33.3)	58 (40.0)		
	Missing	1 (.3)	1 (.7)			
	Total	**286(100.0)**	**141 (100.0)**	**145 (100.0)**	4.60	.20
Race	White	227 (79.4)	110 (78.0)	117 (80.7)		
	Other	59 (20.6)	31 (22.0)	28 (19.3)		
	Total	**286 (100.0)**	**141 (100.0)**	**145 (100.0)**	.31	.58

	Study 2	**Total (%)**	**Male (%)**	**Female (%)**	**Analysis**	
		N=214	*N*=95	*N*=117	x^2	p
Age	12 yrs or less	42 (19.6)	15 (15.8)	27 (23.1)		
	13 yrs	72 (33.6)	36 (37.9)	36 (30.8)		
	14 yrs	59 (27.6)	20 (21.1)	38 (32.5)		
	15 yrs	33 (15.4)	19 (20.0)	14 (12.0)		
	16 yrs	7 (3.3)	5 (5.3)	2 (1.7)		
	Missing	1 (.5)				
	Total	**214 (100.0)**	**95 (100.0)**	**117 (100.0)**	8.87	.06
		X = 13.49	X = 13.67	X = 13.35		
		SD = 1.07	SD = 1.12	SD = 1.01		
Grade	7	78 (36.4)	37 (38.9)	41 (35.0)		
	8	67 (31.3)	28 (29.5)	39 (33.3)		
	9	68 (31.8)	30 (31.6)	37 (31.6)		
	Missing	1 (.5)				
	Total	**214 (100.0)**	**95 (100.0)**	**117 (100.0)**	4.64	.79
Race	White	183 (85.5)	80 (84.2)	103 (88.0)		
	Other	25 (11.7)	12 (12.7)	12 (10.3)		
	Missing	6 (2.8)	3 (3.2)	2 (1.7)		
	Total	**214 (100.0)**	**95 (100.0)**	**117 (100.0)**	2.63	.62

Because the p value is below the conventionally accepted significance level of 0.05 or 5%, the null hypothesis (that the distribution is the same for male and female students) was accepted, and male and female students were recognized as similarly distributed across age levels. For study 2, the actual distribution of male and female students by age was also as expected by chance ($x^2 = 8.87$, df = 4, p = .06).

Grade level in both studies was fairly evenly distributed, among Grades 7 to 9. In both, the fewest number of participants attended Grade 8, with 29.7% and 31.3% in studies 1 and 2 respectively. In study 1, the percentage of students across grade levels ranged from approximately 30% to 37% with most attending Grade 9 (36.7%). For study 2 students, grade levels ranged from approximately 31% to 36%, with the greatest percentage of students attending Grade 7 (36.4%). Chi square results indicate that there was no statistically significant relationship between grade level and gender. For studies 1 and 2 respectively, male and female students were evenly distributed across the three grade levels ($x^2 = 4.60$, p = .20 and $x^2 = 4.64$, p = .79).

Racial background for both samples was predominantly white; 79.4% of students in study 1 and 85.5% in study 2. The remainder of students was categorized as 'Other' for study purposes and included Aboriginals, Asians, Blacks or African Americans, and Hispanics or Latinos, along with 'Other' races. For both studies 1 and 2, the distribution of male and female students was normally distributed by race ($x^2 = 0.31$, p = .58 and $x^2 = 2.63$, p = .62).

Gender itself was closely distributed with females accounting for 51% of students in study 1 and 55% in study 2.

Theory of Planned Behavior Variables

The next set of analyses examined theory of planned behavior (TPB) constructs to determine associations among independent variables and between independent variables and the dependent variables of smoke-free intention and behaviour. Table 4 presents the relationships among TPB components for both studies, reporting male and female data separately. The zero- order correlations between variables, and the means (x) and standard deviations (SD) for each variable are shown. Correlations between TPB variables which are notably stronger for male or female students are highlighted.

The means and standard deviations for TPB variables were computed using ANOVA, to enable comparison between male and female students with respect to individual variables (Table 4). Gender comparisons for students in both samples illustrate close similarities in mean values and standard deviations. For study 1, mean differences are quite small, varying by no more than .21 (for subjective norm). Similarly for study 2, the mean difference between male and female students is .34 or less (for intention). These comparisons indicate there are no significant gender differences with respect to relationships with TPB variables. Variations in the mean value and standard deviations for behavior between the two studies can be explained by the different questionnaire items used for the two samples. The mean for study 1 reflects the number of smoke-free days in the past 30, while smoke-free behaviour in study 2 was rated on a scale from 1 (every day) to 5 (not at all).

Table 4: *Means, Standard Deviations, and Correlations among the Theory of Planned Behaviour Variables for Male and Female Students in Studies 1 and 2*

Study 1	**SN**	**PBC**	**Intention**	**Behaviour**	**Mean (x)**	**SD**
Males						
Attitude	.38 ***	.36 ***	.49 ***	.35 ***	6.21	1.51
SN		.61 *** ♂	.67 *** ♂	.44 ***	6.47	1.36
PBC			.72 *** ♂	.29 ***	6.32	1.26
Intention				.48 ***	6.51	1.25
Behaviour					25.51	8.80
Females						
Attitude	.42 ***	.30 ***	.46 ***	.24 **	6.17	1.59
SN		.12 *	.43 ***	.42 ***	6.68	1.18
PBC			.60 ***	.21 **	6.39	1.10
Intention				.43 ***	6.66	1.20
Behaviour					26.09	8.56

Study 2	**SN**	**PBC**	**Intention**	**Behaviour**	**Mean (x)**	**SD**
Males						
Attitude	.60 ***	.24 *	.54 *** ♂	.46 ***	6.56	1.19
SN		.40 ***	.48 ***	.41 ***	6.73	0.92
PBC			.35 **	.15	6.61	1.03
Intention				.31 **	6.36	1.73
Behaviour					4.72	0.92
Females						
Attitude	.67 ***	.62 *** ♀	.25 **	.56 ***	6.40	1.42
SN		.76 *** ♀	.27 **	.48 ***	6.66	1.08
PBC			.31 **	.50 *** ♀	6.57	1.13
Intention				.28 **	6.70	1.24
Behaviour					4.75	0.91

Note.
♂ = correlation is significantly stronger for male students
♀ = correlation is significantly stronger for female students
SN = subjective norm
PBC = perceived behavioural control
*p < .05; **p < .01; ***p < .001

Correlation results supported the utility of the psychosocial factors of the TPB; attitude, subjective norm, and PBC were all significantly associated with smoke-free intentions for male and female adolescents in both studies. Smoke-free behaviour was also widely associated with TPB predictor variables. The exception was the influence of perceived behavioural control (PBC) on being smoke-free for males in study 2; this was not significant.

There were some notable differences in the influence of TPB variables between studies and between genders. In study 1, the influence of both subjective norm and perceived behavioural control (PBC) on intention was significantly stronger for males than for females. The influence of subjective norm was also much more important in determining PBC for males (.61) than for females (.12) in this sample. It appears that in this sample, the smoking perspective and behaviour of important others exert more influence on male students (.67) than on females (.43). Males (.72) also perceived they have greater control over intending to remain smoke-free than did female students (.60). For both genders, attitude played a significantly important role in the formation of smoke-free intentions (.49 for male students and .46 for females).

Relationships between TPB predictor variables and smoke-free behaviour for students in study 1 exhibited similar strengths for male and female students. Although differences in association were small between genders, males seemed marginally more impacted by each of the variables with regard to smoke-free behaviour. All variables demonstrated significant association with being smoke-free.

An examination of study 2 data describing correlations among TPB variables gives a somewhat different perspective. The contribution of both attitude and subjective

norm (SN) to perceived control in being smoke-free was significantly higher for female students (.62 for attitude and .76 for SN respectively) than for males (.24 for attitude and .40 for SN). Conversely, attitude played a significantly larger role for males (.54) than for female students (.25) in the formation of smoke-free intentions. These results suggest that female students, through their attitudes and attention to important others, experience greater control than do male students in intending to remain smoke-free. This contrasts with the superior control experienced by males in study 1. For the prediction of smoke-free intentions, male students (.54) in this single-school sample expressed attitudes which contributed significantly more than those of female students (.25). Males were also more strongly influenced by the smoke-free perspectives and behaviour of important others (SN = .48) than were females (.27). This stronger reliance on important others in the formation of smoke-free intentions parallels the male experience in study 1.

Some gender differences emerged in study 2 with respect to the relationships between predictive TPB variables and smoke-free behaviour. For the prediction of behaviour, PBC for male students (.15) was not found to be significantly associated with being smoke-free. Females were significantly influenced by PBC (.50) and in fact only the attitudes of female students (.56) were more closely associated with smoke-free behaviour. Male smoke-free behaviour was also highly correlated with their attitudes (.46) but not so strongly as females.

Some differences were found between the two studies with respect to variable associations with smoke-free behaviour. While subjective norms seem similar in all schools (.44 and .42 for male and female students in study 1, and .41 and .48 for males and females in study 2), students' attitude toward smoke-free behaviour was more

strongly related in study 2. Students in this sample showed attitudinal correlations with smoke-free behaviour of .46 for males and .56 for females compared with .35 for males and .24 for females in study 1. In contrast, the relationship of intention with smoke-free behaviour was stronger for study 1 students, measuring .48 and .43 for male and female students respectively, compared with .31 (male) and .28 (female) for students in study 2.

Confounders

It is important to determine whether differences in demographic variables can potentially confound the main analyses. Thus, comparisons were made between each demographic variable and smoke-free behaviour for both male and female students. Using ANOVA, it was determined that a significant overall difference between 'grade level' and being smoke-free existed for both genders in the study 1 sample. Therefore, the demographic variable 'grade' was found to be a confounder, necessitating the construction of dummy variables to control for 'grade' in the main analysis. There were no confounders found for study 2 in the preliminary analysis.

Main Analyses

Regression Analysis

The main hypotheses of the TPB were tested using multiple regression analysis (MRA) to discover the extent to which the theory explains smoke-free intentions and behaviour. Multiple regression analysis was used to search for predictor variables that help to explain significant variation in an independent variable. Research testing TPB variables on various health behaviours, including adolescent smoking, have consistently shown attitude and PBC to be the primary predictors of intention. Subjective norm has customarily been less important or even insignificant. It was therefore hypothesized for

this analysis that attitudes and PBC would significantly predict smoke-free intentions for both genders.

Table 5 illustrates the predictive power of TPB constructs for the study 1 sample. The attitude and PBC constructs were analyzed using their individual components; instrumental (good/bad, harmful/beneficial) and affective (enjoyable/unenjoyable) attitudes, and the PBC factors of controllability (whether performing the behaviour is entirely up to them) and self-efficacy (easy/difficult). Predictors of smoke-free intentions and behaviour for males and females were analyzed separately. As hypothesized, standardized regression coefficients (beta values) for PBC significantly predicted intention for both male and female students; with the self-efficacy component contributing a much greater predictive capability. For male and female students, self-efficacy measured $\beta = .70$ and $\beta = .60$ respectively, while the controllability factor of PBC measured $\beta = .12$ (males) and $\beta = .13$ (females). Uncharacteristically, attitudes were eclipsed by subjective norm (SN) as the next most important predictor of smoke-free intention for females in this study ($\beta = .25$). The contribution of SN for male students was not significant. Only the affective attitudes of male students ($\beta = .11$) showed significance; neither attitudinal component was significant for female students. It is interesting to note, that only male students were significantly impacted by grade level with respect to smoke-free intentions ($\beta = -.13$ for Grade 7 and $\beta = -.12$ for Grade 9). The coefficient of determination (R^2) measures how well the predictors explain the variance in the independent variable. The three TPB predictors of attitude, SN, and PBC explained 74% of the variance in smoke-free intentions for male students and 65% for females.

Table 5: *Results of Regression Analyses for Intention and Behaviour for Study 1*

Predictors	**β^1**	**β^2**	**β^3**	**R^2 total**	**R^2 change**
Intention – Males					
Step 1					
Grade 7	-.17	-.13 *	-		
Grade 9	-.11	-.12 *	-	.02	
Step 2					
Attitude - instrumental	-	-.02			
- affective	-	.11 *	-		
Subjective norm	-	.11	-		
PBC – controllability	-	.12 *	-		
- self-efficacy		.70***		.74	.72
Behaviour – Males					
Step 1					
Grade 7	-.29 **	-.21 *	-.21 *	.07	
Grade 9	-.19 *	-.14	-.14		
Step 2					
Intention	-	.45 ***	.37 **	.26	.19
Step 3					
PBC – controllability	-	-	-.08		
- self-efficacy	-	-	.13	.27	.01
Intention – Females					
Step 1					
Grade 7	.08	.12	-		
Grade 9	.11	.12	-	.01	
Step 2					
Attitude – instrumental	-	.08	-		
- affective		.08			
Subjective norm	-	.25 ***	-		
PBC – controllability	-	.13 *	-		
- self-efficacy		.60 ***		.65	.64
Behaviour – Females					
Step 1					
Grade 7	-.28 **	-.31 **	-.32 **		
Grade 9	-.13	-.18	-.18	.05	
Step 2					
Intention	-	.44 ***	.49 ***	.24	.19
Step 3					
PBC – controllability	-	-	-.04		
- self-efficacy	-	-	-.05	.24	.00

Note.
β^1 = standardized regression coefficient from step 1 of each regression analysis
β^2 = standardized regression coefficient from step 2 of each regression analysis
β^3 = standardized regression coefficient from step 3 of the behaviour regression analysis
PBC = perceived behavioural control
*p < .05; **p < .01; ***p < .001

From Table 5, it is evident that the prediction of smoke-free behaviour is significantly influenced by the variable 'grade', particularly 'Grade 7' (β = -.21 for male students and β = -.32 for females). This suggests that students at this grade level were more likely to be smoke-free than grade 9 students. Given the recognized acceleration of smoking behaviour during this stage of adolescence, it is expected that students at lower grade levels will more likely be smoke-free.

Due to contradictory results in previous research on adolescent smoking behaviour and the dearth of smoke-free investigation, the null hypothesis was tested as to the contributions of intention and PBC components to smoke-free behaviour. Table 5 reveals that intention, when added to the regression at Step 2, had a moderately strong and significant effect. Even after PBC components were input at Step 3, intention remained the sole contributor for both male (β = .37) and female students (β = .49) to their being smoke-free. Neither component of students' perceived control (PBC) significantly affected smoke-free behaviour for either gender in this sample. Grade level, intention and PBC components together explained 27% (males) and 24% (females) of the variance in behaviour.

Results of the regression analysis for study 2 are presented in Table 6. The intention variable had been standardized into z-scores, therefore, all variables were converted to z-scores and the unstandardized coefficients were interpreted. As hypothesized, attitude and PBC were the primary predictors of intention. However for both sexes, only the affective attitude component (β = .32 for males, β = .10 for females), and the self-efficacy component of PBC (β = .58 for males, β = .53 for females) showed significance.

Table 6: *Results of Regression Analyses for Intention and Behaviour for Study 2*

Predictors	**β^1**	**β^2**	**R^2 total**	**R^2 change**
Intention - Males				
Step 1				
Attitude - instrumental	-.02	-		
- affective	.32 **			
Subjective norm	-.09	-		
PBC - controllability	.12	-		
- self-efficacy	.58 ***		.69	
Behaviour – Males				
Step 1				
Intention	.41 ***	.19	.18	
Step 2				
PBC - controllability	-	-.09		
- self-efficacy		.40	.22	.04
Intention – Females				
Step 1				
Attitude - instrumental	.03	-		
- affective	.10 *			
Subjective norm	.01	-		
PBC - controllability	-.02	-		
- self-efficacy	.53 ***		.74	
Behaviour – Females				
Step 1				
Intention	.76 ***	.12	.30	
Step 2				
PBC - controllability	-	.28 **		
- self-efficacy		.39 **	.44	.14

Note.
β^1 = standardized regression coefficient from step 1 of each regression analysis
β^2 = standardized regression coefficient from step 2 of the behaviour regression analysis
PBC = perceived behavioural control
*p < .05; **p < .01; ***p < .001

Neither instrumental attitude nor the controllability component of PBC proved significant. In accordance with prediction, important others (SN) played a small and insignificant role for both genders in predicting smoke-free intentions. Overall, the three TPB predictors of attitude, SN, and PBC accounted for 69% of the variance in intentions for males and 74% for females.

In the study 2 sample, there were gender differences in the effects of both intention and PBC on smoke-free behaviour. Both genders, especially females, exhibited strong intentions (males $\beta = .41$, females $\beta = .76$) to remain smoke-free, until perceived behavioral control was taken into account. For females, PBC components became the sole significant predictors (controllability $\beta = .28$, self-efficacy $\beta = .39$), and the effect of intention became insignificant. Male students also exhibited strong self-efficacy ($\beta = .40$, $p = .055$), however, their controllability over their smoke-free behavior was not significant. The intention of male students to remain smoke-free also became insignificant once PBC was considered. This suggests that perceived control over their own actions and over their environment (PBC) was of primary importance to female students, while males expressed control over their actions only. Explained variance for smoke-free behaviour was 22% for male students ($R^2 = .18$ for intention and $R^2 = .04$ for PBC components), and 44% for females ($R^2 = .30$ for intention and $R^2 = .14$ for PBC).

Moderation Analysis

Previous research has not explored the potential moderation effect of gender between TPB variables and smoke-free intentions and behaviour. This investigation was therefore considered exploratory and the null hypothesis tested. Gender comparisons were made using unstandardized beta coefficients to discover any significant differences

between the predictor variables and the dependent variables of smoke-free intention and behaviour. For study 1, significant differences were found between the coefficient values for both male and female students for the variables 'Grade 7' and 'Grade 9' in the prediction of smoke-free intentions, but not for the prediction of behaviour. The intentions of male students were significantly related to grade level, while those of females were not. There were no significant gender differences found between variables in the prediction of smoke-free behaviour.

One significant gender difference was discovered in the study 2 sample. For this group, smoke-free behaviour was significantly more strongly predicted by PBC for female students than for males. Their perceived control over both themselves and their environment, with regard to staying smoke-free, was clearly stronger for females.

Belief Analysis

To identify key behavioral, normative, and control beliefs associated with smoke free behavior, a series of regression analyses were performed to examine the smoke-free relationship for each belief. Again, analyses were done separately for male and female students and for each study sample.

Table 7 presents the 'Belief/Smoke-free' relationships for study 1. Zero-order correlations are reported in the first two columns for male and female students. For this sample, behavioural beliefs or those which inform attitudes about smoke-free behaviour, exhibited the most significance overall. All behavioural beliefs were significant for both genders with some variability evident in their importance.

Table 7: *Correlation and Regression Results for the Belief/Smoke-free Relationships and Percentage Endorsing each Belief by Gender for Study 1*

	Belief r to being smoke-free (Step 1)		**Belief β to being smoke-free (Steps 2 & 3)**	
	r	**r**	**β**	**β**
Belief	Male	Female	Male	Female
Behavioural (N = 286)				
Yellow teeth	.41 ***	.33 ***	.31 *	
Better health	.33 ***	.33 ***		
Play sports	.34 ***	.37 ***		.30 *
Gross lungs	.36 ***	.27 **		
New friends	.40 ***	17 *	.27 **	
More active	.32 ***	.23 **		
Normative (N = 286)				
Parents	.24 **	.12	.30 *	
Friends	.12	.16 *		
Brother/sister	.17 *	.15 *		
Teacher	.10	.00		
Control (N = 69)				
Looks gross	.06	-.08		
Get suspended	-.05	-.14		
Sent to office	-.02	-.16		
School property	-.09	-.08		
Anti-smoking ads	-.09	-.10		
Expensive	-.06	-.05		

Note.
r = zero-order correlation
β = standardized beta
*p < .05; **p < .01; ***p < .001

For males, the belief that being smoke-free will 'prevent me from getting yellow teeth and fingers' (r = .41) was the most strongly held, followed closely by 'make it easier for me to make new friends' (r = .40), and 'prevent me from getting really gross lungs' (r = .36). Female students in this sample, had stronger beliefs that being smoke-free would let them continue to play sports to the best of their ability (r =.37). They also believed smoke-free behavior would prevent them from getting yellow teeth and fingers (r = .33), and help them achieve better health (r = .33). This latter belief was held equally strongly for male and female students.

There were several behavioral beliefs which clearly exhibited more importance for male students than for females. Males were much more likely to believe that being smoke-free would make it easier to make new friends (r = .40) than females (r = .17). Males also more strongly believed that 'preventing gross lungs' (r = .36 for males, and r = .27 for females) and 'allowing me to be more active' (r = .32 for males and r = .23 for females) were consequences of smoke-free behavior.

With respect to normative beliefs, which inform subjective norms, male students were more likely to say that "parents think I should be smoke-free" (r = .24) than were female students (r = .12), although this latter result is not conventionally considered significant (p = .08). As for the approval of close friends, females were slightly more likely to believe that their friends wanted them to be smoke-free (r = .16, p = .03) than were males (r = .12, p = .12). While both genders placed some importance on the smoke-free expectations of siblings (r = .17, p = .02 for males and r = .15, p = .04 for females), the smoke-free expectations of their teacher were not significant for either gender.

Control beliefs, which explain and inform perceptions of control over smoke-free behavior, were reported only for those students who considered themselves to be smokers. None of the control beliefs for the study1 sample showed correlations within the accepted significance level of $p<.05$.

The second two columns of Table 7 report the results of Steps 2 and 3 for male and female students in the study 1 sample. Significant correlations have been converted to z-scores and entered into a stepwise regression to predict being smoke-free. Those standardized beta values which were significant have been reported. The behavioural beliefs concerning the contribution to smoke-free behaviour of 'prevent me from getting yellow teeth and fingers'' ($\beta = .31$, $p = .028$) and 'make it easier for me to make new friends' ($\beta = .27$, $p = .004$) showed significant importance for male students. Females placed significant weight on the belief that staying smoke-free would let them continue to play sports to the best of their capabilities ($\beta = .30$, $p = .023$). The only normative belief to display significance was the belief that students' parents or guardians think they should be smoke-free, and this was only important for male students in this sample ($\beta = .30$, $p = .017$). Over 78% of male or female students already moderately or strongly hold each of the beliefs which have been found to be significant, suggesting that they may not be critical beliefs to target in promoting smoke-free behaviour in this sample.

The Belief/Smoke-free relationships for study 2 are presented in Table 8. While many of the representative behavioral and normative beliefs were critical for students in this study, generally both belief types showed more importance for female students. For females, all six behavioral beliefs were significantly associated with being smoke-free.

Table 8: *Correlation and Regression Results for the Belief/Smoke-free Relationships and Percentage Endorsing each Belief by Gender for Study 2*

	Belief r to being smoke-free (Step 1)		**Belief β to being smoke-free (Steps 2 & 3)**	
	R	**r**	**β**	**β**
Belief	Male	Female	Male	Female
Behavioural (N = 176)				
Yellow teeth	.39 ***	.37 ***	.40 *	
Better health	.15	.51 ***		.58 ***
Play sports	.26 *	.43***		
Gross lungs	.20 *	.43***		
New friends	.14	.31 **		
More active	.14	.36 ***		
Normative (N = 161)				
Parents	.21 *	.54 ***		.42 ***
Friends	.28 **	.55 ***		
Brother/sister	.13	.44 ***		
Other friends	.21 *	.48 ***		
Kids in my school	.27 *	.48 ***		
Tobacco companies	-.09	.08		
Teacher	.32 **	.38 ***		
Control (N = 37)				
Looks gross	-.64 **	-.33		
Get suspended	-.39 *	-.71 **		
Sent to office	-.43 *	-.55 *		
School property	-.46 *	-.30		
Anti-smoking TV ads	-.58 **	-.45		
Expensive	-.51 **	-.67 **		

Note.
r = zero-order correlation
β = standardized beta
*p < .05; **p < .01; ***p < .001

Correlations ranged from r = .31 to .51; with the belief of better health (r = .51), followed by better ability to play sports (r = .43), and prevention of gross lungs (r = .43) being the most important. For males, three beliefs held importance: that smoke-free behavior would prevent yellow teeth and fingers (r = .39), offer a greater ability to play sports (r = .26), and prevent gross lungs (r = .20).

For female students, six of the seven normative beliefs demonstrated significant association with being smoke-free; only the opinions of tobacco companies were not a significant factor influencing smoke-free behavior. The opinions and smoking behavior of close friends (r = .55), and parents (r = .54) showed the most importance, with that of other friends (r = .48), kids in the school (r = .48), and siblings (r = .44) also exhibiting strong influence. For male students, the smoke-free opinions and behavior of teachers had the most significance (r = .32), although this was still below the importance of teachers' influence on females (r = .38). The normative influence of friends (r = .28), kids in the school (r = .27), parents (r = .21), and other friends (r = .21) were also significant for male students, although the influence of siblings and tobacco companies were not.

Control beliefs were expressed only by those students who self-reported as smokers; however several significant beliefs emerged. Three control beliefs were strongly significant for females; these were the beliefs that being smoke-free would be easy if you thought the consequences of smoking behavior included, school suspension (r = -.71), expensive cigarettes (r = -.67), and being sent to the office (r = -.55). For male students, the expense of cigarettes (r = -.51) was also important; however the belief that it would be easy to be smoke-free if you think smoking looks gross (r = -.64), and if you

see anti-smoking ads on TV (r = -.58) were even more strongly held. In fact, all six control beliefs exhibited significance for males in this study, with correlations ranging from r = -.39 (you get suspended if caught smoking) to r = -.64 (you think smoking looks gross). Regression of control beliefs was not carried out because of the small number of cases resulting from only smokers' completing this portion of the survey.

The standardized beta values of beliefs which were found to be significant for male and female students are reported in Table 8. For males, the behavioural belief that being smoke-free prevents yellow teeth and fingers ($\beta = .40$, $p = .020$) showed importance, while females significantly believed that being smoke-free would help achieve better health ($\beta = .58$, $p = .000$). The only significant normative belief to emerge was the belief of female students that parents think they should be smoke-free ($\beta = .42$, $p = .000$). The percentage of students who already, moderately or strongly, hold the beliefs which have been found significant are already held by greater than 88% of students, suggesting these are not critical beliefs to target in the promotion of smoke-free behavior for these adolescents.

Summary

The demographic data discovered similar characteristics between the two studies and between male and female students. Significant correlations among theory of planned behavior variables (attitude, subjective norm, and perceived behavioral control) and intention supported the utility of the theory. Smoke-free behaviour was also widely associated with TPB predictor variables, with the exception of males in study 2, for whom perceived behavioural control (PBC) did not significantly influence being smoke-free.

TPB predictor variables displayed similar influences on intention for male and female students in both studies; with the exception that male students in study 1 were significantly influenced by grade level with respect to their intention to remain smoke-free. Subjective norm (SN) displayed a moderate association with intention for females in study 1, eclipsing attitude in importance; however SN was not significant for males or for females in study 2. For the prediction of smoke-free behavior, it is notable that PBC was significant for the study 2 sample, while intention and not PBC, was the sole significant predictor for both males and females in study 1.

Moderation analysis determined that the intentions of male students in study 1 were significantly related to grade level, while those of females were not. For study 2, it was discovered that smoke-free behaviour was significantly more strongly predicted by PBC for female students than for males.

All behavioral beliefs were significant for female students in both samples, although for males in study 2, only three of six beliefs were significant. Normative beliefs displayed more significance for females than males in study 2, although for study 1 the importance of these was similar for both genders. All control beliefs were relevant to male students in study 2, although only half of these were important for females; no significant control beliefs emerged for either gender in study 1.

CHAPTER FIVE

Discussion

This secondary analysis was undertaken to investigate potential gender differences in smoke-free intentions and behaviour in adolescents, as well as the underlying beliefs which inform them. This is the first study to examine the association of gender with smoke-free behaviour. The research aims guiding the study were to:

(1) Determine whether the theory of planned behavior (TPB) explains significant variation in smoke-free intentions and behaviour among adolescents, and whether any of these relationships are moderated by gender;

(2) Examine the association of gender-specific beliefs as they inform being smoke-free behaviour.

In this chapter, study results are discussed with respect to existing literature. Additionally, study limitations are reviewed, recommendations are put forward for further research, and suggestions are made for practical interventions which may encourage smoke-free behaviour for this population.

Review of Findings

Predicting Intentions

The results of this study strongly support the use of the theory of planned behavior (TPB) in the prediction of adolescents' intentions to remain smoke-free; the theoretical components of attitude, subjective norm and perceived behavioral control (PBC) explained between 64% and 74% (R^2) of the variance in intention. The proportion of explained variance surpassed that of several previous studies on addictive substances, including tobacco (Conner et al., 2006; Godin et al., 1992; Godin & Kok, 1996;

McMillan et al., 2005; Spijkerman et al., 2004). In adult studies, Godin et.al. (1992) found that the TPB explained 39% of the variance in smoking intention, while Norman, Conner & Bell (1999) reported that the TPB explained 49% of intentions to stop smoking. Research on adolescent smoking has generally demonstrated slightly better predictive ability. In a UK study of 12- to 13-year-olds, McMillan, Higgins & Conner (2005) reported that TPB variables explained 52% of smoking intention. Spijkerman, vandenEijnden, Vitale & Engels (2004) found 44% of smoking intention was explained in their study of 12- to 16-year-olds in the Netherlands. Research examining *smoke-free* behaviour in adolescents (Murnaghan et.al, in press, D.A. Murnaghan, personal communication, January 10, 2008), reported that TPB components explained even more (56%) of the variance in intention. These findings suggest that the theory is particularly well-suited to predicting intentions to remain smoke-free, and also to explaining the perspectives of young adolescents, who are in the process of discovering and developing their individual perceptions and evaluations regarding smoking.

Based on previous literature, it was hypothesized that attitudes and PBC would significantly predict smoke-free intentions for both genders, and that subjective norms would exert either a weak or insignificant influence. Predictions for PBC and subjective norms were largely confirmed; however, attitudes played a less vibrant role than was projected. PBC was found to be the most robust predictor of smoke-free intentions for both studies, corroborating several earlier smoking-related findings (Conner et al., 2006; Higgins & Conner, 2003; McMillan & Conner, 2003; Norman et al., 1999). The strong relationship between PBC and intention implies that these adolescents were more likely to intend to be smoke-free if they felt that tobacco use was within their control; having

confidence in their control over remaining smoke-free may have strengthened their intentions. This result supports a 2005 study (McMillan, Higgins & Conner) of young UK adolescents (12-13 years) which found smoking intentions were based primarily on perceptions of control over not smoking. These findings suggest it may be beneficial to facilitate a heightened sense of control for adolescents, over both themselves and their environment, with respect to smoke-free intentions.

There were substantial differences found in the contributions of the two components of PBC to smoke-free intentions. (This finding may be influenced by the particularly low reliability of PBC items for study 1, which necessitated the use of standardized self-efficacy and controllability measures in regressions.) Self-efficacy exerted a moderately strong and significant influence on intention for both genders in both studies (β varied from .53 to .70); however, the contribution of the controllability component of PBC was much smaller (β varied from -.02 to .13) and was only significant for adolescents in study 1 (both genders). This unequal contribution of the two PBC components supports the self-efficacy/controllability distinction, suggesting that students discriminated between personal control (self-efficacy) and perceived controllability (whether being smoke-free was entirely under their control). Several previous tobacco and cannabis findings support this PBC distinction (Armitage et al., 1999; Maher & Rickwood, 1997; McMillan & Conner, 2003; Smith et al., 2007; Trafimow et al., 2002).

The substantial contribution of self-efficacy to the prediction of smoke-free intentions signifies a high level of personal control. This finding agrees with other research that increased self-efficacy to not smoke is associated with decreased intentions to try the behaviour (McMillan et al., 2005; Smith et al., 2007). Smith's study of high

school students found that an increased perceived difficulty of quitting was the most important determinant of students' intentions to not begin smoking. It seems that adolescents who are aware of the difficulty of quitting, because of the addictive nature of cigarettes, are more likely to intend to remain smoke-free. Several studies have found that adolescents who exhibit decreased self-efficacy have more positive attitudes toward smoking (Chassin et al., 1984; Harakeh et al., 2004; Maher & Rickwood, 1997). This implies that adolescents with higher self-efficacy may hold more negative attitudes towards cigarette use. There is little doubt that even this age group is aware of contemporary smoking issues such as health risks, public smoking bans and retail restrictions. Keeping the smoking debate in the public eye and ensuring that adolescents are exposed to numerous negative messages surrounding cigarette use may serve to enhance the smoke-free intentions of this impressionable group. Personal self-efficacy may also be increased by attributes such as refusal skills (Conrad et al., 1992; Flay et al., 1994; Maher & Rickwood, 1997; Moan & Rise, unpublished). Anticipated regret, which has been suggested as an addition to the theory (Abraham & Sheeran, 2003; Conner et al., 2006; McMillan et al., 2005), has also been found to predict intentions over and above the three TPB predictors. Further, Wilkinson & Abraham (2004) suggest that parental support may nurture self-esteem, and so strengthen non-smoking intentions and help protect against smoking behaviour.

Smoking studies have revealed that attitudes generally contribute consistently and significantly to the prediction of behavioural intention (Jomphe Hill et al., 1997; Maher & Rickwood, 1997; Smith et al., 2007). Contrary to the literature and to prediction, the contribution of attitude to smoke-free intention in this study was limited (see also Moan

& Rise, unpublished). The use of only one item for each of affective and instrumental attitudes could partially explain the limited predictive ability of the variable; alpha values were below acceptable levels for both male ($\alpha = .50$) and female ($\alpha = .53$) students for study 1, necessitating the use of standardized measures in regressions. The variable contribution of the two constructs supports the contention that the variable attitude has two components: affective (enjoyable/unenjoyable) and instrumental (beneficial/harmful) (Conner & Armitage, 1998; Rhodes & Courneya, 2003; Rhodes & Blanchard, 2006). Only affective attitude (enjoyable/unenjoyable) was found to predict intentions, and its contribution was, for the most part, small ($\beta = .10$ or .11) or insignificant (study 1 females). However, for males in study 2, affective attitude made a moderate contribution to the prediction of smoke-free intentions ($\beta = .32$; $p < .01$). This finding implies that these male students, representing a single intermediate school, maintain positive perceptions about the benefits of smoke-free intentions. Because pro-smoking attitudes have been found to be a consistent predictor of regular smoking over time (Tucker et al., 2003/4), it is likely that sustained anti-smoking attitudes can substantially support smoke-free intentions and behaviour. Instrumental attitude (beneficial/harmful) did not significantly predict smoke-free intentions for males or females in either study group. Highly visible smoking prevention campaigns in recent years make it likely that all adolescents have become aware of the harmful effects of tobacco use, yet as a group they typically underestimate the addictiveness of tobacco and the effects of tobacco use on their health. Such ambivalence may lead to uncertain attitudes regarding smoke-free intentions.

Smoking-related studies have generally found subjective norms (SN) either a weak or insignificant predictor of intention (deVries et al., 1995; Higgins & Conner, 2003; McMillan et al., 2005; Wiium et al., 2006). As expected, this study determined that subjective norms did not contribute significantly to the prediction of intention; with the exception of females in study 1, where uncharacteristically the contribution of SN (β = .25) eclipsed attitude in importance. Only a few other researchers have found SN to be a superior predictor to attitude in smoking-related studies (Maher & Rickwood, 1997; D.A. Murnaghan, personal communication, January 10, 2008). Existing literature suggests some gender differences in social influences, although conflicting results indicate no clear pattern (Chassin, 1986; Chassin et al., 1981; Flay et al., 1994; Hoffman et al., 2006; Tyas & Pederson, 1998; Wang et al., 1997). It is possible that individual school environments played a key role in the importance of normative influence for girls in this sample. Some researchers have found that young adolescents who attended a school with a higher prevalence of older smokers were more likely to adopt the behaviour (Ellickson et al., 2003; Leatherdale & Manske, 2005). The school environment for study 1 females may include fewer older smokers. Certainly, results indicate a fundamental influence of significant others to smoke-free intentions in this group; they perceive disapproval for smoking and an endorsement of remaining smoke-free. Research on young and mid-adolescents in the Netherlands (Harakeh et al., 2004), and in Australia (Maher & Rickwood, 1997) found that those who perceived a more pro-smoking group of influencers, had higher intentions to smoke. Influential persons may send a powerful message regarding what is normal and accepted regarding smoking (Wiium et al., 2006). Creating an environment for these most susceptible young people in which smoking is

viewed and modelled in a negative way is likely to be a key factor in their future intentions and behaviour.

The weak association of SN and intention for most adolescents in this study may indicate that the expectations and behaviour of significant others contribute to the formation of smoking-related attitudes, rather than directly to the SN component of intention formation (deVries et al., 1995; Wiium et al., 2006). The fact that only a single measure of the SN variable was used may also play a role. Recent research has supported the importance of considering different forms of normative influence within the context of the TPB. Researchers investigating other health-related behaviours (Godin & Kok, 1996; Rhodes & Blanchard, 2006; Rivis & Sheeran, 2003a) as well as smoking researchers (McMillan & Conner, 2003; McMillan et al., 2005; Smith et al., 2007; Wilkinson & Abraham, 2004) suggest that the subjective norm component is more explanatory of behavioural intentions when conceived as two distinct variables: an injunctive component as the more traditional measure of whether one believes their social network wants them to perform a behaviour; and descriptive norms as a measure of the perceived smoking behaviour of this network. Several investigators additionally suggest that other normative antecedents, such as moral norms and perceived prevalence of smoking in a given adolescent population, would further help to explain behavioural intentions (Conner & Armitage, 1998; Conrad et al., 1992; McMillan & Conner, 2003; McMillan et al., 2005; Moan & Rise, 2005; Smith et al., 2007; Wiium et al., 2006).

A few studies have examined gender as a possible moderator between the TPB and adolescent smoking (Chassin, 1986; Chassin et al., 1981; Chassin et al., 1984; Côté et al., 2004; Flay et al., 1994), although analysis has been partial and results variable. In

this study, there was a significant gender difference found in study 1 adolescents with respect to grade level. Male students were significantly impacted with respect to smoke-free intentions (β = -.13 for Grade 7 and β = -.12 for Grade 9), whereas female students were not. This suggests that male students in grade 7 were more likely to have smoke-free intentions than males in grade 9, while there was no discernable difference by grade level for females. This may be related to the developmental rates of adolescent males; male students may be later in acquiring smoking intentions than females. This finding suggests that smoke-free initiatives should be targeted to female students at a younger age or grade level than males. Côté et.al. (2004) found that the period of transition to junior high school and the first few months in attendance at this secondary level was also the period of greatest transition to smoking behaviour.

Predicting Behaviour

The predictive utility of the TPB was endorsed by this study. TPB variables explained smoke-free behaviour 30 days later moderately well for both genders in both studies (R^2 varied from .22 to .44). The efficacy of the TPB has been found to vary across behavioural categories. Several researchers suggest it is more predictive of some health-related behaviours than others (Garcia & Mann, 2003; Godin & Kok, 1996), and is particularly effective relative to addictive behaviours (Godin & Kok, 1996; Norman & Conner, 2006; Notani, 1998). In their study on legal and illegal drug use, Armitage et.al. (1999) found there was considerably more variance explained in cannabis use as opposed to alcohol consumption. These findings imply that the TPB may be particularly suited to predicting the use of illicit drugs; given that cigarette purchase by minors is illegal in

most jurisdictions, cigarette smoking in young adolescence may be perceived as a comparable behaviour.

The greatest explained variance in smoke-free behaviour was attributable to female students in study 2, largely due to their enhanced level of perceived control. Both genders in study 1 were influenced by grade level; the lower prevalence of grade 7 smokers contributed significantly ($R^2 = .07$ for males, $R^2 = .05$ for females) to the explained variance in smoke-free behaviour. The difference in the two studies relative to the influence of grade level may be attributable to exposure to older student smokers. Researchers have found that junior students were more likely to smoke if they attended a school with a higher prevalence of senior students who smoke (Chassin et al., 1981; Leatherdale, McDonald, Cameron, & Brown, 2005).

Although most health-related meta-analytic reviews confirm the basic premise of the TPB, that intention is the most powerful predictor in explaining present and future behaviour (Albarracin et al., 2001; Armitage & Conner, 2001; Godin & Kok, 1996; Hagger et al., 2002; Hausenblas et al., 1997; Notani, 1998; Rivis & Sheeran, 2003b), smoking studies have found the ability of intention to predict behaviour inconsistent, perhaps because of its addictive nature. In agreement with smoking-related research which found it the best predictor (Côté et al., 2004; deVries et al., 1995; Flay et al., 1994; Harakeh et al., 2004; Higgins & Conner, 2003; Maher & Rickwood, 1997; Wilkinson & Abraham, 2004), smoke-free behaviour for both male and female adolescents in study 1 was significantly predicted by prior intentions not to smoke. The addition of PBC components did not affect the prominence of smoke-free intentions, and were not significant. The smoking behaviour of these adolescents is consistent with the premise

that a firm intention not to smoke offers some level of protection against the risk of smoking in future (Armitage et al., 1999; Wakefield et al., 2004). However, stronger intentions to remain smoke-free were associated with the perception of less control over the behaviour. These adolescents intended to remain smoke-free, but lacked confidence in their ability to do so.

The perceptions these adolescents had of little control over remaining smoke-free, may be related to perceived pressure to smoke, or having family and friends who smoke. Côté et.al. (2004) found, in a study of 11-year-olds in Canada, that the perceived smoking behaviours of friends and of an older brother were among the most protective factors for the maintenance of abstinence from smoking. Several UK studies report similar findings regarding the influence of family and friends. Wilkinson & Abraham (2004) determined that the smoking behaviours of friends and of an older brother directly predict whether 13-year-olds start smoking. Other researchers agree that the smoking behaviour of older siblings was particularly important, especially at the point of smoking uptake, suggesting that the modelling of older siblings can be an important factor in whether or not adolescents begin to smoke (Chassin et al., 1984; Mercken, Candel, Willems & deVries, 2007; Tyas & Pederson, 1998). Further, recent European findings suggest that for 12 and 13-year olds, smoking behaviour is influenced by differences in the types of peer friendships (i.e. reciprocal or non-reciprocal) (Mercken et.al, 2007), and that adolescents of this age choose friends with similar smoking behaviour to their own (deVries, Candel, Engels & Mercken, 2006). McMillan, Higgins & Conner (2005) found the smoking behaviour of family and friends a strong influence on smoking for 12- and 13-year-olds in the UK. Higgins & Conner (2003) suggest that 11- and 12-year-olds who perceive that

others do not want them to smoke are less likely to do so. These results suggest it is possible that smoke-free behaviour could be presented to adolescents as the norm in school; non-smoking students and former smokers might be promoted as positive role models.

In their study of Canadian 5th graders, Côté et.al. found that intention was an important protective factor against smoking, but only when students began secondary school. Canadian statistics indicate that the most likely age for trying a whole cigarette for the first time is between 11 and 12 years (Health Canada: Tobacco Control Programme, 2005; Health Canada: Tobacco Control Programme, 2006b; Heart and Stroke Foundation, 2006). Research into the smoking habits of young adolescents in other countries (France, Israel, Netherlands, US) agrees that there is a sharp increase in the number of experimental smokers at the age when students begin attending secondary school (Meijer et al., 1996). Moreover, adolescents tend to overestimate the prevalence of smokers in such an environment, and exposure to older adolescents who smoke increases the perception that this behaviour is common and accepted (Chassin et al., 1981; Chassin et al., 1984; Conrad et al., 1992; Ellickson et al., 2003; Smith et al., 2007; Tyas & Pederson, 1998). The existence of this critical window for intention formation for many adolescents suggests that prevention initiatives should be targeted to the specific period surrounding the transition from elementary to junior high school; so that smoke-free intentions may be developed before students become accustomed to an environment where smoking is more prevalent.

Although Ajzen (1991) has identified intention as the most proximal and important antecedent of behaviour, some researchers have found PBC components better

predictors of smoking behaviour (Conner et al., 2006; McMillan & Conner, 2003; McMillan et al., 2005; Murnaghan et al., in press). Godin et.al, (1992) found PBC a superior predictor because of the perception of control needed to not smoke. PBC for study 2 participants, particularly its self-efficacy component, eclipsed intention in the prediction of smoke-free behaviour. When PBC components were added to the model, the influence of smoke-free intentions became insignificant. A possible explanation for the prominence of PBC components in comparison with smoke-free intentions is that the uptake of smoking among adolescents may be unplanned; they experiment with smoking without making rational plans about the behaviour in future. These adolescents did not have strong intentions to remain smoke-free; however they perceived some control over this capability.

Research suggests that when a behaviour is not under full volitional control, the PBC components of self-efficacy and controllability tap into different aspects of the difficulty of engaging or not engaging in the behaviour – giving a more nuanced picture of the individual's beliefs (Garcia & Mann, 2003). Self-efficacy has been shown to play an influential role in the prediction of smoking behaviours for adolescents (Conrad et al., 1992; Côté et al., 2004; deVries et al., 1995). Côté et.al. (2004), in their Canadian study of 10- and 11-year-olds, found perceived self-efficacy to be a protective factor in the maintenance of smoking abstinence. In this study, both male and female students perceived moderate personal control as expressed in their levels of self-efficacy ($\beta = .40$, $p = .055$ for males, $\beta = .39$ for females, $p = .01$). However, female students also felt a considerable degree of control over external factors which might influence their smoke-free status. This represents a significant gender difference for this sample. While female

students perceived moderate control over both themselves and their environment with regard to staying smoke-free, the perceptions among male students of controllability over their smoke-free behaviour were negative and insignificant. This finding is contrary to a study of UK 13- and 14-year-olds, where girls were found to have lower perceived overall control over smoking (Wilkinson & Abraham, 2004). The gender effect found in this study may potentially be attributable to the developmental maturity of female students relative to males; girls of this age may have developed greater confidence in their ability to say no to smoking. Several researchers have found that perceived ease of smoking contributed to adolescent smoking behaviour (Tyas & Pederson, 1998; Wilkinson & Abraham, 2004). For adolescents of this age range, such things as parental supervision and support (Chassin, Presson, Todd, Rose, & Sherman, 1998; Chassin, 1986; Tyas & Pederson, 1998; Wilkinson & Abraham, 2004) and school level policies (Clark, 1996; Currie et al., 2004; Wiium & Wold, 2006) contribute to the perception that it is easy to remain smoke-free. These findings underscore the potential importance of making smoking more difficult, perhaps by establishing no-smoking schools, and/or ensuring that smoke-free school policies are enforced.

Smoke-free Beliefs

The second purpose of this study was to identify potential gender-specific underlying beliefs that inform smoke-free behaviour for adolescents. The value of determining these beliefs supports the premise that behaviour may be modified by altering the underlying beliefs of adolescents, so that better behaviour choices will be made. Adolescents who acknowledge more negative outcomes from smoking are less likely to adopt the behaviour (Anderson, Pollak, & Wetter, 2002). By working to change

negative beliefs and promote positive ones, educators may have a better chance to ultimately influence health behaviours (Ragon & Mouzon, 1999). Based on the dearth of study in this area, this gender-specific investigation was considered exploratory. All six behavioural beliefs, which inform smoke-free attitudes, proved to be moderately associated for all study 1 students, and for females in study 2. While male students in study 2 accepted that the negative physical attributes of yellow teeth and gross lungs would be positively impacted by smoke-free behaviour, they did not recognize the smoke-free benefits of better health or a more active lifestyle. (The benefit of avoiding yellow teeth by abstaining from smoking was a belief held strongly by male students in both studies.) Moreover, male students in study 2 did not perceive that being smoke-free would lead to new friendships, while males in study 1 perceived this to be a significant benefit to smoke-free behaviour. This stark contrast in perception may be due to school-level differences; the environment of the single school of the study 2 sample may not be perceived as conducive to friendships which are developed outside of smoking groups.

The close association of behavioural beliefs with smoke-free behaviour for most adolescents in this study suggests that the elicited beliefs are critical for attitude formation. Especially for female students, all health- and activity-related behavioural beliefs showed at least moderate importance; these students realized that choosing to remain smoke-free could have positive consequences for their physical appearance, activity level, and overall health. Ragon & Mouzon (1999) found the behavioural beliefs of adolescents in the US who intended to smoke were significantly different from those who did not. The 'intenders' were much less negative about health consequences such as smoking being harmful to health, increasing chances of lung cancer and causing

addiction. Therefore, ensuring the positive effects associated with smoke-free behaviour are communicated to young adolescents may help them form beliefs which protect against smoking uptake. The health behaviour of friends and family members has also been shown to influence adolescents' attitudes toward the behaviour, by affecting their beliefs about smoking (Chassin, Molina, & Curran, 1994; Wiium et al., 2006). Attitudes are normally developed during socialization with reference groups (Ellickson et al., 2003), and more positive beliefs toward smoking and smokers tend to be related to an increased likelihood of smoking (Tyas & Pederson, 1998). Having more knowledge about the detrimental health effects from smoking has also been found protective against the behaviour (Tyas & Pederson, 1998). It is therefore important for educators to emphasize the positive benefits which remaining smoke-free can ensure, such as having better health, keeping more active, and making new friends.

In this study, normative beliefs which inform subjective norms were generally less closely associated with smoke-free behaviour than were behavioural beliefs. Such things as modelling, pressure to smoke, school-level perceptions and actual smoking, and the beliefs of friends and family members have been suggested and investigated as mechanisms of normative influence. In their review of the psychosocial factors associated with adolescent smoking-related behaviour, Tyas & Pederson (1998) determined that smoking probably serves different functions for males and females over the course of the development and maintenance of the behaviour. In this study, female students, particularly in the study 2 sample, were more likely than males to believe that significant persons in their lives wanted them to remain smoke-free. This finding agrees with several adolescent studies which reported that girls have more anti-smoking

normative beliefs (Chassin et al., 1981; Flay et al., 1994). Although Hoffman et al. (2006), in a more recent review of studies looking at the smoking behaviour of mid-adolescents, report a stronger relationship between social influences and smoking for males than for females. While males, particularly in the study 2 sample, generally held weaker normative beliefs, one notable exception was that they were ambivalent regarding the approval of siblings. Although the smoking beliefs and behaviour of older siblings have been shown to exert some influence on adolescent smoking behaviour (Chassin et al., 1984; Tyas & Pederson, 1998; Wilkinson & Abraham, 2004), findings are not consistent. It may be that the perceived beliefs of siblings are a more protective factor for the maintenance of *abstinence* from smoking for females than for males.

Female students in study 1 were the only group for whom parents' opinions on smoke-free behaviour were not significant; a finding which contradicts an international review of mid-adolescents which found only girls susceptible to parental influence (Tyas & Pederson, 1998), and a US study of adolescent smoking initiation and escalation (Flay et al., 1994). However, Tyas & Pederson also suggest that the significance of parental influence depends on the outcome studied (i.e. smoking intention, current smoking); it could be that normative beliefs associated with *smoke-free* behaviour differ from those associated with smoking. Several researchers have determined that parents' smoking has a negative effect on adolescent smoking behaviour (Bricker et al., 2007; Madarasová Gecková, Stewart, van Dijk, Orosova, Groothoff & Post, 2005; Harakeh et al., 2004; deVries et. al., 2006) suggesting that non-smoking parents may exert a positive influence. In agreement with study findings, other adolescent research has not been conclusive on

the effects of parents' attitudes and modelling, although most find parental approval exerts some influence (Conrad et al., 1992; Ellickson et al., 2003; Tucker et al., 2003/4).

Normative beliefs with respect to friends' approval were significantly stronger for female students in this study; in fact, the influence for study 1 males was insignificant. This contradicts the findings of Wang et.al. (1997), which report in their study of adolescents in grades 7-9, that males are more susceptible to friends' smoking influences. Hoffman et.al. (2006), in their international review on peer influences on adolescent smoking, conclude that the perceptions and behaviour of peers or friends exert a greater influence than parents on adolescent smoking-related behaviour. Some reviewers also found the influence of peer smoking to be more consistent that that of parents (Kobus, 2003; Tyas & Pederson; 1998), although the present study found parents' and friends' influence similar. This finding may be explained by the suggestion that parental influence is greater for younger adolescents, and at the point of smoking initiation rather than later smoking (Hoffman et al., 2006). Several researchers suggest that the opinions and behaviour of smaller peer groups, in particular, appear to predict subsequent individual tobacco use (Tyas & Pederson, 1998; Wang et al., 1997). Furthermore, some researchers studying US adolescents found that the perceived smoking of peers influences smoking behaviour as much or more than actual smoking (Ellickson et al., 2003; Tyas & Pederson, 1998). These latter results suggest that the incidence of smoke-free behaviour can be increased when adolescents are made aware of actual levels of smoking prevalence, and are afforded the refusal skills necessary to navigate peer smoking circles successfully.

Notably, all students in study 2 held the belief that their teachers wanted them to be smoke-free, whereas all students in study 1 did not. This finding may be attributable to more positive teacher-student relationships and smoking perceptions in the study 2 school environment. The variability in findings suggests a need for further research to examine the role of teachers, coaches, and other school staff. Several studies have shown that the perceived smoking of teachers contributes to student smoking-behaviour (Poulsen et al., 2002; Wiium & Wold, 2006), while good teacher support was correlated with lower smoking rates in students (Currie et al., 2004). Certainly, the position of junior high school teachers with respect to students remaining smoke-free should be made unambiguous and compelling to adolescents, especially during this stage of heightened susceptibility to smoking initiation.

Control beliefs, which explain perceptions of control over smoke-free behaviour, were reported in both studies only for students who considered themselves smokers. While none of these beliefs showed significant correlations with smoke-free behaviour in study 1, all control beliefs for the study 2 sample were moderately and significantly held by male students. Among the more significant beliefs for females was that it would be easier to be smoke-free if smoking consequences included being sent to the office or getting suspended from school. This result advocates for unambiguous school smoke-free policies, combined with robust enforcement, to augment other smoke-free initiatives in lowering smoking uptake at the junior high level. Several researchers have found that students' perceptions of policy enforcement are strongly predictive of smoking on school property (Greisbach, Inchley & Currie, 2002; Lovato, Sabiston, Hadd, Nykiforuk & Campbell, 2007); especially for middle school students, lower smoking prevalence has

been found in schools that closely monitor cigarette use (Kumar, O'Malley & Johnston, 2005). The strong susceptibility of male students to anti-smoking ads on TV, suggests that media campaigns directed at adolescent males can also be beneficial in tempering tobacco use. Both genders agreed that the expense of buying cigarettes contributed to the ease of remaining smoke-free. Powell et.al.'s (2005) study of US high school students found that cigarette prices and tobacco control policies, such as restricted access to cigarettes, significantly impacted youth smoking behaviour. In Canada, a steady increase in both provincial and federal taxes on tobacco products have combined with other such initiatives to contribute to a decrease in youth smoking prevalence (Health Canada: Tobacco Control Programme, 2005). Policy measures such as high tax rates for tobacco and rigorous retail legislation which prohibits tobacco purchase by minors should be preserved and even strengthened.

Limitations

This study is subject to a number of limitations. First, the convenience sampling methodology may indicate a selection bias. Future studies should attempt to randomly select schools and students to increase the representativeness of the sample. The sample was also relatively small and representative of a single region in eastern Canada, suggesting that generalizability to other student adolescents in dissimilar social and geographic settings may be difficult. Second, preliminary analysis for study 2 data showed that TPB variables were significantly skewed, and required a censor regression. Although standard TPB global items and scaling formats were used, along with the recommended belief elicitation procedure (Ajzen, 2002), different scaling formats should be examined in future studies to potentially correct this problem. Third, all measures

were self-report, and thus susceptible to bias and misreporting, especially where the behaviour is seen to be undesirable. However, self-reports of smoking behaviour have been shown to be reliable and in agreement with biochemical indicators when measurements are carried out under optimal measurement conditions (i.e. where strict confidentiality was assured) (Chassin et al., 1981; Dolcini, Adler, & Ginsberg, 1996; Patrick et al., 1994). A review of published TPB studies (Armitage & Conner, 2001) indicates that the TPB significantly predicts objectively observed behaviours, although the level of prediction is lower than for self-report measures of behaviour (McMillan & Conner, 2003). Therefore, future studies might benefit from corroborating smoking behaviour with objective indicators. Finally, the measures of attitude and PBC were described by two items for each variable; for study 1 in particular these yielded Cronbach alpha values which were relatively low. To compensate for the low reliability scale, items were standardized into z-scores before being entered into regressions. While using more items is optimal, questionnaires were designed considering time to complete and the comprehension levels of younger participants. However, it would be useful to conduct further studies using a greater number of items in the measurement of each TPB construct as a way to improve reliability scales.

Future Directions

While the usefulness of the TPB for understanding smoking behaviour is supported in previous research, this study is one of only a few to have investigated the predictive ability of the theory as it relates to choosing not to smoke or remaining smoke-free (Côté et al., 2004; Moan & Rise, unpublished; Murnaghan et al., in press). Researchers suggest that new research should seek to understand the factors underlying the maintenance of

smoking abstinence in adolescence, so as to reinforce this positive behaviour (Côté et al., 2004; Manske et al., 1997). Côté et.al. (2004) suggest it would then be possible to develop interventions relying on the mobilization and reinforcement of positive behaviours already displayed by children or adolescents. Whereas much research has examined the reasons why adolescents begin to smoke (Leatherdale et al., 2005; Meijer et al., 1996), it would be worthwhile to discover influences on remaining smoke-free, so that this critical knowledge can be used to support students in making the decision to remain smoke-free.

It is now widely accepted that tobacco control strategies aimed at reducing smoking among adolescents need to adopt a more gender-sensitive approach (World Health Organization, 2003); however, this is hampered by our limited understanding of the reasons behind gender differences in adolescent smoking (Amos & Bostock, 2007; Davis et al., 2004; Wilkinson & Abraham, 2004). While this study may not have exposed conclusive gender differences in the explanation of smoke-free intentions and behaviour in adolescents, it has expanded the literature by identifying areas of divergence and of similarity. Whereas gender appears to moderate the association between influences associated with smoking-related intentions and behaviour, findings have been contradictory as to how males and females are differently affected. For instance, while this study found that subjective norms are significantly more important to the smoking-related behaviour of adolescent girls, Hoffman et.al (2006) suggest that males exhibit a stronger relationship between social influences and smoking. Wilkinson & Abraham (2004) found that girls have lower perceived control over smoking and stronger intentions to smoke in future, while the present study suggests there is little gender

difference. Further study is needed into the particular relationships that gender might play in smoking-related decisions, and how such knowledge might enhance intervention strategies.

Study findings provide support for the proposed PBC distinction into factors of self-efficacy and controllability. Adolescents discriminated between personal control (self-efficacy) and perceived controllability. Manstead & Parker (1995) suggest that there is as yet no consensus among researchers as to the best method to measure antecedents of PBC. It could be that considerably more variance in self-efficacy is accounted for by control belief items, providing a more accurate reflection of the antecedents of self-efficacy than of the controllability component of PBC. The addition of potential antecedents that reflect the controllability factor might be considered.

Recent smoking research highlights the need to examine the smoking-related intentions of younger adolescents, even children. The findings of Côté et.al. (2004) and others (Meijer et al., 1996; Wilkinson & Abraham, 2004) suggest that smoke-free intentions begin to form in elementary school; at the grade 5 level or even younger. Once adolescents enter secondary school, and begin to be exposed to older smokers and develop the perception that smoking is prevalent and acceptable, smoke-free intentions may be more difficult to develop.

Several differences in findings between the two samples in this study imply that school level influences are important for these adolescents. Positive associations between sound school smoking policies and reduced adolescent student smoking have been confirmed in several European studies (Currie et al., 2004; Piontek et al., 2008; Wiium & Wold, 2006). The prevalence of smoking among students was found to be directly

related to the strength and enforcement of school policies to control smoking, after having adjusted for student-level characteristics. Furthermore, adolescents' perceptions of teacher smoking during school hours were associated with higher levels of student smoking (Poulsen et al., 2002; Wiium & Wold, 2006), while good teacher support was correlated with lower smoking rates (Currie et al., 2004). Further investigations into the importance of school context variables for adolescent smoking-related behaviour are warranted. The school is a primary social context where behavioural interventions have the potential to reach a significant portion of adolescents (Baker, Dilly, Aupperlee, & Patil, 2003). School-specific research might highlight the institutional attributes which most support a smoke-free environment.

Implications for Practice

There are a number of practical applications that can be drawn from the reported findings. The global constructs of attitude, subjective norms and perceived behavioural control (PBC) reflect underlying behaviour and context-specific beliefs. Because these beliefs are suggested to be specific to behaviours and to populations (Ajzen, 1985) and indeed the present findings suggest several gender differences, tailoring messages for adolescents should generate significantly better results for smoke-free behaviour (Hanson, 1997; Hanson, 1999). Most adolescents today hold few beliefs about the positive benefits of smoking suggesting public health efforts may have had the desired impact (Maher & Rickwood, 1997). This is reflected in the present findings where adolescents of both genders held moderately strong health-related beliefs. However, males in the study 2 sample did not associate remaining smoke-free with better health, or with being more active. This may be reflective of the ambiguity with which smoking

outcomes are held by this age group; while they acknowledge positive benefits to staying smoke-free, the consequences of smoking may not be accepted on an individual level. Arming male adolescents with information on short- (addiction, shortness of breath) and long-term (heightened susceptibility to many chronic diseases) smoking effects may strengthen their confidence in smoke-free health benefits. These males were also less likely to associate smoke-free behaviour with making new friends. This finding suggests that helping them to develop increased opportunities for involvement with non-smoking peers and to overcome the aura of mystique and desirability sometimes ascribed to smoking groups may enhance their smoke-free intentions.

Understanding the social environment in which smoke-free behaviour occurs is of paramount importance. Programs which take normative influences into account will be better able to sustain tobacco abstinence than those that ignore peer influence. This study provides further evidence of the influence of important others for adolescents. Research has generally found interpersonal factors more important for females. While this study concurred in some respects, males were shown to place just as much importance on the opinions of parents and of teachers. Females did, however, value the smoke-free opinions of friends more highly than did males; perceptions of what their friends thought they should do (and by extension what their friends smoking behaviour actually was) was important. Prevention programs aimed at countering pro-smoking social influences may be beneficial. Teaching adolescent girls better refusal skills and providing accurate information to combat heightened perceptions of smoking prevalence among peers and other students would help instil a greater ability to resist the allure of tobacco. While the influence of parents and siblings smoking opinions and habits on adolescents' health

behaviour can be affected indirectly by school- and community-level initiatives, the school environment itself is more amenable to modification. In particular, the influence of teachers on junior high school students with respect to remaining smoke-free is important. While the two study samples in this investigation exhibited little gender difference with respect to the impact of teachers on staying smoke-free, there was variability evident at the school level. The opinions and smoking-related behaviour of teachers should be perceived as strongly anti-tobacco (even if privately they are not), especially during this stage of heightened susceptibility to smoking initiation.

Interventions to reinforce smoke-free intentions in adolescents might usefully target the control beliefs underlying PBC components, most especially self-efficacy. Once an adolescent has high confidence in their ability to smoke, they are likely to do so (Maher & Rickwood, 1997). By reducing their confidence in their ability to buy and smoke cigarettes (restricting retail access, raising price), smoking behaviour may be discouraged. Having the perception that it is expensive to smoke was significantly related to staying smoke-free for both male and female students in this study. Consequently, tightening control over retail access for minors and increasing tax rates on tobacco are two practical community-level strategies which should facilitate smoke-free behaviour. Similarly, school level controls are critical to increasing smoke-free behaviour. Particularly for females in this study, aspects of the school environment, such as getting suspended or sent to the office, were strongly associated with staying smoke-free. This result clearly advocates for rigorous school smoke-free policies combined with robust enforcement. The impact of anti-smoking TV ads was more significant for males; suggesting that media campaigns which highlight the negative consequences of tobacco

marketing and tobacco cultivation in developing countries could inspire them to shun tobacco use.

Conclusions

This study was conducted to assess potential gender differences in the prediction of smoke-free intentions and behaviour using the theory of planned behavior (TPB). By identifying variables that may be important to the decision to remain smoke-free, intervention efforts to support these attributes among adolescents may be more effective. Study findings provide support for the utility of the predictor variables of the TPB; affective attitudes, subjective norms and PBC components (self-efficacy and controllability) were all significantly associated with smoke-free intentions for at least one group of adolescents in the two samples studied. Similarly, smoke-free intentions and/or PBC components significantly predicted smoke-free behaviour. Significant gender differences were found in the influence of grade level on intentions, and the importance of PBC controllability on smoke-free behaviour. One major application of the findings, given areas of divergence and of similarity with earlier studies, is the need for further research on gender differences in remaining smoke-free. A primary focus of the study was to assess gender-specific beliefs as they inform smoke-free behaviour in adolescence. It is by supporting positive salient underlying beliefs and changing those that facilitate tobacco use that susceptibility to smoking initiation can be reduced. The strength and gender differences of many of the elicited beliefs highlight their importance for practical interventions.

Footnotes

1 Subjective expected utility is a combination of the expected value of an outcome and the expected probability of it occurring. It was originally put forward by L. J. Savage in 1954.

2 Martin Fishbein developed this theory in the early to mid-1970s, to explain and predict individual attitudes towards objects and actions.

3 Bandura's social learning theory posits that people learn from one another via observation, imitation, and modeling.

4 Self-efficacy is a belief that one is capable of performing in a certain manner or attaining certain goals. Self-efficacy theory is an important component of Bandura's social cognitive theory, which suggests high inter-relation between individual behaviour, environment, and cognitive factors.

5 Cronbach's alpha measures how well a set of items (or variables) measures a single unidimensional latent construct. Cronbach's alpha will generally increase when the correlations between the items increase.

6 Richard Krueger is a program evaluation expert, and has written extensively about planning, recruiting, moderating and analyzing focus groups.

7 SHAPES generates health profiles of schools, using standard core items; it is being used for planning, evaluation, surveillance and research across Canada. This survey was originally called the School Smoking Profile.

8 A kappa statistic provides a measure of agreement that corrects for what would be expected by chance when measuring the reliability of a single survey item. Kappa scores reflect the following agreement: <0.2, poor; 0.21 to 0.4, fair; 0.41 to 0.6, moderate; 0.61 to 0.8, good; > 0.81, near perfect.

9 The probability of missing a smoke-free data point was not related to its particular value, but was dependent on other variables in the model.

10 'Fisher's z' is used for computing confidence intervals (CI) on the difference between correlations.

11 A confounding variable is an extraneous variable in a statistical or research model that should have been experimentally controlled, but was not. Failing to take a confounding variable into account can lead to a false conclusion that the dependent variables are in a causal relationship with the independent variable.

12 A moderator is a variable that affects the direction and/or strength of the relationship between an independent or predictor variable and a dependent variable.

13 A p value measures the probability that an observed effect is simply due to chance; it provides a measure of the strength of an association. It can take any value between 0 and 1. Values close to 0 indicate that the observed difference is unlikely to be due to chance, whereas a p value close to 1 suggests there is no difference between groups other than that due to random variation.

14 When it is necessary to determine whether one correlation is significantly different from another (in this case for males and females), a Fisher z' transformation of the correlation is calculated.

References

Abraham, C., & Sheeran, P. (2003). Acting on intentions: The role of anticipated regret. *British Journal of Social Psychology,* 42(4), 495-511.

Ajzen, I. (1985). From decisions to actions: A theory of planned behavior. In J. Kuhl, & J. Beckman (Eds.), *Action-control: From cognition to behavior* (pp. 11-39). New York: Springer.

Ajzen, I. (1988). *Attitudes, personality, and behavior*. Homewood, IL: Dorsey Press.

Ajzen, I. (2002). *Constructing a TpB questionnaire: Conceptual and methodological considerations.*, Retrieved September 26, 2007, from http://www.people.umass.edu/aizen/publications.html

Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behavior. Englewood Cliffs, NJ: Prentice-Hall.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes,* 50, 179-211.

Albarracin, D., Johnson, B. T., Fishbein, M., & Muellerleile, P. A. (2001). Theories of reasoned action and planned behavior as models of condom use: A meta-analysis. *Psychological Bulletin,* 127(1), 142-161.

Amos, A., & Bostock, Y. (2007). Young people, smoking and gender - a qualitative exploration. *Health Education Research,* 22(6), 770-781.

Anderson, C. B., Pollak, K. I., & Wetter, D. W. (2002). Relations between self-generated positive and negative expected smoking outcomes and smoking behavior: An exploratory study among adolescents. *Psychology of Addictive Behaviors,* 16, 196-204.

Armitage, C. J., & Conner, M. (2000). Social cognition models and health behaviour: A structured review. *Psychology and Health,* 15(2), 173-189.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology,* 40(4), 471-499.

Armitage, C. J., Conner, M., Loach, J., & Willetts, D. (1999). Different perceptions of control: Applying an extended theory of planned behaviour to legal and illegal drug use. *Basic and Applied Social Psychology,* 2(4), 301-316.

Armitage, C. J., Norman, P., & Conner, M. (2002). Can the theory of planned behaviour mediate the effects of age, gender and multi-dimensional health locus of control? *British Journal of Health Psychology,* 7, 299-316.

Bagozzi, R. P., Lee, K., & VanLoo, M. F. (2001). Decisions to donate bone marrow: The role of attitudes and subjective norms across cultures. *Psychology and Health,* 16, 29-56.

Baker, J. A., Dilly, L. J., Aupperlee, J. L., & Patil, S. A. (2003). The developmental context of school satisfaction: Schools as psychological health environments. *Social Psychology Quarterly,* 18(2), 206.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review,* 84(2), 191-215.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice Hall.

Blue, C. L. (1995). The predictive capacity of the theory of reasoned action and the theory of planned behavior in exercise research: An integrated literature review. *Research in Nursing and Health,* 18, 105-121.

Bricker, J. B., Peterson, A. V., Sarason, I. G., Andersen, M. R., & Rajan, K. B. (2007). Changes in the influence of parents' and close friends' smoking on adolescent smoking transitions. *Addictive Behaviors,* 32, 740-757.

Brown, S., & Cameron, R. (1997). *School health action planning and evaluation system (SHAPES).* Centre for Behavioural Research and Program Evaluation and Population Health Research Group, University of Waterloo, Ontario. Retrieved October 15, 2007 from http://www.shapes.uwaterloo.ca/

Cameron, R., Brown, S., Best, A., Pelkman, C., Madill, C. L., & Manske, S.R. et al. (1999). Effectiveness of a social influences smoking prevention program as a function of provider type, training method, and school risk. *American Journal of Public Health,* 89, 1827-1831.

Cameron, R., Manske, S., Lovato, C., Brown, K. S., Jolin, M. A., & Murnaghan, D. (2007). Integrating public health policy, practice, evaluation, surveillance, and

research: The school health action planning and evaluation system. *American Journal of Public Health,* 97(4), 648-654.

Chaiton, M., Cohen, J., Kaiserman, M. J., & Leatherdale, S. T. (2005). *2002 Youth smoking survey - technical report: Beliefs and attitudes.* Retrieved September 25, 2007 from <http://www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/yss-etj-2002/chap7_e.html>

Chassin, L., Molina, B. S. G., & Curran, P. J. (1994). A comparison of mechanisms underlying substance use for early adolescent children of alcoholics and controls. *J. Stud. Alcohol,* 55(3), 269-275.

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, 1189-1201.

Chassin, L. A. (1986). Changes in peer and parent influence during adolescence: Longitudinal versus cross-sectional perspectives on smoking initiation. *Developmental Psychology,* 22(3), 327-334.

Chassin, L., Corty, E., Presson, C. C., Olshavsky, R. W., Bensenberg, M., & Sherman, S. J. (1981). Predicting adolescents' intentions to smoke cigarettes. *Journal of Health and Social Behavior,* 22(4), 445-455.

Chassin, L., Presson, C. C., Sherman, S. J., Corty, E., & Olshavsky, R. W. (1984). Predicting the onset of cigarette smoking in adolescents: A longitudinal study. *Journal of Applied Social Psychology,* 14(3), 224-243.

Chen, J. (2003). *Age at diagnosis of smoking-related disease* .Vol. 14, (no. 2) Minister of Industry Canada. Statistics Canada database. Retrieved September 11, 2007 from <http://www.statcan.ca/bsolc/english/bsolc?catno=82-003-X20020026435>

Clark, W. Youth smoking in Canada. *Canadian Social Trends,* 43, 2-5. Academic Search Premier. Retrieved April 5, 2007 from http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=9706260470&loginpage=Login.asp&site=ehost-live>

Conner, M., & Armitage, Christopher J. (1998). Extending the theory of planned behaviour: A review and avenues for further research. *Journal of Applied Social Psychology,* 28, 1429-1464.

Conner, M., Norman, P., & Bell, R. (2002). The theory of planned behavior and healthy eating. *Health Psychology,* 21(2), 194-201.

Conner, M., Sandberg, T., McMillan, B., & Higgins, A. (2006). Role of anticipated regret, intentions and intention stability in adolescent smoking initiation. *British Journal of Health Psychology,* 11, 85-101.

Conrad, K. M., Flay, B. R., & Hill, D. (1992). Why children start smoking cigarettes: Predictors of onset. *British Journal of Addiction,* 87, 1711-1724.

Cooke, R., & Sheeran, P. (2004). Moderation of cognition-intention and cognition-behaviour relations: A meta-analysis of properties of variables from the theory of planned behaviour. *British Journal of Social Psychology,* 43, 159-186.

Côté, F., Godin, G., & Gagné, C. (2004). Identification of factors promoting abstinence from smoking in a cohort of elementary schoolchildren. *Preventive Medicine,* 39(4), 695-703.

Currie, Candace, Griesbach, Dawn, Dur, Wolfgang, Holstein, Bjorn, Poulsen, Lis Hentze, Kannas, Lasse, et al. (2004). *Control of adolescent smoking study (CAS).* Retrieved February 15, 2008, from http://www.hbsc.org/linkedprojects/cas.html

Davis, S., Piercy, F., Meszaros, P. S., Huebner, A., Shettler, L., & Matheson, J. (2004). Female adolescent smoking: A delphi study on best prevention practices. *Journal of Drug Education,* 34(3), 295-311.

deVries, H., Backbier, E., Kok, G., & Dijkstra, M. (1995). The impact of social influences in the context of attitude, self-efficacy, intention, and previous behavior as predictors of smoking onset. *Journal of Applied Social Psychology,* 25(3), 237-257.

deVries, H., Candel, M., Engels, R., & Mercken, L. (2006). Challenges to the peer influence paradigm: Results for 12-13 year olds from six European countries from the European Smoking Prevention Framework Approach study. *Tobacco Control,* 15, 83-89.

Dolcini, M. M., Adler, N. E., & Ginsberg, D. (1996). Factors influencing agreement between self-reports and biological measures of smoking among adolescents. *Journal of Research on Adolescents,* 6, 515-542.

Downs, D. S., & Hausenblas, H. A. (2005). Elicitation studies and the theory of planned behavior: A systematic review of exercise beliefs. *Psychology of Sport and Exercise,* 6, 1-31.

Elder, J. P., Ayala, G. X. & Harris, S. *Theories and intervention approaches to health-behavior change.* Canadian Association of Cardiac Rehabilitation: Winnipeg, Canada. Retrieved January 23, 2007 from www.cacr.ca/news/2002/0212elder.htm

Ellickson, P. L., Bird, C. E., Orlando, M., Klein, D. J., & McCaffrey, D. F. (2003). Social context and adolescent health behavior: Does school-level smoking prevalence affect students' subsequent smoking behavior? *Journal of Health and Social Behavior,* 44(4), 525-535.

Engels, R. C. M. E., Knibbe, R. A., & Drop, M. J. (1999). Predictability of smoking in adolescence: Between optimism and pessimism. *Addiction,* 94, 115-124.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research.* Reading, MA: Addison-Wesley.

Flay, B. R., Hu, F. B., Siddiqui, O., Day, L. E., & Hedeker, D. (1994). Differential influence of parental smoking and friends' smoking on adolescent initiation and escalation of smoking. *Journal of Health and Social Behavior,* 35(3), 248-265.

Garcia, K., & Mann, T. (2003). From 'I wish' to 'I will': Social-cognitive predictors of behavioral intentions. *Journal of Health Psychology,* 8(3), 347-360.

Glanz, K., Lewis, F. M., & Rimer, B. K. (Eds.). (1997). *Health behavior and health education: Theory, research and practice* (2nd ed.). San Francisco, CA: Jossey-Bass.

Godin, G., Conner, M., & Sheeran, P. (2005). Bridging the intention-behaviour 'gap': The role of moral norm. *British Journal of Social Psychology,* 44, 497-512.

Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion,* 11(2), 87-98.

Godin, G., Valois, P., Lepage, L., & and Desharnais, R. (1992). Predictors of smoking behaviour: An application of Ajzen's theory of planned behaviour. *British Journal of Addiction,* 87, 1335-1343.

Griesbach, D., Inchley, J., & Currie, C. (2002). More than words? The status and impact of smoking policies in Scottish schools. *Health Promotion International*, 17(1), 31-41.

Hagger, M. S., & Chatzisarantis, Nikos L. D. (2005). First- and higher-order models of attitudes, normative influence, and perceived behavioural control in the theory of planned behaviour. *British Journal of Social Psychology,* 44, 513-535.

Hagger, M. S., Chatzisarantis, Nikos L. D., & Biddle, Stuart J. H. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport & Exercise Psychology,* 24(1), 3-32.

Hanson, Mary Jane S. (1997). The theory of planned behavior applied to cigarette smoking in African-American, Puerto Rican, and non-Hispanic white teenage females. *Nursing Research,* 46(3), 155-162.

Hanson, Mary Jane S. (1999). Cross-cultural study of beliefs about smoking among teenaged females. *Western Journal of Nursing Research,* 21(5), 635-651.

Harakeh, M. A., Scholte, R. H. J., Vermulst, A. A., deVries, H., & Engels, Rutger C.M.E. (2004). Parental factors and adolescents' smoking behavior: An extension of the theory of planned behavior. *Preventative Medicine,* 39, 951-961.

Hardy, M. A. (1993). Regression with dummy variables. *Quantitative applications in the social sciences* (Series No. 07-093). Newbury Park, CA: Sage.

Hausenblas, H. A., Carron, A. V., & Mack, D. E. (1997). Application to the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis. *Journal of Sport & Exercise Psychology,* 19(1), 36-51.

Health Canada (2007a). *Diseases and Conditions-Cancer*. Ottawa: Health Canada. Retrieved September 11, 2007, from <http://www.hc-sc.gc.ca/dc-ma/cancer/index_e.html>

Health Canada (2007b). *Tobacco Use Statistics-Terminology.* Ottawa: Health Canada. Retrieved January 9, 2008, from http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc_term_e.html

Health Canada: Tobacco Control Programme. (2003). *Canadian Tobacco Use*

Monitoring Survey (CTUMS). Retrieved September 11, 2007, from http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc_2003_e.html

Health Canada: Tobacco Control Programme. (2005).*Youth Smoking Survey – 2002.* Retrieved September 11, 2007, from < http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/survey-sondage_2002_e.html>

Health Canada: Tobacco Control Programme. (2006a). *Canadian Tobacco Use Monitoring Survey (CTUMS).* Retrieved September 11, 2007, from < http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/ctums-esutc_2006_e.html >

Health Canada: Tobacco Control Programme. (2006b). *Youth Smoking Survey - 2004-2005.* Retrieved September 11, 2007, from < http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/survey-sondage_2004-2005_e.html >

Heart and Stroke Foundation. (2006). *Smoking Statistics.* Retrieved September 11, 2007, from

< http://ww2.heartandstroke.ca/Page.asp?PageID=27&CategoryID=5&Src=news >

Higgins, A., & Conner, M. (2003). Understanding adolescent smoking: The role of the theory of planned behaviour and implementation intentions. *Psychology, Health & Medicine,* 8(2), 173-186.

Hoffman, B., Sussman, S., Unger, J. B., & Valente, T. W. (2006). Peer influences on adolescent cigarette smoking: A theoretical review of the literature. *Substance use & Misuse,* 41, 103-155.

Janz, N. K., & Becker, M. H. (1984). The health belief model: A decade later. *Health Education Quarterly,* 11, 1-47.

Jomphe Hill, A., Boudreau, F., Amyot, E., Dery, D., & Godin, G. (1997). Predicting the stages of smoking acquisition according to the theory of planned behavior. *Journal of Adolescent Health,* 21(2), 107-115.

Joreskog, K., & Sorbom, D. (1996). *LISREL 8: User's reference guide.* Scientific Software International

Kaiserman, M. J., & McDonald, P. W. (2005). *2002 Youth smoking survey - technical report: Overview and conclusion* Tobacco Control Programme, Health Canada. Retrieved September 12, 2007 from http://www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/yss-etj-2002/chap13_e.html

Kobus, Kimberly (2003). Peer and adolescent smoking. *Addiction*, 98 (Suppl 1), 37-55.

Kumar, Revathy, O'Malley, Patrick M., & Johnston, Lloyd D. (2005). School tobacco control policies related to students' smoking and attitudes toward smoking: National survey results, 1999-2000. *Health Education & Behavior*, 32, 780-794.

Leatherdale, S. T., & Manske, S. (2005). The relationship between student smoking in the school environment and smoking onset in elementary school students. *Cancer, Epidemiology, Biomarkers & Prevention,* 14(7), 1762-1766.

Leatherdale, S. T., McDonald, P. W., Cameron, R., & Brown, K. S. (2005). A multilevel analysis examining the relationship between social influences for smoking and smoking onset. *American Journal of Health Behavior,* 29, 520-530.

Lovato, C.Y., Sabiston, C.M., Hadd, V., Nykiforuk, C.I.J., & Campbell, H.S. (2007). The impact of school smoking policies and student perceptions of enforcement on school smoking prevalence and location of smoking. *Health Education Research*, 22(6), 782-793.

Madarasová Gecková, A., Stewart, R., Van Dijk, J. P., Orosová, O., Groothoff, J. W., & Post, D. (2005). Influence of socio-economic status, parents and peers on smoking behaviour of adolescents. *European Addiction Research,* 11(4), 204-209.

Maher, R. A., & Rickwood, D. (1997). The theory of planned behavior, domain specific self-efficacy and adolescent smoking. *Journal of Child & Adolescent Substance Abuse,* 6(3), 57-76.

Makomaski Illing, E. M., & Kaiserman, M. J. (2004). Mortality attributable to tobacco use in Canada and its regions, 1998. *Canadian Journal of Public Health,* 95(1), 38.

Manske, S. R., Brown, K. S., & Cameron, A. J. (1997). School-based smoking control: A research agenda. *Cancer Prevention Control,* 1, 196-212.

Manstead, A.S.R., & Parker, D. (1995). Evaluating and extending the theory of planned behaviour. .In W. Stroebe & M. Hewstone (Eds.), *European Review of Social Psychology* (pp. 69-95). Chichester, England: Wiley.

McGahee, T. W., Kemp, V., & Tingen, M. (2000). A theoretical model for smoking prevention studies in preteen children. *Pediatric Nursing,* 26, 135.

McMillan, B., & Conner, M. (2003). Using the theory of planned behaviour to understand alcohol and tobacco use in students. *Psychology, Health & Medicine,* 8(3), 317-328.

McMillan, B., Higgins, A. R., & Conner, M. (2005). Using an extended theory of planned behaviour to understand smoking amongst schoolchildren. *Addiction Research & Theory,* 13(3), 293-306.

Meijer, B., Branski, D., Knol, K., & Kerem, E. (1996). Cigarette smoking habits among schoolchildren. *CHEST: The Cardiopulmonary and Critical Care Journal: Official Publication of the American College of Chest Physicians,* 110(4), 921-926.

Mercken, Liesbeth, Candel, Math, Willems, Paul, & deVries, Hein (2007). Disentangling social selection and social influence effects on adolescent smoking: The importance of reciprocity in friendships. *Addiction*, 102, 1483-1492.

Milton, M. H., Maule, C. O., Yee, S. L., Backinger, C., Malarcher, A. M., & Husten, C. G. (2004). *Youth tobacco cessation: A guide for making informed decisions.* Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and

Prevention. Retrieved September 12, 2007 from http://www.cdc.gov/tobacco/quit_smoking/cessation/YouthTobacco.htm

Moan, I. S., & Rise, J. Predicting smoking initiation among young adolescents using social influence factors and an extended theory of planned behaviour. *Unpublished Manuscript,* Norwegian Institute for Alcohol and Drug Research: Oslo, Norway.

Moan, I. S., & Rise, J. (2005). Quitting smoking: Applying an extended version of the theory of planned behavior to predict intention and behavior. *Journal of Applied Biobehavioral Research,* 10(1), 39-68.

Murnaghan, D. A., Blanchard, C., Rodgers, W., LaRosa, J., MacQuarrie, C., MacLellan, D., et al. (in press). The influence of student level normative, control, and behavioral beliefs on staying smoke-free: An application of Ajzen's theory of planned behavior. *Addiction, Research & Theory.*

Netemeyer, R. G., Burton, S., & Johnston, M. (1991). A comparison of two models for the prediction of volitional and goal-directed behaviors: A confirmatory analysis approach. *Social Psychology Quarterly,* 54(2), 87-100.

Noar, S. M., & Zimmerman, R. S. (2005). Health behavior theory and cumulative knowledge regarding health behaviors: Are we moving in the right direction? *Health Education Research, Theory and Practice,* 20(3), 275-290.

Norman, P., & Conner, M. (2006). The theory of planned behaviour and binge drinking: Assessing the moderating role of past behaviour within the theory of planned behaviour. *British Journal of Health Psychology,* 11, 55-70.

Norman, P., Conner, M., & Bell, R. (1999). Brief report: The theory of planned behavior and smoking cessation. *Health Psychology,* 18(1), 89-94.

Notani, A. S. (1998). Moderators of perceived behavioral control's predictiveness in the theory of planned behaviour: A meta-analysis. *Journal of Consumer Psychology,* 7(3), 247-271.

Patrick, D. L., Cheadle, A., Thompson, D. C., Diehr, P., Koepsell, T., & Kinne, S. (1994). The validity of self-reported smoking: A review and meta-analysis. *American Journal of Public Health,* 84(7), 1086-1093.

Petraitis, J., Flay, B. R., & Miller, T. Q. (1995). Reviewing theories of adolescent substance use: Organizing pieces in the puzzle. *Psychological Bulletin,* 117, 67-86.

Piontek, D., Buehler, A., Donath, C., Floeter, S., Rudolph, U., Metz, K., et al. (2008). School context variables and students' smoking: Testing a mediation model through multilevel analysis. *European Addiction Research,* 14(1), 53-60.

Poulsen, L. H., Osler, M., Roberts, C., Due, P., Damsgaard, M. T., & Holstein, B. E. (2002). Exposure to teachers smoking and adolescent smoking behaviour: Analysis of cross sectional data from Denmark. *Tobacco Control,* 11, 246-251.

Powell, Lisa M., Tauras, John A., & Ross, Hana (2005). The importance of peer effects, cigarette prices and tobacco control policies for youth smoking behavior. *Journal of Health Economics*, 24(5), 950-968.

Prince Edward Island Department of Health and Social Services. (2002). *Prince Edward Island Student Drug Survey, 2002 Highlights Report*. Charlottetown: Government of Prince Edward Island. Retrieved September 12, 2007, from <http://www.gov.pe.ca/photos/original/hss_drug_high_e.pdf>

Prochaska, J. O., & DiClemente, C. C. (1982). Transtheoretical therapy: Toward a more integrative model of change. *Psychotherapy: Theory, Research and Practice,* 19(3), 276-288.

Ragon, B. M., & Mouzon, L. T. (1999). Attitudes and beliefs of adolescents toward the use of tobacco: A 16 year follow-up. *The International Electronic Journal of Health Education,* 2(3), 120-126.

Rehm, J., Baliunas, D., Brochu, S., Fisher, B., Gnam, W., Patra, J., et al. (2006). The cost of substance abuse in Canada, 2002. Canadian Centre on Substance Abuse. Retrieved February 4, 2008 from http://www.ccsa.ca/CCSA/EN/Research/Costs_of_Substance_Abuse_in_Canada/

Rhodes, R. E., & Blanchard, C. M. (2006). Conceptual categories or operational constructs? Evaluating higher order theory of planned behavior structures in the exercise domain. *Behavioral Medicine,* 31(4), 141-150.

Rhodes, R. E., & Courneya, K. S. (2003). Investigating multiple components of attitude, subjective norm, and perceived control: An examination of the theory of planned behaviour in the exercise domain. *British Journal of Social Psychology,* 42, 129-146.

Rivis, A., & Sheeran, P. (2003a). Descriptive norms as an additional predictor in the theory of planned behaviour: A meta-analysis. *Current Psychology,* 22, 218-233.

Rivis, A., & Sheeran, P. (2003b). Social influences and the theory of planned behaviour: Evidence for a direct relationship between prototypes and young people's exercise behaviour. *Psychology & Health,* 18, 567-583.

Rogers, R. W. (1983). Cognitive and psychological processes in fear appeals and attitude change: A revised theory of protection motivation. In J. T. Cacioppo, & R. E. Petty (Eds.), *Social Psychophysiology* (pp. 153-176). New York: Guilford Press.

Rosen, C. S. (2000). Integrating stage and continuum models to explain processing of exercise messages and exercise initiation among sedentary college students. *Health Psychology,* 19(2), 172-180.

Schofield, P. E., Pattison, P. E., Hill, D. J., & Borland, R. (2001). The influence of group identification on the adoption of peer group smoking norms. *Psychology and Health,* 16, 1-16.

Sheeran, P., & Taylor, S. (1999). Predicting intentions to use condoms: A meta-analysis and comparison of the theories of reasoned action and planned behavior. *Journal of Applied Social Psychology,* 29(8), 1624-1675.

Sheppard, B. H., Hartwick, J., & Warshaw, P. R. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research,* 15(3), 325-343.

Shields, M. (2004). A step forward, a step back: Smoking cessation & relapse. *Healthy today, healthy tomorrow? Findings from the National Population Health Survey,* Catalogue 82-618 (Vol. 1, no. 1). Statistics Canada.

Single, E., Robson, L., Xie, X., & Rehm, J. (1996). *The costs of substance abuse in Canada: A cost estimation study*. Retrieved February 4, 2008 from http://www.ccsa.ca/NR/rdonlyres/A6B92C8C-4EFB-42DD-8AE2-566B602C2B61/0/ccsa0062771996.pdf

Smith, B. N., Bean, M. K., Mitchell, K. S., Speizer, I. S., & Fries, Elizabeth A. (2007). Psychosocial factors associated with non-smoking adolescent's intentions to smoke. *Health Education Research,* 22(2), 238-247.

Smith, B. N., & Stasson, M. F. (2000). A comparison of health behavior constructs: Social psychological predictors of AIDS-preventive behavioral intentions. *Journal of Applied Social Psychology,* 30(3), 443-462.

Smith, P., Begley, L., O'Loughlin, J. L., & Snider, J. (2005). *2002 Youth smoking survey - technical report: Smoking behaviour*. Retrieved September 12, 2007 from http://www.hc-sc.gc.ca/hl-vs/pubs/tobac-tabac/yss-etj-2002/chap3_e.html

Spijkerman, R., van den Eijnden, Regina J.J.M., Vitale, S., & Engels, R. C. M. E. (2004). Explaining adolescents' smoking and drinking behavior: The concept of smoker and drinker prototypes in relation to variables of the theory of planned behavior. *Addictive Behaviors,* 29(8), 1615-1622.

SPSS Inc. (1996). *SPSS 11.5 for windows.*, 2007, from http://www.spss.com/spss/

Statistics Canada. (2006). *Healthy Canadians: A federal report on comparable health indicators 2006.* Retrieved June 21, 2007, from http://www.hc-sc.gc.ca/hcs-sss/pubs/system-regime/2006-fed-comp-indicat/2006-fed-comp-indicat-3_e.html#1

Sussman, S. (2002). Tobacco industry youth tobacco prevention programming: A review. *Prevention Science,* 3(1), 57-67.

Tabachnick, B. G., & Fidell, L. S. (1998). *Using multivariate statistics* (4th ed.). Toronto, ON: Allyn & Bacon.

Trafimow, D., Sheeran, P., Conner, M., & Finlay, K. A. (2002). Evidence that perceived behavioural control is a multidimensional construct: Perceived control and perceived difficulty. *British Journal of Social Psychology,* 41, 101-121.

Tucker, J. S., Ellickson, P. L., & Klein, D. J. (2003/4). Predictors of the transition to regular smoking during adolescence and young adulthood. *Journal of Adolescent Health,* 32(4), 314-324.

Tyas, S. L., & Pederson, L. L. (1998). Psychosocial factors related to adolescent smoking: A critical review of the literature. *Tobacco Control,* 7(4), 409-420.

van den Eijnden, Regina J.J.M., Spijkerman, R., & Engels, R. C. M. E. (2006). Relative contribution of smoker prototypes in predicting smoking among adolescents: A comparison with factors from the theory of planned behavior. *European Addiction Research,* 12, 113-120.

Van Til, L. (2006). *Prince Edward Island health indicators.* Prince Edward Island Department of Health. Retrieved September 11, 2007 from http://www.gov.pe.ca/photos/original/peindicators.pdf

Wakefield, M., Kloska, D. D., O'Malley, P. M., Johnston, L. D., Chaloupka, F., Pierce, J., et al. (2004). The role of smoking intentions in predicting future smoking among youth: Findings from monitoring the future data. *Addiction,* 99, 914-922.

Wang, M. Q., Fitzhugh, E. C., Turner, L., & Fu, Q. (1997). Social influence on southern adolescents' smoking transition: A retrospective study. *Southern Medical Journal,* 90(2), 218-222.

Weinstein, N. D. (1993). Testing four competing theories of health-protective behavior. *Health Psychology,* 12(4), 324-333.

Wiium, N., Breivik, K., & and Wold, B. (2006). The relationship between smoker role models and intentions to smoke among adolescents. *Journal of Youth and Adolescence,* 35(4), 551-562.

Wiium, N., & Wold, B. (2006). Family and school influences on adolescent smoking behaviour. *Health Education,* 106(6), 465-479.

Wilkinson, D., & Abraham, C. (2004). Constructing an integrated model of the antecedents of adolescent smoking. *British Journal of Health Psychology,* 9, 315-333.

World Health Organization. (2002). *The world health report 2002: Reducing risks, promoting health life*. 1-167. Retrieved September 27, 2007 from http://www.who.int/whr/2002/en/

World Health Organization. (2003). *WHO framework convention on tobacco control.* Retrieved February 15, 2008, from http://www.who.int/tobacco/resources/publications/fctc/en/index.html

Comprehensive School Health Research Project

Health Behaviour Survey Instructions

Please Do Not Put Your Name on the Survey

Please tell us what you think about:

- eating 5 servings of fruits and vegetables each day
- participating in regular physical activity
- being smoke free during the next 4 weeks

IMPORTANT

Please read the information below before you answer the questions about fruits and vegetables.

One serving of fruit is equal to:

- 1 medium piece of fruit (1 apple, 1 banana)
- 1 fruit cup
- 1/4 cup raisins (1 box of raisins) or other dried fruit
- ½ cup of real orange or apple juice

One serving of vegetable is equal to:

- 1 medium carrot or other raw vegetable
- 1 medium potato
- 1 small bowl of salad
- ½ cup of cooked vegetables such as mashed potatoes or carrots
- 3/4 cup of vegetable soup

IMPORTANT

Please read the definitions below before you answer the questions about regular physical activity.

Regular physical activity is defined as

1) 30 minutes of activity **everyday** that would make you sweat and breathe hard so it is difficult to talk. These activities might be basketball, soccer, running, or similar aerobic activities.

AND

2) 60 minutes of activities **everyday**. The activity would **not** make you sweat or breathe hard. These activities might be slow walking, slow biking, skating leisurely, or other similar activities.

Please Do Not Put Your Name on the Survey

1: To answer questions 1 to 3 please circle a number between 1 & 7 using the scale below.

	Extremely Unenjoyable						Extremely Enjoyable
(1) During the next 4 weeks, for me to eat 5 servings of fruits and vegetables each day will be…	1	2	3	4	5	6	7
(2) During the next 4 weeks, for me to be smoke-free will be…	1	2	3	4	5	6	7
(3) During the next 4 weeks, for me to participate in regular physical activity will be…	1	2	3	4	5	6	7

2: To answer questions 4 to 6 please circle a number between 1 & 7 using the scale below.

	Extremely Good						Extremely Bad
(4) During the next 4 weeks, for me to eat 5 servings of fruits and vegetables each day will be…	1	2	3	4	5	6	7
(5) During the next 4 weeks, for me to be smoke-free will be…	1	2	3	4	5	6	7
(6) During the next 4 weeks, for me to participate in regular physical activity will be…	1	2	3	4	5	6	7

3: To answer questions 7 to 9 please circle a number between 1 & 7 using the scale below.

	Strongly Disagree						Strongly Agree
(7) During the next 4 weeks, most people important to me (family, friends, etc…) think I should eat 5 servings of fruits and vegetables each day…	1	2	3	4	5	6	7
(8) During the next 4 weeks, most people important to me (family, friends, etc…) think I should be smoke-free…	1	2	3	4	5	6	7
(9) During the next 4 weeks, most people important to me (family, friends, etc…) think I should participate in regular physical activity…	1	2	3	4	5	6	7

4: To answer questions 10 to 12 please circle a number between 1 & 7 using the scale below.

	Extremely Not Confident						Extremely Confident
(10) During the next four weeks, how confident am I that I can eat 5 servings of fruits and vegetables each day…	1	2	3	4	5	6	7
(11) During the next 4 weeks, how confident am I that I can be smoke free…	1	2	3	4	5	6	7
(12) During the next 4 weeks, how confident am I that I can participate in regular activity…	1	2	3	4	5	6	7

5: To answer questions 13 to 15 please circle a number between 1 & 7 using the scale below.

	Strongly Disagree						Strongly Agree
(13) During the next 4 weeks, it is completely up to me whether or not I eat 5 servings of fruits and vegetables each day…	1	2	3	4	5	6	7
(14) During the next 4 weeks, it is completely up to me whether or not I will be smoke free…	1	2	3	4	5	6	7
(15) During the next 4 weeks, it is completely up to me whether or not I participate in regular physical activity…	1	2	3	4	5	6	7

6: To answer questions 16 to 18 please circle a number between 1 & 7 using the scale below.

	Strongly Disagree						Strongly Agree
(16) During the next 4 weeks, I intend to eat 5 servings of fruits and vegetables each day…	1	2	3	4	5	6	7
(17) During the next 4 weeks, I intend to be smoke free…	1	2	3	4	5	6	7
(18) During the next 4 weeks, I intend to participate in regular physical activity…	1	2	3	4	5	6	7

7: For questions 19 to 21 please insert a number from 0 to 7 in the blank.

(19) During the next 4 weeks, I intend to eat 5 servings of fruits and vegetables on (insert a number from 0 to 7) _____days per week

(20) During the next 4 weeks, I intend to be smoke free insert a number from 0 to 7) _____days per week

(21) During the next 4 weeks, I intend to participate in regular physical activity at least (insert a number from 0 to 7) _____days per week

---

8: To answer questions 22 to 26 please circle a number between 1 & 7 using the scale below.

The following people think I should participate in regular physical activity during the next 4 weeks.

	Strongly Disagree						Strongly Agree	
(22) my brother or sister	1	2	3	4	5	6	7	Does not apply
(23) my friends	1	2	3	4	5	6	7	
(24) my parents/guardians	1	2	3	4	5	6	7	
(25) my coaches	1	2	3	4	5	6	7	Does not apply
(26) my gym teacher	1	2	3	4	5	6	7	

9: To answer questions 27 to 32 please circle a number between 1 & 7 using the scale below.

If I was to participate in regular physical activity over the next 4 weeks, I would…

	Strongly Disagree						Strongly Agree
(27) feel better	1	2	3	4	5	6	7
(28) have more energy	1	2	3	4	5	6	7
(29) control my weight	1	2	3	4	5	6	7
(30) be more healthy	1	2	3	4	5	6	7
(31) keep in shape	1	2	3	4	5	6	7
(32) be more awake	1	2	3	4	5	6	7

10: To answer questions 33 to 38 please circle a number between 1 & 7 using the scale below.

Would it be more easy or more difficult for you to participate in regular physical activity during the next 4 weeks if…

	Extremely Easy						Extremely Difficult
(33) you have homework to do	1	2	3	4	5	6	7
(34) the weather is bad (cold, rainy)	1	2	3	4	5	6	7
(35) you don't have access to exercise equipment (balls, bats, weights) or you don't have access to exercise space (gym, field, pool)	1	2	3	4	5	6	7
(36) you want to play on the computer	1	2	3	4	5	6	7
(37) you are concerned that other people will see you exercising	1	2	3	4	5	6	7
(38) you want to watch TV	1	2	3	4	5	6	7

11: To answer questions 39 to 42 please circle a number between 1 & 7 using the scale below.

The following people think I should be smoke free during the next 4 weeks.

	Strongly Disagree						Strongly Agree	
(39) my parents/guardians	1	2	3	4	5	6	7	
(40) my friends	1	2	3	4	5	6	7	
(41) my brother or sister	1	2	3	4	5	6	7	Does not apply
(42) my teacher	1	2	3	4	5	6	7	

12: To answer questions 43 to 48 please circle a number between 1 & 7 using the scale below.

Being smoke free during the next 4 weeks will…

	Strongly Disagree						Strongly Agree
(43) prevent me from getting yellow teeth & fingers	1	2	3	4	5	6	7
(44) help me achieve better health	1	2	3	4	5	6	7

	Strongly Disagree						Strongly Agree
(45) let me continue to play sports to the best of my capabilities	1	2	3	4	5	6	7
(46) prevent me from getting really gross urges	1	2	3	4	5	6	7
(47) make it easier for me to make new friends	1	2	3	4	5	6	7
(48) allow me to be more physically active	1	2	3	4	5	6	7

Please skip question 13 if you do not smoke.

13: To answer questions 49 to 54 please circle a number between 1 & 7 using the scale below.

Would it be more easy or more difficult for you to be smoke free during the next 4 weeks if…

	Extremely Easy						Extremely Difficult
(49) you think smoking looks gross	1	2	3	4	5	6	7
(50) you get suspended if you are caught smoking	1	2	3	4	5	6	7
(51) you get sent to the office if you are caught smoking	1	2	3	4	5	6	7
(52) you are not allowed to smoke on school property	1	2	3	4	5	6	7
(53) it is expensive to smoke	1	2	3	4	5	6	7
(54) you see anti-smoking TV commercials	1	2	3	4	5	6	7

14: To answer questions 55 to 58 please circle a number between 1 & 7 using the scale below.

The following people think I should eat five servings of fruits and vegetables each day during the next 4 weeks…

	Strongly Disagree						Strongly Agree	
(55) my parents/guardians	1	2	3	4	5	6	7	
(56) my friends	1	2	3	4	5	6	7	
(57) my brothers or sisters	1	2	3	4	5	6	7	Does not apply
(58) my teacher	1	2	3	4	5	6	7	

15: To answer questions 59 to 64 please circle a number between 1 & 7 using the scale below.

If I was to eat a total of 5 servings of fruits and vegetables each day for the next 4 weeks, I would...

	Strongly Disagree						Strongly Agree
(59) have more energy	1	2	3	4	5	6	7
(60) play sports better	1	2	3	4	5	6	7
(61) not get sick	1	2	3	4	5	6	7
(62) lose or maintain my weight	1	2	3	4	5	6	7
(63) feel better	1	2	3	4	5	6	7
(64) look better	1	2	3	4	5	6	7

16: To answer questions 65 to 71 please circle a number between 1 & 7 using the scale below.

Would it be more easy or more difficult for you to eat a total of 5 servings of fruits and vegetables each day for the next 4 weeks if...

	Extremely easy						Extremely Difficult
(65) TV commercials such as McDonald's or Wendy's make me crave fast food...	1	2	3	4	5	6	7
(66) Fruits and vegetables take too long to prepare, not quick like junk food	1	2	3	4	5	6	7
(67) fruits and vegetables are not available at home	1	2	3	4	5	6	7
(68) I go to fast food restaurants at lunch time	1	2	3	4	5	6	7
(69) fruits and vegetables are expensive	1	2	3	4	5	6	7
(70) the high school cafeteria or canteen does not have fruit and vegetable choices that I like	1	2	3	4	5	6	7
(71) I get made fun of for eating fruits and vegetables...	1	2	3	4	5	6	7

Comprehensive School Health Research Project
Health Behaviour Survey

Please Do Not Put Your Name on the Survey

General Questions: Please Circle Answer

1. How old are you?
   A. 12 years old or younger
   B. 13 years old
   C. 14 years old
   D. 15 years old
   E. 16 years old

2. What is your sex?
   A. Female
   B. Male

3. In what grade are you?
   A. Grade 7
   B. Grade 8
   C. Grade 9

4. How do you describe yourself?
   A. Aboriginal
   B. Asian
   C. Black or African American
   D. Hispanic
   E. White or Caucasian
   F. Other

5. During this school year, how would you describe your grades in school?
   A. 90% and above
   B. 80% - 89%
   C. 70% - 79%
   D. 60% - 69%
   E. 50% - 59%
   F. 49% and below

6. Have you ever tried cigarette smoking, even one or two puffs?
   A. Yes
   B. No

7. During the past 30 days, on how many days did you smoke cigarettes?
   A. 0 days
   B. 1 or 2 days
   C. 3 to 5 days
   D. 6 to 9 days
   E. 10 to 19 days

F. 20 to 29 days
G. All 30 days

8. During the past 7 days, how many times did you drink 100% fruit juices such as orange juice, apple juice, or grape juice? (Do not include punch, Kool-Aid, sports drinks, or other fruit-flavoured drinks.)
   A. I did not drink 100% fruit juice during the past 7 days
   B. 1 to 3 times during the past 7 days
   C. 4 to 6 times during the past 7 days
   D. 1 time per day
   E. 2 times per day
   F. 3 times per day
   G. 4 or more times per day

9. During the past 7 days, how many times did you eat fruit? (Do not count fruit juice.)
   A. I did not eat fruit during the past 7 days
   B. 1 to 3 times during the past 7 days
   C. 4 to 6 times during the past 7 days
   D. 1 time per day
   E. 2 times per day
   F. 3 times per day
   G. 4 or more times per day

10. During the past 7 days, how many times did you eat green salad?
   A. I did not eat green salad during the past 7 days
   B. 1 to 3 times during the past 7 days
   C. 4 to 6 times during the past 7 days
   D. 1 time per day
   E. 2 times per day
   F. 3 times per day
   G. 4 or more times per day

11. During the past 7 days, how many times did you eat potatoes? (Do not count french fries, fried potatoes or potato chips.)
   A. I did not eat potatoes during the past 7 days
   B. 1 to 3 times during the past 7 days
   C. 4 to 6 times during the past 7 days
   D. 1 time per day
   E. 2 times per day
   F. 3 times per day
   G. 4 or more times per day

12. During the past 7 days, how many times did you eat carrots?
   A. I did not eat carrots during the past 7 days
   B. 1 to 3 times during the past 7 days
   C. 4 to 6 times during the past 7 days
   D. 1 time per day
   E. 2 times per day
   F. 3 times per day
   G. 4 times or more per day

13. During the past 7 days, how many times did you eat other vegetables? (Do not count green salad, potatoes, or carrots.)

A. I did not eat other vegetables during the past 7 days
B. 1 to 3 times during the past 7 days
C. 4 to 6 times during the past 7 days
D. 1 time per day
E. 2 times per day
F. 3 times per day
G. 4 or more times per day

14. Compared to your fruit and vegetable consumption over the past 30 days was last week's fruit and vegetable consumption?

A. more
B. less
C. the same

15. On how many of the past 7 days did you exercise or participate in physical activity for at least 30 minutes that made you sweat and breathe hard, such as basketball, soccer, running, swimming laps, fast bicycling, fast dancing, or similar aerobic activities?

A. 0 days
B. 1 day
C. 2 days
D. 3 days
E. 4 days
F. 5 days
G. 6 days
H 7 days

16. On how many of the past 7 days did you participate in physical activity for at least 60 minutes that did not make you sweat or breathe hard, such as fast walking, slow bicycling, skating, pushing a lawnmower, or mopping floors?

A. 0 days
B. 1 day
C. 2 days
D. 3 days
E. 4 days
F. 5 days
G. 6 days
H. 7 days

17. Compared to your physical activity over the past 30 days, was last week's physical activity?

A. more
B. less
C. the same

Comprehensive School Health Research Project

Health Behaviour Survey Instructions

Please do not put your name on the survey

Please tell us what you think about:

- eating 5 servings of fruits and vegetables each day
- participating in regular physical activity
- being smoke free during the next 4 weeks

IMPORTANT
Please read the information below before you answer the questions about fruits and vegetables.

One serving of fruit is equal to:

- 1 medium piece of fruit (1 apple, 1 banana)
- 1 fruit cup
- 1/4 cup raisins (1 box of raisins) or other dried fruit
- ½ cup of real orange or apple juice

One serving of vegetable is equal to:

- 1 medium carrot or other raw vegetable
- 1 medium potato
- 1 small bowl of salad
- ½ cup of cooked vegetables such as mashed potatoes or carrots
- 3/4 cup of vegetable soup

IMPORTANT
Please read the definitions below before you answer the questions about regular physical activity.

Regular physical activity is defined as

1) 30 minutes of activity **everyday** that would make you sweat and breathe hard so it is difficult to talk. These activities might be basketball, soccer, running, or similar aerobic activities.

AND

2) 60 minutes of activities **everyday**. The activity would **not** make you sweat or breathe hard. These activities might be slow walking, slow biking, skating leisurely, or other similar activities.

Health Behaviour Survey

Please Do Not Put Your Name on the Survey

1. How old are you?

   A. 12 years old or younger

   B. 13 years old

   C. 14 years old

   D. 15 years old

   E. 16 years old

2. What is your sex?

   A. Female

   B. Male

3. In what grade are you?

   A. Grade 7

   B. Grade 8

   C. Grade 9

4. How do you describe yourself?
(Select one or more responses.)

   A. Aboriginal

   B. Asian

   C. Black or African American

   D. Hispanic or Latino

   E. White or Caucasian

   F. Other

5. During the past 12 months, how would you describe your grades in school?

   A. Mostly 90% and above

   B. Mostly 80% - 89%

C. Mostly 70% - 79%

D. Mostly 60% - 69%

E. Mostly 50% - 59%

F. Mostly 49% and below

G. Not sure

The next 12 questions ask you about tobacco use.

6. Have you ever tried cigarette smoking, even one or two puffs?

A. Yes

B. No

7. How old were you when you smoked a whole cigarette for the first time?

A. I have never smoked a whole cigarette

B. 8 years old or younger

C. 9 or 10 years old

D. 11 or 12 years old

E. 13 or 14 years old

F. 15 or 16 years old

G. 17 years old or older

8. During the past 30 days, on how many days did you smoke cigarettes?

A. 0 days

B. 1 or 2 days

C. 3 to 5 days

D. 6 to 9 days

E. 10 to 19 days

F. 20 to 29 days

G. All 30 days

9. During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?

A. I did not smoke cigarettes during the past 30 days

B. Less than 1 cigarette per day

C. 1 cigarette per day

D. 2 to 5 cigarettes per day

E. 6 to 10 cigarettes per day

F. 11 to 20 cigarettes per day

G. More than 20 cigarettes per day

10. During the past 30 days, how did you usually get your own cigarettes? (Select only one response.)

A. I did not smoke cigarettes during the past 30 days

B. I bought them in a store such as a convenience store, supermarket, discount store, or gas station

C. I bought them from a vending machine

D. I gave someone else money to buy them for me

E. I borrowed (or bummed) them from someone else

F. A person 19 years old or older gave them to me

G. I took them from a store or family member

H. I got them some other way

11. During the past 30 days, on how many days did you smoke cigarettes on school property?

A. 0 days

B. 1 or 2 days

C. 3 to 5 days

D. 6 to 9 days

E. 10 to 19 days

F. 20 to 29 days

G. All 30 days

12. Have you ever smoked cigarettes daily, that is, at least one cigarette every day for 30 days?

A. Yes

B. No

13. During the past 12 months, did you ever try to quit smoking cigarettes?

A. I did not smoke during the past 12 months

B. Yes

C. No

14. During the past 30 days, on how many days did you use chewing tobacco, snuff, or dip, such as Redman, Levi Garrett, Beechnut, Skoal, Skoal Bandits, or Copenhagen?

A. 0 days

B. 1 or 2 days

C. 3 to 5 days

D. 6 to 9 days

E. 10 to 19 days

F. 20 to 29 days

G. All 30 days

15. During the past 30 days, on how many days did you use chewing tobacco, snuff, or dip on school property?

A. 0 days

B. 1 or 2 days

C. 3 to 5 days

D. 6 to 9 days

E. 10 to 19 days

F. 20 to 29 days

G. All 30 days

16. During the past 30 days, on how many days did you smoke cigars, cigarillos, or little cigars?

A. 0 days

B. 1 or 2 days

C. 3 to 5 days

D. 6 to 9 days

E. 10 to 19 days

F. 20 to 29 days

G. All 30 days

17. On how many days in the past 30 days were you smoke free? Place a number between 0 and 30 in the blank.

_____ days

The next 9 questions ask about food you ate or drank.

Think about all the meals and snacks you had from the time you got up until you went to bed. Be sure to include food you ate at home, at school, at restaurants, or anywhere else.

18. During the past 7 days, how many times did you drink 100% fruit juices such as orange juice, apple juice, or grape juice?
(Do not count punch, Kool-Aid, sports drinks, or other fruit-flavored drinks.)

A. I did not drink 100% fruit juice during the past 7 days

B. 1 to 3 times during the past 7 days

C. 4 to 6 times during the past 7 days

D. 1 time per day

E. 2 times per day

F. 3 times per day

G. 4 or more times per day

19. During the past 7 days, how many times did you eat fruit?
(Do not count fruit juice.)

A. I did not eat fruit during the past 7 days

B. 1 to 3 times during the past 7 days

C. 4 to 6 times during the past 7 days

D. 1 time per day

E. 2 times per day

F. 3 times per day

G. 4 or more times per day

20. During the past 7 days, how many times did you eat green salad?

A. I did not eat green salad during the past 7 days

B. 1 to 3 times during the past 7 days

C. 4 to 6 times during the past 7 days

D. 1 time per day

E. 2 times per day

F. 3 times per day

G. 4 or more times per day

21. During the past 7 days, how many times did you eat potatoes?
(Do not count french fries, fried potatoes, or potato chips.)

A. I did not eat potatoes during the past 7 days

B. 1 to 3 times during the past 7 days

C. 4 to 6 times during the past 7 days

D. 1 time per day

E. 2 times per day

F. 3 times per day

G. 4 or more times per day

22. During the past 7 days, how many times did you eat carrots?

A. I did not eat carrots during the past 7 days

B. 1 to 3 times during the past 7 days

C. 4 to 6 times during the past 7 days

D. 1 time per day

E. 2 times per day

F. 3 times per day

G. 4 or more times per day

23. During the past 7 days, how many times did you eat other vegetables?
(Do not count green salad, potatoes, or carrots.)

A. I did not eat other vegetables during the past 7 days

B. 1 to 3 times during the past 7 days

C. 4 to 6 times during the past 7 days

D. 1 time per day

E. 2 times per day

F. 3 times per day

G. 4 or more times per day

24. During the past 7 days, how many glasses of milk did you drink?
(Include the milk you drank in a glass or cup, from a carton, or with cereal. Count the half pint of milk served at school as equal to one glass.)

A. I did not drink milk during the past 7 days

B. 1 to 3 glasses during the past 7 days

C. 4 to 6 glasses during the past 7 days

D. 1 glass per day

E. 2 glasses per day

F. 3 glasses per day

G. 4 or more glasses per day

25. During the last 30 days, I ate at least 5 servings of fruits and vegetables on (insert a number between 0 and 30) ____ days.

26. Compared to your fruit and vegetable consumption over the past 30 days was last week's fruit and vegetable consumption?

A. more

B. less

C. the same

The next 10 questions ask about physical activity.

27. On how many of the past 7 days did you exercise or participate in physical activity for at least 30 minutes that made you sweat and breathe hard, such as basketball, soccer, running, swimming laps, fast bicycling, fast dancing, or similar aerobic activities?

A. 0 days

B. 1 day

C. 2 days

D. 3 days

E. 4 days

F. 5 days

G. 6 days

H. 7 days

28. On how many of the past 7 days did you participate in physical activity for at least 60 minutes that did not make you sweat or breathe hard, such as fast walking, slow bicycling, skating, pushing a lawn mower, or mopping floors?

A. 0 days

B. 1 day

C. 2 days

D. 3 days

E. 4 days

F. 5 days

G. 6 days

H. 7 days

29. On how many of the past 7 days did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting?

A. 0 days

B. 1 day

C. 2 days

D. 3 days

E. 4 days

F. 5 days

G. 6 days

H. 7 days

30. On an average school day, how many hours do you watch TV?

A. I do not watch TV on an average school day

B. Less than 1 hour per day

C. 1 hour per day

D. 2 hours per day

E. 3 hours per day

F. 4 hours per day

G. 5 or more hours per day

31. In an average week when you are in school, on how many days do you go to physical education (PE) classes?

A. 0 days

B. 1 day

C. 2 days

D. 3 days

E. 4 days

F. 5 days

32. During an average physical education (PE) class, how many minutes do you spend actually exercising or playing sports?

A. I do not take PE

B. Less than 10 minutes

C. 10 to 20 minutes

D. 21 to 30 minutes

E. 31 to 40 minutes

F. 41 to 50 minutes

G. 51 to 60 minutes

H. More than 60 minutes

33. During the past 12 months, on how many sports teams did you play?
(Include any teams run by your school or community groups.)

A. 0 teams

B. 1 team

C. 2 teams

D. 3 or more teams

34. On how many days in the past 7 days did you participate in moderate physical activity for 60 minutes a day? Moderate physical activity does not make you sweat or breathe hard. For example slow biking or pushing a lawn mower.

Place a number between 0 and 7 in the blank.

_____ days

35. On how many days in the past 7 days did you participate in vigorous physical activity for 30 minutes a day? Vigorous physical activity makes you sweat or breathe hard. For example playing soccer or running.

Place a number between 0 and 7 in the blank.

_____ days

36. Compared to your physical activity over the past 30 days, was last week's physical activity?

A. more

B. less

C. the same

Appendix C

Comprehensive School Health Research Project

Smoke Free Survey

Please Do Not Put Your Name on the Survey

1: To answer question 1 please circle a number between 1 & 7 using the scale below.

	Extremely Unenjoyable						Extremely Enjoyable
(1) During the next 4 weeks for me to be smoke free will be	1	2	3	4	5	6	7

2: To answer question 2 please circle a number between 1 & 7 using the scale below.

	Extremely Good						Extremely Bad
(2) During the next 4 weeks for me to be smoke free will be	1	2	3	4	5	6	7

3: To answer question 3 please circle a number between 1 & 7 using the scale below.

	Strongly Disagree						Strongly Agree
(3) During the next 4 weeks, most people important to me think I should be smoke free	1	2	3	4	5	6	7

4: To answer question 4 please circle a number between 1 & 7 using the scale below.

	Extremely Not Confident						Extremely Confident
(4) During the next 4 weeks, how confident am I that I can not smoke	1	2	3	4	5	6	7

5: To answer question 5 please circle a number between 1 & 7 using the scale below.

	Strongly Disagree						Strongly Agree
(5) During the next 4 weeks, it is completely up to me whether or not I will be smoke free	1	2	3	4	5	6	7

6: To answer question 6 please circle a number between 1 & 7 using the scale below.

	Strongly Disagree						Strongly Agree
(6) During the next 4 weeks, I intend to be smoke free	1	2	3	4	5	6	7

7: For question 7 please insert a number from 0 to7 in the blank.

(7) During the next 4 weeks, I intend to be smoke free (insert a number from 0 to 7) _____ days per week

---

8: To answer questions 8 to 14 please circle a number between 1 & 7 using the scale below.

Each of the following people think I should be smoke free during the next 4 weeks.

	Strongly Disagree						Strongly Agree	
(8) my parents/guardians	1	2	3	4	5	6	7	
(9) my brother or sister	1	2	3	4	5	6	7	Does not Apply
(10) my 5 closest friends	1	2	3	4	5	6	7	
(11) the other friends I hang out with (excluding my 5 closest friends)	1	2	3	4	5	6	7	
(12) the kids in my school that I want to be friends with	1	2	3	4	5	6	7	
(13) my teacher	1	2	3	4	5	6	7	
(14) tobacco companies	1	2	3	4	5	6	7	

9: To answer questions 15 to 20 please circle a number between 1 & 7 using the scale below.

Being smoke free during the next 4 weeks will…

	Strongly Disagree						Strongly Agree
(15) prevent me from getting yellow teeth & fingers	1	2	3	4	5	6	7
(16) help me achieve better health	1	2	3	4	5	6	7
(17) let me continue to play sports to the best of my capabilities	1	2	3	4	5	6	7
(18) prevent me from getting really gross lungs	1	2	3	4	5	6	7
(19) make it easier for me to make new friends	1	2	3	4	5	6	7
(20) allow me to be more physically active	1	2	3	4	5	6	7

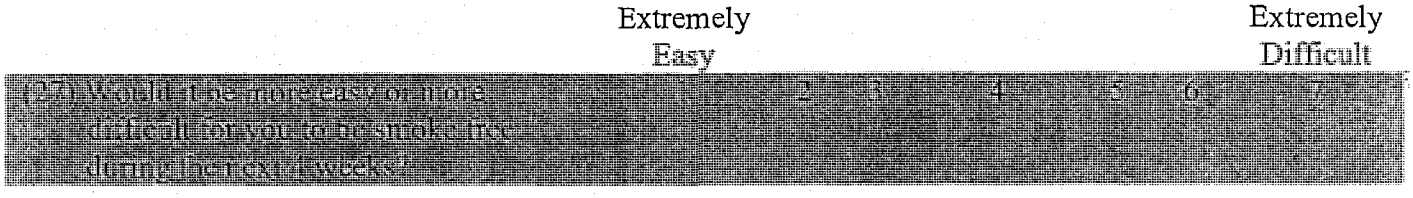
Please skip question 10 if you do not smoke.

10: To answer questions 21 to 26 please circle a number between 1 & 7 using the scale below.

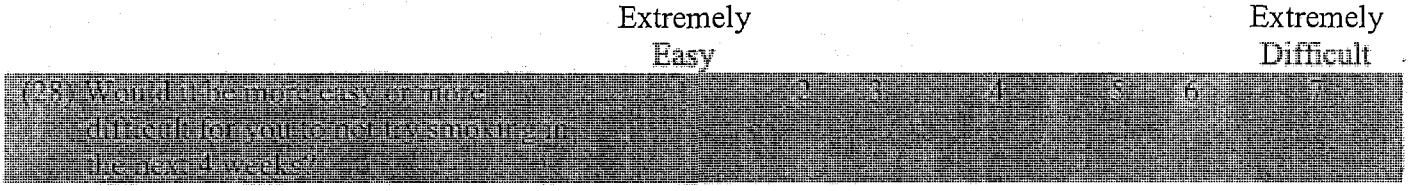
Would it be more easy or more difficult for you to be smoke free during the next 4 weeks if…

	Extremely easy						Extremely Difficult
(21) you think smoking looks gross	1	2	3	4	5	6	7
(22) you get suspended if you are caught smoking	1	2	3	4	5	6	7
(23) you get sent to the office if you are caught smoking	1	2	3	4	5	6	7
(24) you are not allowed to smoke on school property	1	2	3	4	5	6	7
(25) it is expensive to smoke	1	2	3	4	5	6	7
(26) you see an anti-smoking commercial	1	2	3	4	5	6	7

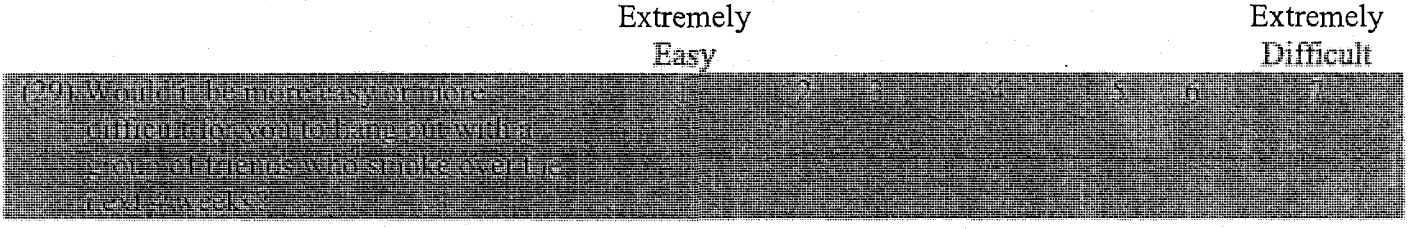
11: To answer question 27 please circle a number between 1 & 7 using the scale below.



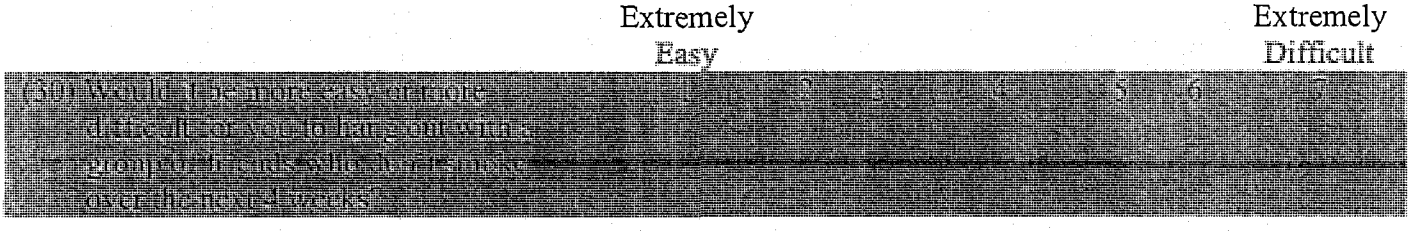
12: To answer question 28 please circle a number between 1 & 7 using the scale below.



13: To answer question 29 please circle a number between 1 & 7 using the scale below.



14: To answer question 30 please circle a number between 1 & 7 using the scale below.



15: To answer questions 31 to 34 please circle a number between 1 & 7 using the scale below.

During the next 4 weeks if one of my friends was thinking about trying smoking, I would…

	Strongly Disagree						Strongly Agree
(31) talk to them	1	2	3	4	5	6	7
(32) feel uncomfortable around them	1	2	3	4	5	6	7
(33) have enough information to talk to them about it	1	2	3	4	5	6	7
(34) not feel it's my place to talk it's their own decision	1	2	3	4	5	6	7

16: To answer questions 35 to 40 please circle a number between 1 & 7 using the scale below.

If I was thinking about trying smoking, I would…

	Strongly Disagree						Strongly Agree
(35) talk it over with my friends who use tobacco	1	2	3	4	5	6	7
(36) talk it over with my friends who do not use tobacco	1	2	3	4	5	6	7
(37) talk it over with my brothers or sisters or cousins who use tobacco	1	2	3	4	5	6	7
(38) talk it over with my brothers or sisters or cousins who do not use tobacco	1	2	3	4	5	6	7
(39) talk it over with an adult (teacher, coach, parent) who uses tobacco	1	2	3	4	5	6	7
(40) talk it over with an adult (teacher, coach, parent) who does not use tobacco	1	2	3	4	5	6	7

Comprehensive School Health Research Project
Smoke Free Survey

Please Do Not Put Your Name on the Survey

General Questions: Please Circle Answer

1. How old are you?
   A. 12 years old or younger
   B. 13 years old
   C. 14 years old
   D. 15 years old
   E. 16 years old

2. What is your sex?
   A. Female
   B. Male

3. In what grade are you?
   A. Grade 7
   B. Grade 8
   C. Grade 9

4. How would you describe yourself?
   A. Aboriginal
   B. Asian
   C. Black or African American
   D. Hispanic
   E. White or Caucasian
   F. Other

5. During this school year, how would you describe your grades in school?
   A. 90% and above
   B. 80% - 89%
   C. 70% - 79%
   D. 60% - 69%
   E. 50% - 59%
   F. 49% and below

6. Are you a smoker?
   A. Yes
   B. No

7. Have you ever smoked a cigarette even just a few puffs?
   A. Yes
   B. No

8. Have you ever smoked a whole cigarette?
   A. Yes
   B. No
   C. I have never smoked

9. Have you smoked 100 or more whole cigarettes in your life?
   A. Yes
   B. No
   C. I have never smoked

10. Think about the last 30 days. Did you smoke a cigarette, even just a few puffs?
   A. Every day
   B. Almost every day
   C. Some days
   D. 1 or 2 days
   E. Not at all

11. Think about the last 30 days. Choose the answer that best describes you.
   A. I did not smoke at all
   B. I smoked a few puffs a day
   C. I smoked 1-2 cigarettes a day
   D. I smoked 3-5 cigarettes a day
   E. I smoked 6-10 cigarettes a day
   F. I smoked 11-19 cigarettes a day
   G. I smoked 20 or more cigarettes a day

12 In the last 12 months, how often did you smoke?
   A. I have never smoked
   B. I have smoked, but not in the last 12 months
   C. I have tried one cigarette in the last 12 months
   D. I have had more than one cigarette in the last 12 months

Student Tobacco Survey

These questions are about the smoking experiences and attitudes of students like yourself. Read each question carefully and answer as honestly as you can. The information you give will be kept completely secret and confidential. This survey is anonymous, so please do not put your name on any of the pages.

For each question, mark your answer by making a dark pencil mark that fills the circle completely. Fill in only one (1) circle for each question unless the instructions tell you to do something different.

⊗⊘◒⊙
Improper Marks

Please

●○○○
Proper Mark

The name of my school is: _____

1. What grade are you in?

- ○ 6
- ○ 7
- ○ 8
- ○ 9
- ○ 10
- ○ 11
- ○ 12

2. How old are you?

- ○ 11 or younger
- ○ 12
- ○ 13
- ○ 14
- ○ 15
- ○ 16
- ○ 17
- ○ 18 or older

3. Are you male or female?

- ○ Male
- ○ Female

4. Does your father (or stepfather or foster father) smoke cigarettes? Think about the father you see the most. Fill in the circle next to the one answer you choose.

- ○ I have no father
- ○ No, he has never smoked
- ○ No, he has stopped smoking
- ○ Yes, he smokes cigarettes, cigars or a pipe
- ○ I don't know

5. Does your mother (or stepmother or foster mother) smoke cigarettes? Think about the mother you see the most. Fill in the circle next to the one answer you choose.

- ○ I have no mother
- ○ No, she has never smoked
- ○ No, she has stopped smoking
- ○ Yes, she smokes cigarettes, cigars or a pipe
- ○ I don't know

6. Do any of your older brothers smoke cigarettes?

- ○ Yes
- ○ No
- ○ I don't know
- ○ I don't have any older brothers

7. Do any of your older sisters smoke cigarettes?

- ○ Yes
- ○ No
- ○ I don't know
- ○ I don't have any older sisters

PLEASE DO NOT WRITE IN THIS AREA

301024

8. Have you ever smoked a cigarette, even just a few puffs?

- ○ Yes
- ○ No

9. Have you ever smoked a whole cigarette?

- ○ Yes
- ○ No
- ○ I have never smoked

10. Have you smoked 100 or more whole cigarettes in your life?

- ○ Yes
- ○ No
- ○ I have never smoked

11. Think about the last 30 days. Did you smoke a cigarette, even just a few puffs?

- ○ Every day
- ○ Almost every day
- ○ Some days
- ○ 1 or 2 days
- ○ Not at all

12. Think about the last 30 days. On the days that you smoked, how many cigarettes did you usually smoke?

- ○ I did not smoke at all
- ○ A few puffs in a day
- ○ 1-2 cigarettes in a day
- ○ 3-5 cigarettes in a day
- ○ 6-10 cigarettes in a day
- ○ 11-19 cigarettes in a day
- ○ 20 or more cigarettes in a day

13. In the last 12 months, how often did you smoke?

- ○ I have never smoked
- ○ I have smoked, but not in the last 12 months
- ○ I have tried one cigarette in the last 12 months
- ○ I have had more than one cigarette in the last 12 months

14. Are you a smoker?

- ○ Yes
- ○ No

15. Have you smoked a cigarette today?

- ○ Yes
- ○ No
- ○ I do not smoke

16. Do you think in the future you might try smoking cigarettes?

- ○ Definitely yes
- ○ Probably yes
- ○ Probably not
- ○ Definitely not
- ○ I already smoke

17. If one of your best friends were to offer you a cigarette, would you smoke it?

- ○ Definitely yes
- ○ Probably yes
- ○ Probably not
- ○ Definitely not

18. At any time during the next year do you think that you will smoke a cigarette?

- ○ Definitely yes
- ○ Probably yes
- ○ Probably not
- ○ Definitely not

19. Your closest friends are the friends you like to spend the most time with. How many of your 5 closest friends smoke cigarettes?

- ○ None
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

20. Do you plan to quit smoking cigarettes?

- ○ I have never smoked
- ○ I have already quit
- ○ Yes, within one week
- ○ Yes, within 30 days
- ○ Yes, within six months
- ○ Yes, within one year
- ○ Yes, but I'm not sure when
- ○ No, I do not plan to quit smoking

21. How long ago did you quit smoking?

- ○ I have never smoked
- ○ I am still smoking
- ○ I quit less than 2 weeks ago
- ○ I quit between 2 weeks and 6 months ago
- ○ I quit between 6 months and one year ago
- ○ I quit more than one year ago

22. How many times in the past year have you tried to quit smoking?

- ○ I have not smoked in the last year
- ○ I have not tried to quit in the last year
- ○ I have tried to quit once in the last year
- ○ I have tried to quit 2 times in the last year
- ○ I have tried to quit 3 times in the last year
- ○ I have tried to quit 4 or more times in the last year

23. How sure are you that you could quit smoking if you wanted to?

- ○ Very sure
- ○ Sure
- ○ Unsure
- ○ Very unsure
- ○ I do not smoke
- ○ I do not want to quit

24. Is there help available at this school for students who want to quit smoking?

- ○ Yes
- ○ No
- ○ I'm not sure

25. Would you join a program to help you quit smoking if one was offered at your school?

- ○ Yes
- ○ No
- ○ I do not smoke cigarettes anymore
- ○ I have never smoked

26. If you were thinking about quitting smoking, rate whether you might use the following ways to quit.

	Definitely	Maybe	Never	I don't smoke
a. A self-help booklet	○	○	○	○
b. Group meetings at school	○	○	○	○
c. My doctor	○	○	○	○
d. Chat room on the Internet	○	○	○	○
e. Information site on the Internet	○	○	○	○
f. Teacher, guidance counsellor, or school nurse	○	○	○	○
g. Free telephone quit line	○	○	○	○
h. Friend's advice	○	○	○	○
i. Quit on my own	○	○	○	○
j. Nicotine gum or nicotine patch	○	○	○	○
k. Other:_____	○	○	○	○

27. How often do you smoke in each of the following places?

	Often	Sometimes	Never	I don't smoke
a. At home	○	○	○	○
b. Walking to or from school	○	○	○	○
c. At school but off school property	○	○	○	○
d. At school on school property	○	○	○	○
e. At concerts/dances/clubs	○	○	○	○
f. In restaurants/coffee shops	○	○	○	○
g. At parties	○	○	○	○
h. Other:_____	○	○	○	○

28. How often do you smoke at the following times?

	Often	Sometimes	Never	I don't smoke
a. Before school	○	○	○	○
b. During the school day	○	○	○	○
c. After school	○	○	○	○
d. In the evening	○	○	○	○
e. On weekends	○	○	○	○
f. Other:_____	○	○	○	○

29. How often do you smoke with the following people?

	Often	Sometimes	Never	I don't smoke
a. By myself	○	○	○	○
b. With my parents	○	○	○	○
c. With other family members	○	○	○	○
d. With friends	○	○	○	○
e. Other:_____	○	○	○	○

30. How strongly do you agree or disagree with each of the following statements?

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. I feel close to people at this school	○	○	○	○
b. I feel I am part of this school	○	○	○	○
c. I am happy to be at this school	○	○	○	○
d. The teachers at this school treat students fairly	○	○	○	○
e. I feel safe in my school	○	○	○	○

31. **How do you usually get your cigarettes?**
- ○ I buy them
- ○ Someone buys them for me
- ○ I get them from my friends
- ○ I get them from home
- ○ Other:_____
- ○ I do not smoke

32. **If you buy your own cigarettes, where do you buy them? PLEASE FILL IN ALL THAT APPLY**
- ○ Convenience store (e.g., 7-11)
- ○ Gas station
- ○ Grocery store/supermarket
- ○ Restaurant/diner/cafeteria
- ○ Bar
- ○ Friend or other person
- ○ Other:_____
- ○ I do not buy cigarettes

33. **In the past month, when you tried to buy cigarettes, how often were you asked your age?**
- ○ Never
- ○ Less than half of the time
- ○ About half of the time
- ○ More than half of the time
- ○ Always or almost always
- ○ I did not buy cigarettes in the past month

34. **How many people your age, in your school, do you think smoke cigarettes?**
- ○ 91-100%
- ○ 81-90%
- ○ 71-80%
- ○ 61-70%
- ○ 51-60%
- ○ 41-50%
- ○ 31-40%
- ○ 21-30%
- ○ 11-20%
- ○ 0-10%

35. **Not counting yourself, how many people smoke inside your home every day or almost every day?**
- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5 or more

36. **Are you exposed to smoking at your job?**
- ○ Yes
- ○ No
- ○ I do not have a job outside of school

37. **Do you think all public places (e.g., restaurants, malls, arcades, etc.) should be smoke-free?**
- ○ Definitely yes
- ○ Probably yes
- ○ Probably not
- ○ Definitely not

38. **You can be fined for smoking on school property.**
- ○ True
- ○ False
- ○ I'm not sure

39. **I often see students smoking near this school.**
- ○ True
- ○ Usually true
- ○ Usually false
- ○ False

40. **This school has a clear set of rules about smoking for students to follow.**
- ○ True
- ○ Usually true
- ○ Usually false
- ○ False
- ○ I don't know

41. **If students are caught breaking the smoking rules at this school, they get into trouble.**
- ○ True
- ○ Usually true
- ○ Usually false
- ○ False
- ○ I don't know

42. **How many students at this school smoke where they are not allowed to?**
- ○ A lot
- ○ Some
- ○ A few
- ○ None

43. **In your free time away from home, how often does your mother or father know where you are?**
- ○ Always
- ○ Usually
- ○ Sometimes
- ○ Seldom
- ○ Never

44. **How often do you talk to adults in your family about what you have done during the day?**
- ○ Less than once a week
- ○ Once a week
- ○ A few times a week
- ○ Almost every day

45. **How is cigarette smoking handled in your home?**
- ○ No one is allowed to smoke In my home
- ○ Only special guests are allowed to smoke in my home
- ○ People are allowed to smoke only in certain areas In my home
- ○ People are allowed to smoke anywhere in my home

46. **Have your parents ever expressed a desire for you <u>not</u> to smoke?**
- ○ Yes
- ○ No