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When healthcare providers smoke, their willingness to deliver smoking cessation messages is inhibited. Although they acknowledge the health consequences of smoking, they have difficulty quitting with relapse rates equivalent to the general population. Multiple barriers exist to hinder smoking cessation and often defense mechanisms are engaged to reduce cognitive dissonance associated with smoking.

The purpose of this study was to examine beliefs and predict healthcare providers' intentions to quit smoking using the theory of planned behavior (TPB). To determine if these same healthcare providers engaged a cognitive dissonance reducing defense, self-exempting beliefs was selected as an additional predictor. The research was a descriptive correlational design using a survey method. The primary analyses included multiple linear regressions and a mediational analysis. A convenience sample of 90 adult self-identified smoking healthcare providers was recruited and 55% were nurses.

The TPB explained 29% of the variability in intentions. Self-exempting beliefs was not statistically significant but the addition of the variable increased the explained variance by 2%. Perceived behavioral control was the only significant variable explaining 23% of this variance; suggesting the intention to quit would be greater by increasing one's sense of control over the beliefs that make quitting easier or more difficult.

EXPLAINING INTENTION TO STOP SMOKING WITH THE THEORY OF PLANNED BEHAVIOR AND SELF-EXEMPTING BELIEFS

by

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CHAPTER I

INTRODUCTION

Research has shown that American adults were far from meeting the *Healthy People 2010* goal of a 12% prevalence of cigarette smoking (U.S. Department of Health and Human Services [USDHHS], 2006). Approximately 46 million or 20.6% of American adults continue to smoke (Center for Disease Control and Prevention [CDC], 2008), and each year more than 1,000 youth become new smokers (Substance Abuse and Mental Health Services Administration [SAMSA], 2009). In Virginia, the 2009 adult smoking rate was 19 percent, which is higher than the 16.4 percent rate from 2008 and above the national average of 17.9 percent. Among the 50 states, Virginia has the 19th highest smoking rate (Virginia Government, 2010).

Presently smoking is the number one cause of disability and death in the U. S., and the cost of smoking in lost productivity is estimated at $97 billion and $93 billion in health care expenditures (CDC, 2008). Smoking causes cancer, heart disease, and lung disease, and for every person who dies from a smoking related disease, there are 20 more living with at least one smoking related disease (CDC, 2008; Nusselder, Looman, Marang-van de Mheen, van de Mheen, & Mackenbachet, 2000). Deaths associated with smoking occur annually to more than 443,000 smokers and 49,400 nonsmokers due to second hand smoke (CDC, 2008).

An estimated 31 million individuals want to stop smoking, yet only one million are successful (Young & Kornegay, 2004). A recent national adult tobacco survey from 19 states revealed that 79.3% of smokers intended to quit (CDC, 2010a). Unfortunately, it is estimated that 75% of smokers who quit will relapse within the first year (Andrews & Heath, 2003; Rowe & Macleod-Clark, 2000b). Motivating factors to initiate tobacco cessation are complex with the most common reasons cited as nicotine dependence, and environmental, social, and psychological factors (Aghi, Asma, Yeong, & Vaithinathan, 2001; Andrews & Heath, 2003). Since the creation of workplace smoking bans, smoking has decreased but continues to be highly resistant to change and relapse rates remain high (Braun et al., 2004; Longo, Johnson, Kruse, Brownson & Hewett, 2001).

Despite the personal knowledge and work experience associated with the harmful effects of smoking, it is estimated that greater than 25% of healthcare workers continue to smoke (McCarthy, Hennrikus, Lando & Vessey, 2001; McKenna et al., 2001; Young & Kornegay, 2004). When tobacco is used by healthcare workers, their health and the health of others is compromised and attitudes relevant to delivering tobacco cessation messages are negatively impacted (Berkelmans, Burton, Page, & Worrall-Carter, 2010). The public has a perception that healthcare workers have a responsibility to model and promote healthy lifestyle behaviors and advocate tobacco cessation (Association of American Medical Colleges [AAMC], 2007; Merrill, Madanat, Kelley, 2010; Pericas et al, 2009).

In healthcare institutions, nurses represent the greatest number of healthcare workers (McKenna et al., 2001) and they are in optimal positions to deliver tobacco

cessation interventions; yet nurses have one of the highest personal tobacco use rates as compared to other healthcare professionals (Andrews & Health, 2003; Rowe & Clark, 2000). Optimistically, a decline in smoking has been reported by the Nurses' Health Study when comparing 33.2% of smoking nurses in 1976 to a decrease of 8.4% of smoking RNs in 2003 (Sarna et al., 2008). Unfortunately, workers who use tobacco are reluctant to encourage tobacco cessation (Carmichael & Cockcroft, 1990; Heath, Andrews, Kelley, & Sorrell, 2004; Jenkins & Ahijevych, 2003; Rowe & Clark, 2000; Sarna, Brown, Lillington, Wewers, & Bretcht, 2000; Young & Kornegay, 2004) despite the *Public Health Service Clinical Practice Guidelines* (Fiore et al., 2008) recommending all healthcare workers ask, advise, assess, assist, and arrange for smoking cessation for their patients. All healthcare workers are in optimal positions to influence tobacco cessation and deliver smoking cessation messages but personal smoking contributes to reluctance, impacts role attitudes, and hinders tobacco cessation delivery even more.

Healthcare workers' reluctance to encourage patient smoking cessation may be at least partially due to cognitive dissonance. Cognitive dissonance is a common phenomenon among smokers (Festinger, 1957; Pericas et al., 2009) and dissonance is predicted to be greater in smoking healthcare workers. This phenomenon is described as an internal psychological tension that develops when two contradictory beliefs exist simultaneously (Festinger, 1957). Ajzen (2006a) suggested that dissonance can be reduced with a change in attitude toward smoking or a change in smoking behavior. According to cognitive dissonance theory, underestimating the harmful effects of smoking or ignoring information opposing their smoking behavior are two strategies used

to neutralize dissonance (Festinger, 1957). A study by Olshavsky and Summers (1974) examined the relationships between beliefs, knowledge, intentions, and behavior of cigarette smokers. Their findings suggest smoking dissonance was reduced when smokers either stated an intention to quit or held firm to beliefs which revealed distorted reasoning or distorted facts. When a smoker engages self-exempting beliefs that minimize the perceived risk of smoking and reduces cognitive dissonance (Balmford & Borland, 2008), it would seem prudent to consider cognitive dissonance and measure self-exempting beliefs when intentions to quit smoking are being studied.

Significance

It has been demonstrated that smoking cessation can prevent the development or exacerbation of many diseases (CDC, 2008). Healthcare providers, especially nurses are in unique positions to advocate for prevention of tobacco use and implement smoking cessation strategies for patients; they are also well respected by patients and a trusted source of healthcare advice within communities (Lally et al., 2008; Smith, 2010). Healthcare providers can therefore make significant contributions to reduce smoking rates and improve health outcomes by providing well received advice. A problem exists however, when healthcare providers deny their influential role in reducing tobacco use because of their own personal smoking behaviors.

To reduce the prevalence of smoking and the impact of smoking related diseases, interventions targeted specifically to healthcare providers who smoke are needed. Smoking cessation is difficult with many physiological, emotional, and social barriers that impact success and result in relapse. To assist with smoking cessation, and therefore

improve the delivery of advice to smoking patients, targeted interventions that can increase intentions to quit are imperative. Since healthcare provider-specific cessation programs are limited (Bialous et al., 2009) using theoretical approaches to improve the understanding of factors that hinder or facilitate smoking cessation may help (O'Connell, 2009). The theory of planned behavior (TPB) is the most widely researched and applied theory for examining psychosocial factors that explain and predict intentions to engage in health behaviors (Ajzen, 2006a; Armitage & Conner, 2001; Rise, Kovac, Kraft, & Moan, 2008). By explaining and predicting healthcare providers intentions to quit smoking, targeted interventions may result in a reduction in smoking.

Despite the small number of studies using the TPB to examine smoking, there are even fewer studies examining the attitude toward quitting among smoking healthcare providers. In addition, no study was located using TPB to predict smoking cessation intentions in healthcare providers.

Purpose of the Study

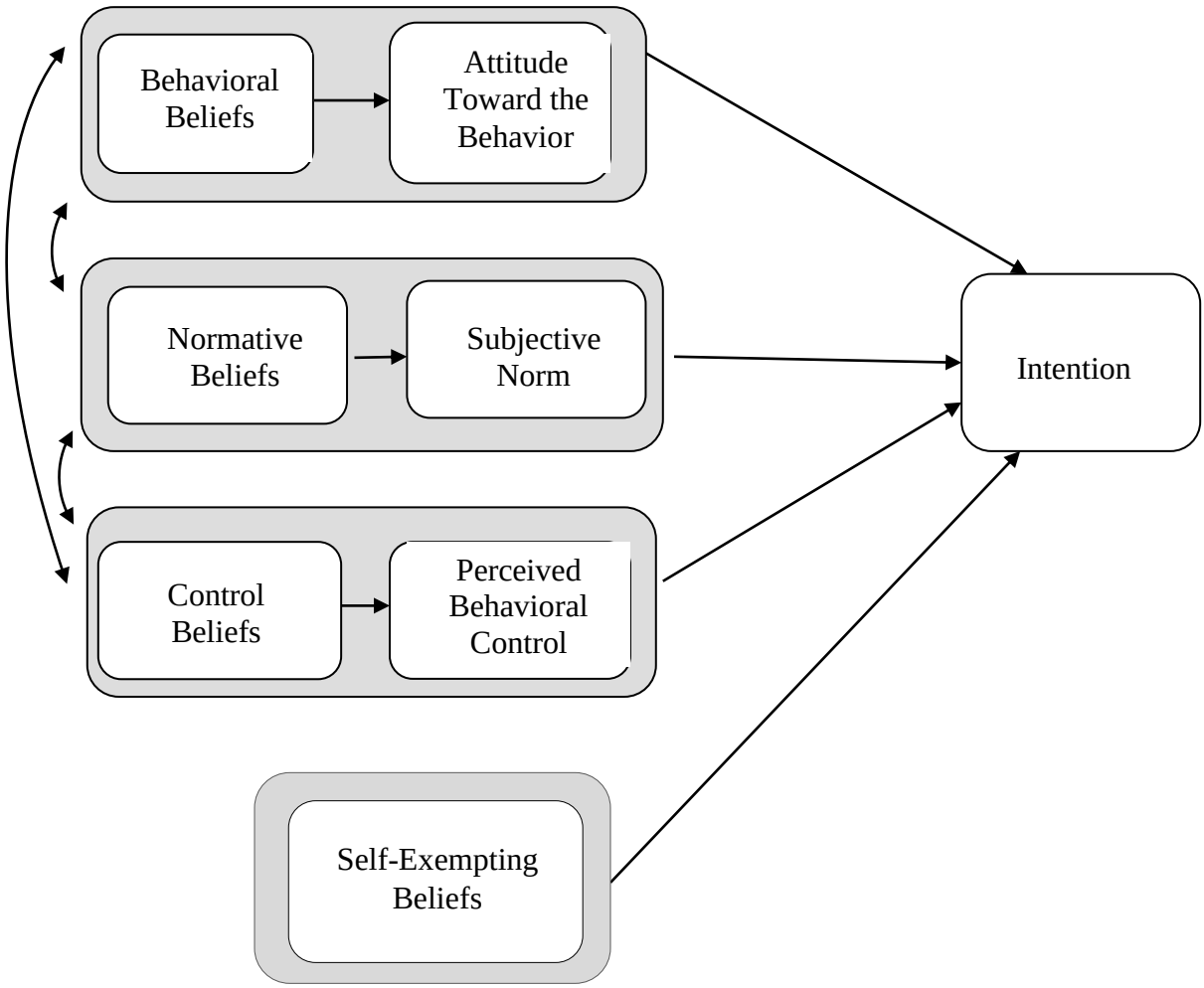
The purpose of this study is to examine healthcare providers' intentions to quit smoking by investigating the TPB variables: attitudes, subjective norm, perceived behavioral control, behavioral beliefs, normative beliefs, and control beliefs along with self-exempting beliefs. The study will also examine which theoretical model (i.e., TPB or TPB with self-exempting beliefs) explains the greatest amount of variance in intention to quit smoking. The results of this study can facilitate the creation of a more effective intervention for healthcare providers to reduce their smoking behavior.

Theoretical Framework

Theory of Planned Behavior

The TPB (Ajzen, 2006a) with the addition of self-exempting beliefs (a cognitive dissonance construct) is the conceptual framework selected to guide this study. The relationships between the model constructs are graphically displayed in Figure 1.

Figure 1. Theory of Planned Behavior with Self-Exempting Beliefs Concept: A Schematic Relationship of the Theoretical Variables with the Addition of Self-Exempting Beliefs.



Ajzen, I. (2006b). Icek Ajzen's Homepage: TPB diagram. Used with permission.

Retrieved from http://www.people.umass.edu/aizen/tpb.diag.html

The TPB (Ajzen, 2002a) is a value-expectancy model and prominent framework within health psychology research and has been applied to health maintenance and health related behavioral change such as condom use (Arden & Armitage, 2008), breastfeeding (Bai, Middlestadt, Peng, & Fly, 2009), smoking cessation (Godin, Valois, Lepage, & Desharnais, 1992), exercise (Abraham & Sheeran, 2004; Biddle & Nigg, 2000), and dietary changes (Blue & Marrero, 2006). This behavioral model is one of the most widely applied models for predicting intentions to perform specific behaviors and for understanding health behaviors (Ajzen, 1985, Armitage & Conner, 2001; Bledsoe, 2006).

The theory of reasoned action (TRA), developed in the 1960's by Fishbein and Ajzen (1980), was a predecessor to the TPB. Fishbein and Ajzen (2010) maintain that a relationship existed between one's beliefs and his or her attitudes. They assert that people develop attitudes, and these attitudes incline the person to respond favorably or unfavorably toward performing a specific behavior. The TRA proposes that if a person decides a behavior has positive outcomes and also believes that significant others support this behavior; then the person will have a strong intention and be more likely to perform the behavior (Ajzen, 1988). The TRA was criticized because it did not account for those behaviors people had little or no control over, such as nicotine dependence. To address this issue, Ajzen (1988) extended the model by adding the perceived behavioral control construct. Perceived behavioral control is similar to the self-efficacy concept introduced by Bandura's (1977a) Social Cognitive Theory. The addition of perceived behavioral control enhanced the TRA model and resulted in the theory name change to theory of planned behavior. The perception of having control over a behavior influences

intentions, as well as predicts behavior in situations where the behavior is considered not under the total control of the individual (Ajzen 1988). Based on past research findings, Ajzen (2006b) proposed that perceived behavioral control influences both intention to perform a behavior and functions as a moderator between intention and behavior. The addition of perceived behavioral control makes the TPB the more attractive of the two theories for this study since tobacco addiction is often perceived as being outside the individual's control.

The TPB is based on cognitive theory influenced by Skinner's (1974) work. Skinner believed strongly in behaviorism and his contribution of operant conditioning theory to social psychology was well received. In operant conditioning, rewards and/or punishments are considered reinforcers of behavioral change. Similarly, the TPB emphasizes expectancy-value beliefs in which individuals consider the value (rewards) of a behavior, (positive and negative consequences they might experience) prior to initiating a behavior. The reinforcing effects of tobacco, such as relaxation, euphoria, and nicotine dependence, make smoking behavior more difficult to change than many other health behaviors. Thus, for many smokers it seems the positive outcomes often outweigh the negative consequences of tobacco use.

The TPB proposes that one's intention to perform a behavior is predicted by attitudes, subjective norms, and perceived behavioral control. As depicted in the model, indirect beliefs consist of behavioral beliefs, normative beliefs, and control beliefs, and these beliefs are the basis of attitude formation, subjective norm, and perceived behavioral control, respectively. In other words, one's attitude toward engaging in a

behavior is formed from the behavioral beliefs the person holds, subjective norm is formed from normative beliefs, and perceived behavioral control is formed from control beliefs. Thus, the beliefs are indirect proxies for attitude, subjective norm, and perceived behavioral control (Ajzen, 2006a).

Self-Exempting Beliefs

Smokers are prone to deny their risk of developing smoking-related diseases (McKenna et al., 2001; Weinstein et al., 1998) or rationalize the health consequences of smoking behavior in order to reduce cognitive dissonance (Peretti-Watel, Halfen, & Gremy, 2007). In Festinger's (1957) study of smokers, he found that the more people smoked the less they would accept information that conflicted with their smoking behavior. The term cognitive dissonance best describes feelings a smoker may experience when conflicted about the health consequences of tobacco use. Cognitive dissonance is defined as internal conflict, uncomfortable tension or anxiety which comes from having two conflicting thoughts at the same time (Bawa & Kansal, 2008; Festinger, 1957; Keutzer, 1968; Pervin & Yatko, 1965). Cognitive dissonance is experienced by many smokers (Chapman, Smith, & Wong, 1993; Festinger, 1957) and is often a powerful motivator for treating tobacco dependence. When tension from dissonance is experienced, this tension can motivate a smoker to reduce internal conflicts by changing their behavior (Cooper, 2007; Festinger, 1957; Perloff, 2008). According to Pervin and Yatko (1965), when a smoker experiences internal conflict with smoking one of following actions to reduce this conflict will occur: the smoker will quit smoking, avoid

information supporting a smoking-cancer relationship, criticize the health consequences of smoking, or minimize the harmful effects.

The self-exempting belief scale (Peretti-Watel, Halfen, & Gremy, 2007) was selected to measure dissonance among smoking healthcare workers. It is predicted that the more dissonance one perceives the more self-exempting beliefs will be used. An inverse relationship is expected between the self-exempting beliefs and the intention to quit smoking.

Basic Assumptions of the Theory

The TPB (Ajzen, 1988, 1991) proposes a model on how cognitions influence human behavior. According to the TPB, an individual's intention to perform a specific behavior is the best predictor of their behavior (Ajzen, 2002a; Blue, Marrero, & Black, 2008; Frances, et al. 2004). To predict an individual's intention to stop smoking (dependent variable), three cognitions that influence smoking cessation through their impact on intention are examined. These predictor variables include:

1) whether they are in favor of quitting (attitude);

2) how much the individual feels social pressure to quit or not quit (subjective norm)

3) whether the individual feels in control of factors that would make quitting smoking easy or difficult (perceived behavioral control) (Francis, et al. 2004).

A more positive attitude, a stronger subjective norm, and a stronger perceived behavioral control should result in a stronger intention which leads to increased chances of quitting smoking.

The variables in the TPB model are psychological (internal) constructs. Each predictor variable is measured directly, such as asking respondents about their overall attitude, and indirectly by asking respondents about specific behavioral beliefs and outcome evaluations. Direct and indirect measurement approaches make different assumptions about the underlying cognitive structures (Frances, et al. 2004); however when direct and belief variables measure the same construct the scores are expected to be positively correlated. Ajzen (1988) supports examining the foundational beliefs for each of the direct variables as they provide targets for future interventions; as this theory suggests, we can increase the chance a person will intend to do a desired action, such as quit smoking, by changing one or all of the most influential predictors.

Theoretical Definitions of Key Variables

This section defines the TPB concepts as related to smoking cessation and self-exempting beliefs.

Intention.

Behavioral intention is the perceived likelihood one will engage in smoking cessation. It reflects a person's readiness to engage in quitting smoking and is influenced by behavioral beliefs, attitude, normative beliefs, subjective norm, control beliefs, and perceived behavioral control (Ajzen, 2006a). Intention suggests a readiness to devote the required energy to quit smoking. Therefore, one's intention is the most critical factor and predictor of smoking cessation.

Behavioral Beliefs and Attitude.

Behavioral beliefs (BB) derive from an individual's perception and prediction that by performing a specific behavior, such as quitting smoking, a positive or negative outcome will occur. Attitude is the degree to which an individual has a favorable or unfavorable evaluation of quitting smoking and determines one's intention to quit (Ajzen, 2006a). Attitudes form from an individual's belief system and by measuring those beliefs the attitude toward the behavior in question can be calculated (Ajzen, 2006a).

Normative Beliefs and Subjective Norm.

Normative beliefs (NB) are the smoker's beliefs significant others will approve or disapprove of smoking cessation and whether one is willing to comply with others perceived wishes. NB influence the formation of subjective norm (Ajzen, 2006b). Subjective norm (SN) is one's perception of social pressure to quit smoking or not quit smoking and the motivation to conform to these social pressures (Ajzen, 2006b).

Control Beliefs and Perceived Behavioral Control.

Control beliefs (CB) are an individual's beliefs about the presence of factors that can facilitate or impede quitting smoking and the power of those factors to influence behavior change. Control beliefs are indirect measures of perceived behavioral control (Ajzen 2006b). Perceived behavioral control (PBC) is the perceived ease or difficulty of one's ability to quit smoking and takes into account past experiences as well as potential barriers to stop smoking (Ajzen, 2006b).

Self-Exempting Beliefs.

Self-exempting beliefs are views an individual maintains to reduce one's cognitive dissonance associated with smoking (Balmford & Borland, 2008).

Research Questions

The research questions in this study will address the total, direct, and indirect effects of each predictor variable on intention to quit smoking. The research addressed the following questions:

1. What is the relationship between behavioral beliefs, attitude, normative beliefs, subjective norm, control beliefs, and perceived control, and intention to quit smoking?
2. What is the relationship between behavioral beliefs, attitude, normative beliefs, subjective norm, control beliefs, perceived control, and self-exempting beliefs and intention to quit smoking?
3. Does the TPB and self-exempting beliefs explain more of the variance in intention to quit smoking than the TPB alone?

Study Hypotheses

Based on the proposed theoretical frameworks and related literature, the following hypotheses were tested:

1. Behavioral beliefs, attitude, normative beliefs, subjective norm, control beliefs, perceived behavioral control, and self-exempting beliefs will be related to healthcare providers' intention to quit smoking.

2. The TPB and self-exempting beliefs will explain more of the variance in healthcare providers' intention to quit smoking than the TPB alone.
3. No difference will be found in the amount of variance explained by behavioral beliefs, attitude, normative beliefs, subjective norm, control beliefs, perceived behavioral control, and self-exempting beliefs in the equations for intention.

Summary

Smoking healthcare providers are less likely to believe smoking cessation advice to patients can be effective (Merrill et al., 2010) and are even more reluctant to provide smoking cessation interventions. However, as healthcare providers they have the greatest potential to influence patients to quit and play a key role in advising and arranging for smoking cessation interventions. Therefore, it is necessary to eliminate personal smoking in providers to improve their health and to reduce smoking related diseases in those they serve.

Motivating factors to initiate smoking cessation are complex and smoking relapse rates remain high. Despite healthcare providers' knowledge and experience with smoking related diseases, at least 25% continue to smoking. The more knowledge gained about healthcare providers' behaviors, attitudes, beliefs, and intentions, the more likely a targeted intervention can be developed to improve smoking cessation in this population. By implementing a study using an effective theoretical framework, TPB, and examining the prevalence of self-exempting beliefs much can be learned to reduce the health consequences of smoking. According to O'Connell (2009), much of the research in

smoking cessation is atheoretical; therefore research findings that are theory based can further advance the science of smoking cessation.

CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter provides an overview of the literature which describes the problem of smoking among healthcare providers. Relevant nursing literature examining smoking among nurses and nurses' reluctance to provide smoking cessation education will be reviewed along with literature examining healthcare professionals in general. Since reluctance to provide smoking cessation to patients may be associated with cognitive dissonance (Festinger, 1957) this relationship will also be explored. The chapter will conclude with a review of the theory of planned behavior (Ajzen, 2002a & 2006b) within the context of smoking cessation.

Review of Smoking

The knowledge of the health consequences of smoking has increased dramatically since the 1964 Surgeon General's Report (U.S. Department of Health and Human Services, 1964) and smoking is now defined as both a chronic and relapsing disease. Treatment guidelines, *Treating Tobacco Use and Dependence*, were developed from evidenced based studies to improve effective delivery of tobacco cessation messages by all healthcare providers (Fiore et al., 2008). Unfortunately, these guidelines have been underutilized by most healthcare providers (Sarna et al., 2008).

Multiple factors are correlated with smoking and these include: age, race, ethnicity, educational level, and income status. Smoking prevalence is highest among adults age 18-24 years (28.5%), American Indians and Alaska Natives (40.8%), those living below the poverty level (32.9%), and individuals who did not graduate from high school and including those who received a general equivalency diploma (42.3%). Men are more likely to be smokers than women (25.2% versus 20%), but the decline in smoking is significantly slower among women (CDC, 2010c), and particularly nurses (Sarna et al., 2008).

Smoking among adolescents begins with curiosity when the addictive nature of nicotine is underestimated (CDC, 2008). Adolescents report smoking provides both a sense of pleasure and reduces stress (Haddad & Malak, 2002;Kegler et al., 1999). Unfortunately these pleasurable sensations along with nicotine dependency persist into adulthood. The CDC (2008) reported the most common barriers to tobacco cessation are nicotine dependence, stress reduction, and fear of weight gain. More adolescent girls than boys smoke and the desire to be thin perpetuates continued smoking (Honjo & Siegel, 2003; Tomeo, 1999). Encouragingly, the majority of smokers, including adolescents, intend to quit (CDC, 2008). Haddad and Malak (2002) studied smoking university students in Jordan and found two-thirds of these students expressed a desire to quit smoking but addiction was identified as the biggest barrier to cessation.

The fear of nicotine withdrawal symptoms has been associated with the majority of smoking cessation relapses (Kovac, Rise & Moan, 2010; Piasecki, 2006). Nicotine is

the addictive substance in tobacco that has neurobiological effects and contributes to tobacco cravings and withdrawal symptoms. Nicotine withdrawal symptoms include anxiety, irritability, headache, nausea, diarrhea, fatigue, insomnia, concentration difficulties, and depression (American Psychological Association, APA, 2000). Within the U.S., an estimated 70-80% of smokers have a nicotine dependency (Zwar, 2008) and healthcare providers are not exempt (Berkelmans, Burton, Page, & Worrall-Carter, 2010) from this most common form of chemical dependence (American Society of Addiction Medicine, 2010). Apart from nicotine dependence, predictors of cessation can differ by gender. Nieva et al. (2011) examined smoking relapse differences between males and females were examined. They found greater smoking cessation relapses in males with high levels of impulsivity and female smokers were more likely to relapse due to social pressures. For more discussion on the gender differences in smokers see: Dohnke, Weiss-Gerlach, and Spies (2010) and Wiium, Breivik, and Wold (2006). From these studies, it would seem useful to address the impact of social pressures, fears of weight gain, and nicotine dependency effects on tobacco cessation within the healthcare profession.

Healthcare Provider's Use of Tobacco

The use of tobacco among nurses and student nurses has been studied worldwide (Schultze & Wittmann, 2003). It is estimated that 8.4% to 25% of U.S. nurses' smoke (McCarthy, 2001; McKenna et al., 2001; National League for Nursing, 2004; Sarna et al., 2008) and nurses continue to smoke more than any other group of healthcare

professionals (Andrews & Health, 2003; Rowe & Mcleod-Clark, 2000a). Several studies have suggested the percentage of smoking nurses may be even higher (Young & Kornegay, 2004), but due to the growing social unacceptability of tobacco use, smokers may be more reluctant to accurately report their smoking status (Rowe & Mcleod-Clark, 2000b).

Sarna, Bialous, Sinha, Yang, and Wewers (2010) examined data from the *U.S. 2003 and 2006/2007 Tobacco Use Supplement* and reported the lowest prevalence of smoking was among physicians, dentists, and registered nurses (RNs), respectively, but the decline in smoking cessation rates during those years were insignificant. With the slow decline in healthcare workers quit rates, their impact on reducing tobacco is hindered even more (Fiore et al., 2008). The decline in quit rates appears even greater when the calculation of those quit rates are examined (Sarna et al., 2010). The U.S. quit ratios are calculated by dividing the number of former smokers by the number who have ever smoked and with the increasing number of nonsmoking healthcare providers entering the profession, this ratio fails to reflect an accurate portrait. In the same study (Sarna et al., 2010), licensed practical nurses (LPNs) and respiratory therapists had the highest smoking prevalence and LPNs had lower quit rates than the general population. Several researchers, (Elkind, 1980; Rowe & Mcleod-Clark, 2000b) have reported similar results with regard to LPNs. Given that smoking is more prevalent in groups with lower incomes and less education, smoking LPN's may emulate the socioeconomic discrepancies seen within the general population (Sarna et al, 2010). Paul et al. (2010)

examined differences in smoking quit attempts in Australians from higher and lower socioeconomic groups. Among the different themes identified within this qualitative study, they discovered smoking quit attempts were less successful among the lower socioeconomic groups because smoking was considered more socially acceptable and work environments were more conducive to tobacco use. Further studies are needed to determine if these same variables impact smoking LPNs.

Studies identifying the prevalence of smoking among nurses can be misleading when researchers fail to define the nurses within a study. A *nurse* is often a generic term used in studies and nurses differ in relation to amount of education, training, or certification (e.g. nursing assistant, LPN, RN with associate's degree, and RN with bachelor's degree, or advanced practice nurse). Therefore, when researchers do not define the type of nurse, two significant variables measured by the CDC, educational level and socioeconomic status, are negated. Within the literature, only a limited number of research studies have defined the term *nurse*. One study, Feldman and Richards (1986) compared LPN's to RN's and found LPN's had a higher prevalence rate of smoking and this finding was also supported by Sarna, Bialous, Sinha, Yang, and Wewers (2010). However, in the same study, they compared RNs to other professionals and found quit rates among RNs were lower than dentists, pharmacists, and physicians (Feldman & Richard, 1986), but they failed to differentiate between the bachelor and associated degree RNs. This same concern occurred within Patkar, Hill, Batra, Vergare,

and Leone's (2003) study when they reported the smoking rate of RN students (13.5%) as compared to smoking medical students (3%).

Questionnaire response bias can also contribute to skewed smoking prevalence rates among all healthcare providers (Smith & Leggart, 2007). Smith examined the longitudinal trends of alcohol and tobacco consumption among Australian physicians and nurses and compared them to the U. S. surveys on tobacco. The researcher found a decrease in the reported use of tobacco among both groups and suggested non-smokers were more likely to return their questionnaires than current smokers due to the society's current disapproval of smoking.

Why Healthcare Providers Smoke

Insight into why healthcare workers smoke and how they approach cessation has been studied by many (Berkelmans, et al., 2011; Chalmers, et al., 2001; McKenna et al., 2001; Rowe and Mcleod-Clark, 2000a; Sarna, 2011). Factors contributed to smoking among healthcare workers are similar to those found in the general population and are associated with: (a) stressful working environments; (b) peer pressure and social influences; (c) nicotine dependency and dreaded nicotine withdrawal symptoms; and (d) post cessation weight gain.

Lived experiences of healthcare professionals who continue to smoke despite their awareness of the health consequences from smoking were examined in a qualitative study by Young and Kornegay (2004). Among the eight smoking healthcare professionals recruited, a paramedic, a respiratory therapist, and six RNs, the researchers found five

predominant themes among these smokers. Themes were identified as *knowing better, addiction and habit, rewards associated with smoking, justification for smoking, and a desire to quit smoking*. Despite the small sample size, these themes resonate throughout the literature. Overall, smoking healthcare providers attribute their smoking cessation difficulties to nicotine addiction and the pleasures experienced from smoking. Those pleasures were described as: relief from work stress with a temporary smoking break, the physical sensations associated with inhaling, and the perceived relaxation response from the nicotine (Young & Kornegay, 2004).

While in some studies smoking providers acknowledge the harmful effects of smoking, other studies have reported smokers do not believe their smoking impacts patient care. Nagle, Schofield, and Redman (1999), examined Australian nurses' knowledge and attitudes toward providing smoking cessation and no significant differences were found between smokers and nonsmokers as their results indicated a 98% agreement smoking was harmful to the health while 81% believed smoking cessation would extend life. Rowe and Macleod-Clark (2000a) evaluated the effectiveness of a smoking cessation intervention among 22 RNs and 32 smoking student nurses and a comparison group with an equal number of nonsmoking participants. Participants in both groups agreed smoking was detrimental to their health and the health of their families ($p < .001$). However in other studies, the contrary was noted. For example, in one international tobacco survey among general and family physicians across 16 countries, 42% of the respondents were smokers, and U. S. physicians were represented in a large

sample size of 2,836 (Pipe, Sorensen, Reid, 2009). The majority of respondents agreed smoking was a chronic and relapsing disease and physically addictive; however, these smokers were less likely to associate their personal smoking as a threat to their patient's health, and were less likely to prioritize the delivery of smoking cessation interventions. Numerous other studies have reported healthcare workers denial of harm associated with their smoking (Clark, McCann, Rowe, & Lazenbatt, 2003). From a sample of 610 nurses employed by the Australia Health Service, Hughes and Rissel (1999) found attitudes toward passive smoking were different based on smoking status; more nonsmoking nurses (97%) than smokers (88%) agreed passive smoking was harmful ($p < .001$).

Despite the acknowledgement by many providers that smoking is detrimental to one's health and the health of others, many smokers want to successfully quit (Smith & Leggat, 2007); however, quit attempts are declining and relapse rates remain high. Additional research studies are needed to identify factors that contribute to healthcare providers smoking behaviors and the barriers preventing smoking cessation success. Tailored interventions could be appropriate to address tobacco dependence among healthcare providers.

Healthcare Provider's Role in Tobacco Cessation

Among the many barriers to promoting tobacco cessation, the most significant is the personal use of tobacco by healthcare providers (Fiore et al., 2008). Studies show smoking healthcare providers avoid being proactive in providing smoking cessation services to patients (Berkelmans, et al., 2010; McEwen & West, 2001), have less

favorable attitudes and behaviors toward prevention, and hold more negative attitudes toward smoke-free environments (Becker & Rosenstock, 1984; Reeve, Adams, & Kauzekanai, 1996; Ficarra et al., 2010; Hughes & Rissel, 1999; Merrill, Madanat, & Kelley, 2010; O'Donovan, 2009; Puffer & Rashidian, 2004; Sejr & Osler, 2002; Siques et al., 2006). Other studies suggest attitudes and motivations of smoking healthcare providers result in reduced smoking cessation interventions (Ficarra et al., 2010; Hensel, 2011; Hughes & Rissel, 1999; Merrill, Madanat, & Kelley, 2010; O'Donovan, 2009; Puffer & Rashidian, 2004; Siques et al., 2006).

The American Nurses Association (ANA, 2005) and the International Council of Nurses (ICN, 2006) have issued mandates for nurse's to promote public health and they stipulate that personal tobacco cessation is a professional responsibility and no longer a matter of personal choice. Physicians are required by practice guidelines to ask patients about tobacco use and to document patient smoking status (Association of American Medical Colleges, AAMC, 2007). Despite mandates and requirements, all healthcare providers are in unique positions to deliver tobacco cessation messages with a significant role in promoting smoking prevention. Nurses and healthcare providers, of any level, function as societal role models and health educators.

Healthcare providers are often viewed as community role models with a professional ethic to serve and improve society's health (Berkelmans, et al., 2010; Ficarra et al., 2010 Hensel, 2011). Florence Nightingale even promoted a nurse's duty included caring for their own personal health and promoting health through role-modeling

(Dossey, 2005). Unfortunately, smokers are less likely than nonsmokers to believe smoking health professionals should be role models (Pericas et al., 2009). Hughes and Rissel's (1999) study revealed three-fourths of all nurses who smoked did not believe they were patient role models nor did they believe their smoking behavior influenced others to think smoking was less hazardous to the health.

Nonsmoking nurses can have an enormous impact on promoting tobacco cessation (Dekker, Looman, Adriaanse, Van Der Maas, 1993; McKenna, et al., 2001). Nurses have the greatest access to patients in a variety of healthcare settings (Chalmers et al., 2001: Elkind, 1980; International Council of Nurses, 2006; Oncology Nursing Society, 2008; World Health Organization, 2004b) and represent the largest number of healthcare workers within all healthcare institutions. Bialous and Sarna (2004) recommended that "if only half of all nurses helped one patient per month quit smoking; more than 12 million smokers would overcome their addictions every year" (p. 55). Schultze and Wittmann (2003) also suggested nurses could have a greater impact on reducing tobacco use if more nurses became nonsmokers. In the same literature review by Schultze and Wittmann (2003) it was found smoking healthcare workers lacked motivation to provide patients tobacco cessation interventions and excuses for their lack of interventions included: Insufficient time, lack of skills and knowledge in providing tobacco cessation messages, patients lack of motivation to quit, and an unwillingness to further stress ill patients with tobacco cessation messages.

The American Legacy Foundation funded a study by the AAMC to assess physician knowledge, attitudes, and practice patterns related to smoking cessation and tobacco use (AAMC, 2007). This comprehensive, national survey of physicians had an initial response rate of 17.1%, with 66% of respondents identified as nonsmokers. The results from the mailed surveys revealed physicians believed it was their role to help patients quit smoking; while 86% advised patients to stop smoking only 17% provided assistance with smoking cessation. The researchers concluded over 70% of smokers visit a physician each year and physician interventions as brief as three minutes have been found to significantly increase cessation rates.

Support from physicians increases a smoker's chance of long-term abstinence. Orleans and Alper (2003) determined smoking cessation interventions offered by physicians had the potential to increase long-term cessation rates from 7% to 30%. If physicians advised all smoking patients to quit, it has been estimated about 1.7 million more smokers per year would be successful (Agency for Health Care Policy and Research, 1996). Therefore, physicians have the potential to greatly impact tobacco cessation (AAMC, 2007).

Unfortunately, smoking healthcare workers are in optimal positions to assist with smoking cessation, but are hindered by their own personal tobacco use. To continue smoking in the healthcare role, workers must rationalize their behavior by denying personal health risks or other mechanisms to minimize this paradoxical behavior. Little

is known about healthcare providers self-perceptions as a smoker or defenses engaged to justify continued smoking.

Cognitive Dissonance

When healthcare providers smoke it is believed they experience some level of cognitive dissonance or internal conflict related to smoking (Chapman, Wong, & Smith, 1993). A variety of defense strategies have been used by smokers to reduce dissonance but remain barriers to cessation. The theory of cognitive dissonance, a social psychological perspective, provides one explanation of the internal conflicts which are expressed as feelings of guilt and shame related to personal smoking (Berkelmans, et al., 2010; Bialous, Sarna, Wewers, Froelicher, & Danao, 2004). Oftentimes smokers, when questioned about their smoking, react with a defensive response and will mount an exaggerated expression of their intention to quit smoking (Aronson, 1992; Martin, 2001; Michie & Abraham, 2004; O'Keefe, 2002). Numerous researchers also found healthcare smokers display an unwillingness to discuss or provide smoking cessation information to patients, fail to document a patient's smoking status, and minimize the harmful effects of smoking with psychological justifications (Beletsioti-Stika & Scriven, 2006; McCann, Clark, & Rowe, 2005; Pericas et al., 2009; Steptoe et al, 2002).

Justifications to reduce dissonance have been measured and described in a variety of ways. Some of the most common are: effective cognitive dissonance measures (Keutzer, 1968); smoking attitudes scale (Clark & McCann, 2004); risk minimizing beliefs scale (Borland et al., 2009); smokers' risk perception scale (Weinstock,

1988,1998); self-exempting beliefs scale (Chapman, Wong, & Smith, 1993; Oakes, Chapman, Borland, Balmford, & Trotter, 2004; optimistic bias (McCoy, et al., 1992; Weinstein, Marcus, & Moser, 2005); permission giving beliefs (Beck, Wright, Newman, & Liese, 1993); and disengagement beliefs (Dijkstra, 2009). Numerous other studies examined the general population of smokers' use of dissonance reducing strategies (Chapman & Rubinstein, 1987, Chapman, Wong, & Smith, 1993; Dijkstra, 2009; Hansen & Malotte, 1986; Oakes, Chapman, Borland, Balmford, & Trotter, 2004; Peretti-Watel, Halfen, Gremy, 2007; Yong, Borland, Siahpush, 2005).

The relationship between cigarette smoker's beliefs, knowledge, intentions, and behaviors were examined by Olshavsky and Summers (1974). A questionnaire was administered to 108 cigarette-smoking graduate and undergraduate students. The results from their study revealed self-deceptive attitudes and beliefs, as well as distorted reasoning to justify their continued smoking behavior. Self- deceptive beliefs included underestimating the dangers of smoking; not considering the dangers of smoking as personally relevant; more smoking pleasure was experienced with the more cigarettes smoked; and less variation in intention, knowledge, and behavior scores was found among those who intending to quit. Overall, those most knowledgeable about the harmful effects of smoking were not more likely to intend to quit and those who intended to reduce or quit smoking failed to smoke fewer cigarettes.

A self-exempting belief scale using four patterns of risk denial among smokers was developed and used by Peretti-Watel, Halfen, & Gremy (2007). The scale was

referenced in the Health Monitoring Centre of Paris Ile-de-France Region (ORSIF) study. In the study, they conducted a random regional telephone survey on knowledge, attitude, beliefs, and practices among 939 smoking French participants. A relationship was discovered between a smokers' denial of risk and their smoking motives and they found a significant correlation between cigarette consumption and duration of smoking. They suggested smokers' have the ability to develop and maintain convincing patterns of beliefs to counteract antismoking campaigns. They concluded smokers' self-exempting beliefs were acquired cognitive skills and not associated with either a psychological cause or lack of knowledge. This self -exempting belief scale, a reliable and validated measure, was selected for use in the current study to measure smoking healthcare workers display of risk denial beliefs.

The purpose of this self-exempting beliefs measurement was to determine if a relationship exists between self-exempting beliefs and intention to quit smoking. By determining if self-exempting beliefs inversely influence intentions toward smoking cessation, increasing cognitive dissonance may be one strategy to include in a future smoking cessation intervention.

Psychosocial Theories and Smoking Research

Theories of psychology are the most frequently cited within the smoking literature. O'Connell (2009) conducted a Medline database search (1989-2008) and found 137 smoking cessation studies by nurse researchers and theories from psychology were most frequently mentioned. The transtheoretical model of behavior (Prochaska &

DiClemente, 1983) was cited in 50% of the studies and Bandura's self-efficacy theory (1977b) followed close behind. Replicating O'Connell's database search parameters, 16,813 smoking cessation research articles were published by non-nursing researchers. This finding indicates nursing researchers are behind in developing and applying theoretical frameworks in research to advance the science in smoking.

Psychosocial theories currently provide the most comprehensive explanation of changing smoking health behaviors and offer the greatest understanding of how cognitive and social factors impact health behaviors (Bandura, 2000). Psychosocial theories examine cognitive processes that both explain and predict individual motivations. They also assume health behavior is influenced by individual thought processes, perceptions of reality, and the social environment (Conner & Norman, 2005). Among the psychosocial theoretical frameworks, the most widely used in smoking research include: the transtheoretical model (Prochaska & DiClemente, 1983), social cognitive theory (Bandura, 1977a), health belief model (Becker & Rosenstock, 1984), the theory of reasoned action (Ajzen & Fishbein, 1980), and TPB (Ajzen, 1991).

In order to examine smoking healthcare providers' attitude and beliefs related to smoking cessation and predict determinants for changing smoking behavior, a psychosocial theoretical framework was the most reasonable choice. After an extensive review of the literature and comparisons of the above mentioned models, the TPB was selected because of its logical framework, well defined methodology, and proven reliable and valid predictability.

Theoretical Review and Support

There is evidence that the TPB is a powerful model for predicting intentions to change a wide range of behaviors by a significant number of studies and meta-analytic reviews (Ajzen, 2006a; Armitage & Conner, 2001; Rise, Kovac, Kraft, & Moan, 2008). This model is important in predicting intentions to quit smoking because the intention to stop smoking paves the way to changing smoking behavior (Ajzen, 1991).

The most predominant subjects recruited among all smoking TPB studies were college students and adolescents. At least 50% of smoking studies examined the intention to smoke or not smoke and only a limited number of studies examining smoking cessation intention (Johnston et al., 2006; Kovac, Rise, & Moan; 2010; Moan & Rise, 2005; Norman et al, 1999; Rise et al, 2008). Among these studies, the average correlations between the variables revealed the strongest relationships between intention and perceived behavioral control (r = .48) and intention and attitude (r = .45). Intention and subjective norm (r = .27) were less likely to have a significant relationship as compared to perceived behavioral control (PBC) and attitude. The findings from these smoking studies were consistent with the findings from other health behaviors. The most significant predictor of intention in 66% of these smoking research studies was PBC, or its proxy self-efficacy, followed by attitude (44%). Subjective norm (SN) was the weakest predictor of intentions (Armitage & Conner, 2001).

A meta-analyses review of 200 studies of various health behaviors with a sample size of over 50,000 was conducted by Conner & Sparks (2005). The three direct TPB

variables (attitude, SN, and PBC) explained 34% of the variance in intentions. Only four smoking studies were described in this meta-analytic review (Godin et al., 1992; McMillan & Conner, 2003; Moan & Rise, 2006; Wiium, Breivik, & Wold, 2006) and all three direct variables explained an average of 32% of the variance in intention with effect sizes ranging from 12% to 49%.

A meta-analytic review during a ten-year period, examined 57 health related studies using TPB (Godin & Kok, 1996). The correlation coefficients between intention and attitude, SN, and PBC, averaged .46, .34, and .46 respectively. The variance in intention explained by all these variables was 40.9%. PBC was a significant predictor in 85.5% of the studies followed by attitude (81.5%), and SN (47.4%). PBC explained an average of 13.1% of the variance in intentions above attitude and SN. The average R^2 = .45 and PBC added 14% to the prediction of intentions among 11 studies of addiction (cigarettes, alcohol, drugs and eating disorders).

In another review of 185 health related studies (Armitage & Conner, 2001), the TPB accounted for 39% of the variance in intention. The PBC contributed 6% to the prediction of intention above attitude and SN.

The majority of TPB studies used additional predictor variables in examining health behaviors (e.g., Godin & Kok, 1996; Moan & Rise, 2005). The inclusion of additional variables may improve the prediction of intentions according to Kovac, Rise, and Moan (2010). As evident in a recent smoking cessation study using an extended version of TPB (Høie, Moan, & Rise, 2010), all three direct variables accounted for 12.3% of the

variance in quitting intention while the extension variables of group identity, self-identity, moral norms, and past quit attempts contributed an additional 16.5% to the explained variance in intentions. Ajzen (1991) supports the addition of additional variables to the model as long as the original TPB variables are explained and the additional predictor variables contribute significantly to intention.

Only a limited number of smoking studies elicited beliefs as recommended by Ajzen (1991). This study was designed to follow Ajzen's methodology to elicit beliefs for use in the data collecting instrument. By eliciting the beliefs, a study gains rich qualitative data grounded in the population and more of the variance in intentions can be explained. In one study by Puffer and Rashidian (2004), nurses' intentions to offer smoking cessation advice to patients was examined. By measuring both the direct and belief variables, they determined 40% of the variance in intention was explained. The belief variables alone explained 21% of the variance in intention.

The TPB theoretical framework has demonstrated its ability to predict intentions but the strength of the predictions appear to vary across situations and behaviors (Armitage & Conner, 2001). Despite over 900 publications, since 1985, that identified TPB as the explicit theoretical framework to explain a variety of health behavior intentions (Francis et al., 2004; Godin et al., 1992; Sutton, 1998), studies that applied the TPB to predict smoking cessations were scarce. Critics of the theory have suggested the results obtained from most studies were often inconclusive and the theoretical framework provided only a description of the motivational processes underlying quitting smoking with limited

information (Webb, Sniehotta & Michie, 2010). Therefore, instead of negating the elicitation of beliefs and using predetermined independent variables found in many studies, eliciting the beliefs and direct variables grounded in the specific population would appear to provide more useful information.

Attitude.

Attitude is defined as a cognitive process influenced by personal experiences and is expressed by either behavioral or emotional responses (Fishbein & Ajzen, 2010). The study of attitude contributes to our understanding of human behavior and Thurston (1931) asserted that opinions or beliefs about a behavior could be measured from verbal expressions. He was the first to develop a standardized attitude measurement instrument that been influential in the development of other attitude scales, i.e. the Likert scale. His belief-based measurement is a primary component within the TPB methodology. TPB asserts that behavioral beliefs represent a person's attitude toward performing a behavior; therefore, more information can be gained regarding a person's attitude by examining levels of beliefs (insight into ways people think about the behavior). Fishbein and Ajzen (2010) stated "once a set of beliefs are formed and are accessible in memory; it provides the cognitive foundation from which attitudes are assumed to follow*"* (p.99). According to the TPB, bipolar adjective scales measure attitude of smokers, such as *desirable* or *undesirable* and *good* or *bad.* The stronger the attitude is toward quitting the better the predictor of one's intention to quit smoking (Fazio, 2001).

Two distinct underlying dimensions of attitude, affective and instrumental, have been discussed in several studies (Conner & Armitage, 1998; French et al., 2005). Affective attitudes are feelings associated with performing a behavior (e.g., *I will feel more anxious*). By asking *what are the advantages* and *disadvantages of smoking cessation* the instrumental construct of attitude is measured. During the process of eliciting behavioral beliefs, both dimensions of attitude are collected but rarely differentiated as separate concepts in the questionnaire. Because of expressed concerns, French et al., (2005) examined the method of eliciting beliefs and the measurements of attitude. In their study, beliefs regarding exercise were elicitation from 213 participants to determine if different beliefs triggered affective or cognitive attitudes. They determined positive beliefs, such as I am good, were positively associated with both affective (feelings) and cognitive (thinking) attitudes, and negative beliefs, such as I am bad, were positively associated with cognitive attitudes and negatively associated with affective attitudes. While the feeling components have consistently been the strongest predictor of behavioral intentions, this study reinforces the value of examining the factor analysis to ensure the variable reflects the construct we want to measure.

Subjective Norm.

SN has been the weakest predictor of intention across all behaviors (Armitage & Conner, 2001; Conner & Sparks, 2005; Wiium, Breivik, Wold, 2006) and normative beliefs, indirect measure of SN, are the most problematic variables within the model (French et al., 2007). To address concerns with the validity, reliability, and sensitivity of

the TPB questionnaire development and specifically the NB variable; French et al. (2007) conducted two studies. Using a *think aloud* method, researchers asked participants to expresses their thoughts out loud while completing the TPB questionnaire. This method allowed researchers to assess problems the participants were having with completing the TPB questions. Two groups with different educational levels participated in the study and differences among the two groups were not statistically significant. The most pervasive problems identified with the TPB questionnaire included: the complex question structure as measured by the many participants inability to understand the questions or answer them as the researcher intended; participant's lack of knowledge or lack of beliefs to adequately answer the questions; and participant's hesitancy or indifference to answering the normative belief questions. This study raises some important considerations with TPB questionnaire development and provides support for assessing scale reliability.

Godin and Kok (1996) suggest SN's inability to reach significance as often as attitude or PBC is related to two problems; we are not measuring the effect exerted by social influences and SN is inadequately operationalized. To increase the predictability of subjective norm, McMillan and Conner (2003) redefined subjective norm into two variables, descriptive norms and moral norms. In a previous study (1999) they determined descriptive norms explained 2% of the variance in intention above the TPB variables; therefore they felt normative influences may play a greater role in predicting intentions and explaining behavioral change if defined differently. McMillan and Conner

(2003) examined undergraduate student's self-reported use of alcohol and tobacco to assess if the variables, moral norm and descriptive norm, would be better predictors of intentions than SN. Moral norm was defined in relation to moral or ethical influences, such as when the students considered the consumption of either alcohol of tobacco as morally wrong. Descriptive norm was assessed in relation to the consumption of either tobacco or alcohol by friends, a partner, or family member. They determined moral norms were not a significant predictor of intentions although prior studies found that the addition of moral norms added significantly to the prediction of intention (Ajzen, 1991; Beck & Ajzen, 1991, Conner & Armitage, 1998; Kurland, 1995). Descriptive norm was only marginally predictive of the intention to use tobacco but a significant predictor of intention to use alcohol. In conclusion, redefining subjective norm did not add to its predictability of intentions to use alcohol or tobacco and PBC was the most significant predictor of intention to use both substances (alcohol: $R^2 = .29$, $F(2, 138) = 28.1$, $p < .001$; tobacco: $R^2 = .43$, $F(2, 138) = 50.6$, $p < .001$).

Kim (2008) conducted a smoking cessation study among Korean men using a modified version of the TPB and he examined the relationships between many of the psychosocial variables and intentions. He deviated from Ajzen's (1988, 2006b) methodology in a number of ways. He measured self-efficacy instead of PBC. He used his self-developed attitude scale instead of the normed attitude measurement. He also measured SN as perceived social pressures from the family and from friends because of his perception that friends and family hold conflicting beliefs related to smoking. He

found no significant relationship between self-efficacy and intentions, but both attitudes and social norms were significantly correlated with intentions. The psychosocial variables he measured, tobacco use history and past-year quit attempts, were significantly correlated with intentions to quit. The past-year quit attempts and average number of cigarettes smoked per day explained 15% of the variance in intentions to quit smoking. Overall, the modified variables explained 37% of the variance in intention, and attitudes and perceived family social norms explained 22% of this variance.

Perceived Behavioral Control.

PBC is defined by the extent to which individuals feel control over smoking and the perceived ease of quitting. However, the literature suggests a controversy exists in conceptualizing PBC and measuring the variable. Several researchers have suggested that PBC, as it is measured and conceptualized, actually represents two different constructs (Kraft et al, 2005; Terry & O'Leary, 1995; Trafinow et al., 2002; White, Terry, & Hogg, 1994). In a discussion by Smith et al. (2006), PBC is represented by two constructs: perceived control over the behavior and perceived difficulty of performing the behavior. Trafinow et al. (2002) used a meta-analysis to demonstrate distinctions between the two constructs because they found each construct predicted behavioral intentions independently and perceived difficulty accounted for more variance across multiple studies. This controversy has occurred in other studies in which the measure of self-efficacy was used as a proxy for PBC and was found to have higher predictability of

intentions (Rise, et al, 2008). The two different concepts of PBC were also identified and measured within this current study.

PBC and intention interaction has been identified as the most predictive among all the TPB variables (Armitage & Conner, 2001). In their meta-analytic review, all three direct variables (attitudes, SN, and PBC) on average explained 39% of the variance in intentions; whereas PBC alone accounted for 27% of the variance. Many studies have shown PBC as the most important predictor variable of intentions (Ajzen, 2002a; Apodaca et al, 2007; Godin & Kok, 1996; Kovac, Rise, & Moan, 2010; Moan & Rise, 2005; Norman, Conner, & Bell, 1999; Rise et al., 2008).

Demographic Variables.

Ajzen (1991) has suggested that both demographic and environment factors are already included in the TPB constructs and do not independently contribute to the model. In keeping with Ajzen's recommendations, the collected demographic characteristics of this study are used for descriptive purposes only.

Summary.

The TPB is a theoretical framework to both predict and explain intentions to quit smoking among healthcare providers and the prescribed methodology can identify constructs that enable future interventions to be developed. The predictor variables are attitude (smoker's cognitive evaluation of smoking); SN (perception of social pressure to quit); and PBC (the perception of control over smoking). The dependent variable, intentions to quit smoking, are generally stronger when attitudes toward quitting are

positive, perceptions exist that significant others want them to quit, and the control over smoking cessation exists. From the literature it appears PBC has shown the greatest predictability of intentions; therefore, by supporting a smoker's sense of ease with smoking and strengthening their sense of control, intentions to quit would be greater.

The TPB methodology recommends the data collection instrument be developed from the direct predictor variables as well as elicited belief measures. Theoretically, the positive and negative beliefs about smoking cessation provide targets from which interventions can be developed; therefore, by strengthening the expressed positive beliefs toward smoking cessation and extinguishing the negative beliefs, smoking cessation is more likely to occur. Few TPB studies were found in the literature that explain or predict smoking cessation intentions. Even fewer studies used both the direct and belief predictors. No TPB studies were located that explained or predicted smoking healthcare providers' intentions to quit smoking.

This review revealed tobacco cessation guidelines have been developed but have been underutilized by most healthcare providers. Although healthcare providers have the knowledge related to the health consequences of smoking, their personal smoking behaviors limit their effectiveness and willingness to assist patients with smoking cessation. Those who deny the health consequences of smoking may be using risk denial strategies to cope with their paradoxical behavior. It is practical to think some smoking healthcare workers experience cognitive dissonance from smoking and use strategies i.e. self-exempting beliefs to reduce this dissonance.

CHAPTER III

METHODOLOGY

Introduction

The methods applied in this study are discussed in this section. A description of the research design, sample, measures to protect human subjects, data collection procedures, and strategies for data entry and statistical analysis are detailed.

Study Design

The purpose of this study was to examine the relationship between the TPB constructs in predicting intentions to quit smoking among healthcare workers and the relationship between these TPB variables with the addition of self-exempting beliefs measure. The research design was a descriptive correlational design with the use of a cross-sectional survey method. A descriptive correlational study explores the relationships between variables and provides estimates of their variance (Polit & Beck, 2010). The primary analyses included multiple linear regression and mediation (path) analysis.

Sample Recruitment

A convenience sample of 90 self-identified smoking adult healthcare workers, 18 years of age and older, employed by Carilion Clinic, and able to speak and read English were recruited. A power analysis using *G-Power (Version 3.1.1)*, a freeware sample sizesoftware package (Faul, Erdfelder, Buchner, & Lang, 2009), revealed that 90 participants were required to have 80% power to detect an effect size of 35%, which is considered large, and a 2-sided test with a level of significance at $p = 0.05$. The choice of a large R^2 is supported by multiple correlation coefficients (.32 to .39) reported in three similar studies in the literature (Armitage & Conner, 2001; Johnston et al., 2004; Norman, Conner, & Bell, 1999).

Setting and Questionnaire Administration

Recruitment included all self-identified smoking healthcare workers through direct contact with observed smokers or with advertisements placed on the employee intranet site, and flyers distributed on bulletin boards, personnel restrooms, and locker rooms within Carilion Clinic facilities. The recruitment flyer is located in Appendix A. Permission was granted to recruit subjects from a variety of outpatient clinics and from the four hospital administrators. Carilion Clinic healthcare system is tobacco free and at the time of obtaining permission to recruit subjects, administrators provided details of the widely known smoking locations off site. With the help of an enlarged sign replicating the recruitment flyer, researcher displayed the sign hanging from a cord worn around the neck and solicited potential subjects as they left the facility to smoke. Other participants

either called or emailed researcher with interest in the study. The researcher provided each participant the research study information sheet which detailed the informed consent, (see Appendix B), and provided confidentiality assurance. If participants were willing to participate they were provided the questionnaire in a manila envelope with an additional subject information sheet attached. Some participants were hand delivered the questionnaire while some participants requested delivery through interoffice mail. A convenient time and location were identified for the delivery of the completed questionnaire and compensation of a *Quit Now* tote bag containing smoking cessation literature and the $15.00 gasoline gift card were provided. After receiving the completed questionnaire, the gift card identification number was recorded on the numbered envelope to provide a record of accountability for the grant providers.

The recruitment and data collection phases of this study were completed in six weeks during February and March. The settings included three rural hospitals and one larger urban hospital as well as numerous outpatient medical clinics within the city and rural communities. The support received from the healthcare managers and administrators within the four hospitals and multiple outpatient healthcare sites made the data collection enjoyable and successful. Additionally, a grant award was received from the data collection agency to conduct this study (see grant award letter in Appendix C).

Human Subjects Protection

The Human Subjects Committee, Internal Review Board exemption approval was obtained from the University of North Carolina at Greensboro and Carilion Clinic, the

healthcare organization site of recruitment (See Appendix D, E, & F). To ensure patient anonymity, the healthcare organization required that no record of individual participants' enrollment be maintained and no confidential identifier number could be assigned to document a subjects' participation. At the time of recruitment each participant was informed verbally and in writing that the study was voluntary and that they could choose not to participate or withdraw from the study anytime without consequences. All potential subjects were informed regarding the procedure and purpose of the study.

Instrumentation

Ajzen (2006b) details the specific methodology for developing the TPB measures which includes both an initial qualitative study followed by a quantitative study. The predictor variables in the TPB model are internal constructs with each variable measured directly and indirectly. Both methods were included in the quantitative portion of the study and measured within the context of the TPB model.

Construction of TPB Belief Measures

In the initial qualitative study, N=16, healthcare providers similar to the study's population were solicited to answer open-ended questions about their beliefs and from these beliefs a final questionnaire was developed. This method of eliciting beliefs from the population to be studied provides more relevant information for the questionnaire development. The elicitation of beliefs about quitting smoking from smoking adult healthcare employees was performed and after 16 interviews, saturation of data was reached.

To elicit outcome expectations these questions were asked: 1) What are the good things that would happen for you if you were to stop smoking from now to three months from now? and 2) What are the bad things that would happen to you if you were to stop smoking from now to three months from now?

To elicit important referents for the development of the normative belief scale, the respondents were asked: 1) Who are the people important to you who may influence you to keep smoking? and 2) Who are the people important to you who may influence you to stop smoking?

To elicit factors that would make smoking cessation easy or difficult to be used in the development of the control belief scale, the respondents were asked: 1) "What are the factors or things in your life that would make stopping smoking easier?" and 2) "What are the factors or things in your life that would make stopping smoking more difficult?" After each question, they were asked "can you think of anything else?"

The collected belief statements from the interviews were analyzed and their responses were then grouped into modal sets of beliefs (i.e., behavioral beliefs, normative beliefs, and control beliefs). A content worksheet was prepared and three experts in scale construction and/or the theory of planned behavior were asked to review and provide comments related to the content, placement of responses, and the relevance of the responses to the questions asked. The worksheets were collected and compiled. Content validity of the scales was established by a 96% agreement among this panel of experts. The content in the modal belief sets were used to form the questionnaire scales to

measure the indirect variables for the final study. These indirect measures included the behavioral beliefs, normative beliefs, and control beliefs and their corresponding outcome expectancy beliefs. The behavioral belief scale was comprised of items formed from the elicited behavioral beliefs, and the outcome evaluation scale included corresponding evaluation of each behavioral belief. Important referent beliefs that were elicited were used to form items for the normative belief scale, and the motivation to comply scale included corresponding beliefs about whether the participant would comply or not comply with the referent. The control belief scale was developed from the elicited beliefs about what makes smoking cessation easy or difficult, and the perceived power scale was formed from items corresponding to the control beliefs that measured the perceived power to control each of the factors. The strength of this questionnaire construction methodology is that by eliciting the underlying cognitions from smoking healthcare workers, the TPB concepts used in the data collection are more representative of the study population (Ajzen, 2006b), and therefore, the data are grounded in the population under study.

Quantitative Questionnaire Development

In the literature, most of the TPB research studies did not include the elicitation of indirect belief measures. Both direct and belief construct measurements were included in the questionnaire for this study because greater construct validity can be established and more variance in the dependent variable, intention, can be explained. The direct measurements of the study constructs (attitude, subjective norm, perceived behavioral

control, and intention) were developed from Fishbein and Ajzen's (2010) composition of generic direct beliefs. Since both direct and belief scales examine the same construct, they are expected to be positively correlated (Francis et al., 2004). Measurements of validity and reliability of the developed instruments were assessed to provide assurance the instruments measured what they are intended to measure (validity) and assessed how dependable the instrument measured the constructs they were designed to measure (reliability) (Polit & Beck, 2010).

Attitude.

Attitude toward quitting were measured directly with seven items: *"My quitting smoking in the next 3 months is …*" wise-foolish, unpleasant-pleasant, harmful-beneficial, productive-unproductive, bad-good, useless-useful, and worthless-valuable. All items were scored using a five-point bipolar scale from 1 (very unlikely) to 5 (very likely). Higher scores represented a positive attitude toward smoking cessation.

The belief measure of attitude, behavioral beliefs and corresponding outcome evaluation, was developed from the initial elicitation study. The behavioral beliefs were measured with 13 items based on a 5-point scale ranging from 1 (very unlikely) to 5 (very likely). Higher scores indicated a more positive behavioral belief related to smoking cessation. The corresponding 13 outcome evaluation items were evaluated on a 5-point scale ranging from 1 (extremely bad) to 5 (extremely good). Each behavioral belief was multiplied by its corresponding outcome evaluation and the products were summed for a weighted belief score. An average of the product scores were used to quantify behavioral

beliefs. The possible range for the behavioral belief score is from 1 to 25. The higher the score, the more favorable the behavioral belief is toward quitting smoking. The belief measure of attitude is mathematically represented by $A= \sum (bb) (oe)$, where A represents the attitude toward the behavior, bb is the strength of the behavioral belief about quitting smoking, and oe is the outcome evaluation of the belief.

Subjective norm.

SN is the perceived social pressure that important others demand, or expect for one to quit or not quit smoking. SN was measured with three items using a five-point bipolar scale: i*)* "Most people who are important to me think I should quit smoking in the next 3 months", ranging from 1 (true) to 5 (false); ii) "Most people whose opinions I value would approve of me quitting smoking in the next 3 months*",* ranging from 1 (unlikely) to 5 (likely); iii) "Most people like me quit smoking within 3 months following major heart surgery", ranging from 1 (agree) to 5 (disagree). Possible responses all ranged from 1 to 5 with higher scores indicting others influenced them to quit smoking.

NB are belief measures of SN indicating whether the individual believes significant others will approve or disapprove of them quitting smoking and whether they want to comply with others perceived wishes. The NB and the corresponding motivation to comply (MC) were assessed with the belief items derived from the elicitation study. Normative beliefs were measured with eight items (about whether specific individuals are perceived to exert pressure to quit smoking) and using a 5-point measurement scale from

1 (definitely should not) to 5 (definitely should). Higher scores indicate a more positive normative belief that the participant experiences social pressure to quit smoking. The corresponding eight scores for motivation to comply items were evaluated from 1 (not at all) to 5 (very much). Each normative belief was multiplied by its corresponding motivation to comply response and the products were summed for a weighted belief score. An average of the product scores were used to quantify normative beliefs. Mathematically this is calculated by SN= $\sum$ (nb) (mc). The possible range for the normative belief is from 1 to 25.

Perceived behavioral control.

PBC is the perception of how easy or difficult it is for one to quit smoking and takes into account past experiences of quitting as well as potential barriers to quitting (Ajzen, 2006b). PBC was measured with four items: "I am confident that I can quit smoking in the next 3 months", rated on a scale from 1 (true) to 5 (false); "My quitting smoking in the next 3 months is completely up to me," rated on a scale from 1 (disagree) to 5(agree); "If I really wanted to, I could quit smoking in the next 3 months," rated on a scale from 1 (likely) to 5 (unlikely); "For me to quit smoking in the next 3 months is under my control," rated on a scale from 1 (absolutely no control) to 5 (complete control). The higher the PBC score the greater the sense of control over quitting.

Control beliefs are the belief measures of PBC and reflect beliefs that behavioral change is under one's own control instead of control from others. The control beliefs were measured with 13 items based on a 5-point scale ranging from 1(strongly disagrees)

to 5 (strongly agrees). All positive items were scored from 1 to 5 and negative items were reverse scored (six of the thirteen items were reverse scored). The higher the scale score, the more positive one's sense of control appears. The corresponding 13 perceived power items were evaluated on a 5-point scale 1 (strongly disagree) to 5 (strongly agree). Each CB was multiplied by its corresponding perceived power and the products summed for a weighted score. An average of the product scores were used to quantify control beliefs. PBC was calculated by $\sum$ (cb) (p) (Ajzen, 1991); the strength of each control belief (cb) (what things would facilitate or inhibit smoking cessation) and the perceived power (p) of the control belief (how difficult or easy would it be to quit smoking).

Intention to quit smoking.

Intention to quit smoking is the dependent variable and was measured with four items on a five-point bipolar adjective scale preceded by the statements: "I intend to quit smoking in the next three months" ranging from 1 (definitely do) to 5 (definitely do not); "I will quit smoking in the next 3 months" from 1 (likely) to 5 (unlikely); " I am willing to quit smoking in the next 3 months " from 1 (false) to 5 (true); and "I plan to quit smoking in the next 3 months" ranging from 1 (agree) to 5 (disagree).

Self-Exempting beliefs.

Peretti-Watel, Halfen, and Gremy (2007) explained that the more internalized conflict (cognitive dissonance) a smoker perceives, the more they will engage self-exempting beliefs. It is expected that the greater one's intention is to quit they less they will use self-exempting beliefs. This 10-item scale included the statements: "If I quit

smoking, I am afraid I will gain weight;" "If I quit smoking, I am afraid I will get even more stressed;" "I have not smoked long enough to be exposed to smoking-related diseases;" "I don't smoke enough cigarettes to be exposed to smoking-related diseases;" "My family ancestry protects me from the health consequences of smoking;" "Physical exercise protects me against smoking-related disease;" "Living in a fresh air climate protects me against smoking-related diseases;" "The way I smoke protects me against smoking-related diseases;" "I have already smoked so much that quitting now would not decrease my personal risk for having a smoking-related disease;" "Science and medicine will soon find a treatment to definitely cure smoking-related diseases," and was preceded by the statements: 1) strongly disagree to 5) strongly agree. The higher the score the more engaged will be the self-exempting beliefs with less intention to quit smoking.

Social desirability.

Social desirability was measured to explore potential bias in the participant's responses. Since nonsmoking has become the norm in our society, the likelihood for subjects to portray themselves in socially acceptable ways by underreporting their smoking and over reporting positive beliefs about smoking cessation seems possible. This is especially likely with questions pertaining to attitudes (Fishbein & Ajzen, 2010). To assess this potential response bias, social desirability was assessed using a shorten version of the Marlowe-Crowne Social Desirability Scale (Johnson, n.d., Strahan & Gerbasi, 1972). The 10-item scale requires participants to decide whether each statement having social desirability properties is true or false. Responses are given a value of one if

true and zero if false. Scale items were recoded so that statements indicating socially desirable responses will have a value of one, while responses that do not indicate socially desirable response bias will have a value of zero. The items were then added for a measure of social desirability. The higher the score the greater the possibility of a socially desirable response set.

Data Collection Procedure

The questionnaire for this study is made up of three sections and can be found in Appendix G. The first section is the smoking survey consisting of seven subsections to measure the TPB theoretical constructs of; behavioral beliefs and outcome evaluations, normative beliefs and motivation to comply, control beliefs and power of control factors, and the direct measures of attitude, subjective norm, perceived behavioral control, and intention to stop smoking. The belief portion of the TPB scale consists of six subsections applying a 5-point bipolar response scale. The direct TPB constructs and the intention to quit scale made up the seventh subsection and required the participant to rate their opinions on a scale from one to five, (See Table 1).

Table 1

Correspondence Between Elements of the Model, Study Variables, and Questionnaire Items

Elements of the Model	Study Variables	Questionnaire Item Number
Independent variables: Behavioral Beliefs & Outcome expectancy (Beliefs)	Beliefs that quitting smoking leads to certain outcomes.	1a,b,c,d,e,f,g,h,I,j,k,l,m 2a,b,c,d,e,f,g,h,i,j,k,l,m
Normative Beliefs & Motivation to Comply (Beliefs)	Beliefs that significant others will approve or disapprove of smoking cessation and whether they want to comply with to others perceived wishes.	3a,b,c,d,e,f,g,h 4a,b,c,d,e,f,g,h
Control Beliefs & Perceived Power of Control (Beliefs)	Beliefs that smoking cessation is under one's control instead of control from others.	5a,b,c,d,e,f,g,h,I,j,k, l, m 6a,b,c,d,e,f,g,h,I,j,k,l,m
Attitude Toward the Behavior (Direct Measure)	A person's favorable or unfavorable evaluation of smoking cessation.	7
Subjective Norm (Direct Measure)	The perception of social pressures to engage or not engage in smoking cessation and the motivation to conform to these pressures.	8, 9, 10
Perceived Behavioral Control (Direct Measure)	The perception of how easy or difficult it is for one to stop smoking and accounts for past experiences and potential barrier to smoking cessation.	11,12,13,14
Self-Exempting Beliefs (Peretti-Watel, Halfen, & Gremy, 2007)	Beliefs minimizing the perceived risk of smoking and reduces cognitive dissonance.	19a,b,c,d,e,f,g,h,I,j

Table 1 continued

Elements of the Model	Study Variables	Questionnaire Item Number
Dependent variable: Intention to Quit Smoking	The perceived likelihood one will engage in smoking cessation.	15, 16, 17, 18
Social Desirability Scale (Strahan and Gerbasi, 1972),	10-item version of Marlowe-Crowne social desirability scale.	20
Personal Characteristics	Age	21
	Sex	22
	Education	23
	Ethnicity	24-25
	Marital Status	26
	Children in the Home	31
	Annual Family Income	30
Occupational Characteristics	Length of Time in Current Job	27
	Current Position	28
Health Characteristics	Medical Disease State	29
Smoking Status	Partner	32
	Friends	33
	Age Began Smoking	34
	Number of Years Smoked	35
	Time Until First Cigarette	36
	Cigarettes per Day	37
	Most Cigarettes Smoked	38
	Cigarette Less Willing to Give Up	39
	Other Forms of Tobacco	40
Smoking Cessation Characteristics	Quit Attempt Within Past Year	41
	Interest in Quitting	42
	Number of Quit Attempts	43
	Confidence to Quit Scale	44
	Sought Treatment in the Past	45
	Treatments Attempted to Quit	46
	Called or Participated in *Quit Now*	47-48

Elements of the Model	Study Variables	Questionnaire Item Number
	Virginia, Telephone Quit Line Willingness to Participated in Quit Line	49

The second section is the 10-item self-exempting belief scale. This scale is an additional variable added to the TPB theoretical constructs. This scale was initially developed by the International Tobacco Control Four-Country Survey (ITF-4), and was used in their prospective study of more than 2,000 longitudinal survey responses. The scale was designed to evaluate the impact of smoking control measures (Thompson, et al., 2006). Other empirical studies (Chapman & Rubinstein, 1987; Chapman, Wong, & Smith, 1993; Hansen & Malotte, 1986; Peretti-Watel, Halfen, & Gremy, 2007; Yong & Borland, 2008) have used the original or reduced versions of the self-exempting belief scale and reported reliability scores ranging from 0.63 to 0.86. The 10-item scale selected for this study was easily accessible (Peretti-Watel, Halfen, & Gremy, 2007) and permission to use the scale was provided by I. Gremy from the France Health Monitoring Center of Paris, France (see Appendix F1, Permission to use Self-exempting Belief Scale).

The final section of the questionnaire contains a 10-item short version of the Marlowe-Crowne social desirability scale (Strahan & Gerbasi, 1972) and a 29-item demographic and tobacco use survey. The demographic and tobacco use survey describes the characteristics of the sample and seeks basic information as found in the Global Adult Tobacco Survey (CDC, 2010b). The demographic questions pertain to age,

sex, highest level of education, ethnic identity, marital status, position of employment, income level, and medical disease status. The tobacco use survey includes questions on the individual's age at the initiation of smoking, history of tobacco use, number of previous quit attempts, willingness to quit smoking, types of tobacco cessation techniques attempted, the timing of the first cigarette smoked in a day (an indicator of nicotine dependence as measured by the Fagerstrőm Nicotine Dependence Scale (Heatherton, Kozlowksi, Frecker, & Fagerstrőm, 1991) and the interest of the subject to participate in the healthcare system's sponsored telephone cessation program.

According to Ajzen's methodology (2006a), the instrument was developed and collected data with a self-administered, paper and pencil questionnaire. The questionnaire subject burden was taken into consideration during instrument development. This included the instruments established reading level, time in completing the questionnaire, and the validity of the measures. Microsoft Word was used to compute the readability score using the *Flesch-Kincaid* grade level score. The questionnaire revealed a 5.7 readability score suggesting at least a 6th grade reading level. After the draft of this questionnaire was piloted by healthcare workers, items were reworded for clarity and it was determined that the survey takes approximately 20 minutes to complete.

Data Analysis Plan

This section includes a discussion of the procedures used for data entry and analysis. The level of significance was set a priori at $p < 0.05$ to reduce the Type 1 error

rate. See Table 2 for a list of each research question and the selected statistical analysis and rationale.

Table 2

Statistical Analyses of the Research Questions

Research Question	Statistical Analysis	Rationale
1. What is the relationship between behavioral beliefs, attitude, normative beliefs, subjective norm, control beliefs, and perceived behavioral control, and the intention to stop smoking?	Pearson's r correlation Multiple linear regression: -Multiple correlation coefficient *r* -Coefficient of determination (R^2)	To examine relationships among all of the variables. To indicate strength of relationship and degree to which they are related. To explain the percentage of variance in intentions from behavioral beliefs, normative beliefs, and control beliefs.
2. What is the relationship between behavioral beliefs, attitude, normative beliefs, subjective norm, control beliefs, perceived control, self-exempting beliefs and intention to quit smoking?	Pearson's *r* correlation Multiple linear regression and mediational path analysis	Intention, the dependent variable is continuous and is measured on an interval scale
3. Does the Theory of Planned Behavior and self-exempting beliefs explain more of the variance in intention to quit smoking that the Theory of Planned Behavior?	Multiple regression Mediational analysis	Self-exempting beliefs are categorical and measured on a nominal scale

Research Question	Statistical Analysis	Rationale

Research Questions	Statistical Analysis	Rationale
Demographic and tobacco use survey questions and social desirability scale to describe the sample.	Descriptive statistics: Means, Standard Deviations, & Valid percentages	data Nominal& ordinal data

Data Entry and Validation.

The survey data were organized, and analyzed using the *Statistical Package for the Social Sciences (SPSS, version 18).* Frequencies and cross tabulations on all the variables were computed to ensure correct data entry and to assess for completed data. When discrepancies in the data entry were identified, the questionnaires were examined and corrections were made. Continuous scale variables were inspected for outliers, and each scale item was inspected for accuracy, missing data problems, outliers and skewness.

Analysis and Treatment of Missing Data.

Missing data are expected with self-administered questionnaires; however from the total of 90 respondents and 153 questions only .03% of the data from this study was calculated as missing. All of the demographic and tobacco survey questions were completed with the exception of two respondents omitting question number 38, "When during the week do you smoke the most?" It is not clear why this one question was omitted unless the participants felt they smoked the same amount during both the week

and weekend and the question did not provide an alternative answer. The majority of missing data was found in two scales, the direct attitude and indirect normative belief scale. Two respondents in the attitude scale omitted answering seven of the questions and 14 respondents omitted questions in the normative belief and corresponding motivation to comply scales. The four items from the normative belief scale with missing data included: "How strongly are you willing to do: 1) what my partner or spouse, 2) my children, 3) other family members, and 4) my preacher or other religious advisor, thinks I should do about smoking?" It was assumed the data from the normative belief scale was not omitted randomly but associated with the absence of that referent in the subject's life. Again, no response was provided in the questionnaire answer for respondents to indicate not applicable. Tabachnick and Fidell (2007, pp. 62-72) discuss multiple techniques to handle missing data, both missing at random and missing not at random. They recommend with missing data of less than 5% to negate all of the subject's responses. Instead of losing all the data from the nonresponding participants, the decision was made to impute that individual's scale means, rounded to the nearest whole number.

Evaluation of Assumptions

When testing hypotheses about the relationships between variables and before performing statistical analysis, certain assumptions are made about the data and must be tested to ensure no violations have occurred. Each analysis requires different tests of assumptions and some analysis are stricter about violations than others. When assumptions about the population are satisfied, confidence about the accuracy of tests of

statistical significance is increased (Pallant, 2010). Five assumptions must be reasonably satisfied when the primary analysis is multiple linear regression. These assumptions can all be assessed from residual plots except for multicollinearity. These assumptions included; 1) normality which occurs when residuals are normally distributed around the dependent variable scores; 2) linearity which requires the independent variables to exhibit a straight line relationship with the dependent variable scores; 3) homoscedasticity which is satisfied when the variance between the obtained and predicted dependent variable scores are the same for all predicted scores; and 4) avoiding multicollinearity, which exists when the independent variables are highly correlated. Multicollinearity can also be tested from the multiple regression statistical output collinearity diagnostics table labeled coefficients. Two values of tolerance and variance inflation factor (VIF) were examined. Tolerance indicates how much of the variability of the specific independent variable is not explained by the other independent variables in the model. This is calculated by 1-*R* squared for each variable (Pallant, 2010). If the tolerance values are less than .10, this indicates that the correlation of the predictor variables with each other is high and the VIF is the inverse of tolerance value (1/tolerance), values of 10 or above indicate severe multicollinearity (O'Brien, 2007; Tabachnick & Fidell, 2007).

Preliminary analyses were performed on all direct, indirect multiplicative scales, intentions, and the self-exempting belief scale. This analysis was necessary to examine for the presence of outliers and to ensure no violation of the assumptions of normality, linearity, and homoscedasticity occurred. There are multiple ways to assess for these

assumptions, both graphically and statistically. Graphical methods include examining scatterplots, histograms, and P-P plots, and statistical methods include examining for multicollinearity with the VIF and tolerance values.

No highly skewed distributions or significant outliers were detected. Linearity and homoscedasticity were assessed with the bivariate scatterplots of the dependent variable (intentions) against the independent variables and the residual plots to provide a general estimate of linear relationships. A reasonable oval-shaped pattern of the plot indicated linearity and normality (Tabachnick & Fidell, 2007, pp. 83-86) which was found between the intention variable and the independent variables.

Scatterplots of each variable were examined for the presence of outliers because significant outliers can lead to Type I or Type II errors of interpretation. Normality was assessed by examining the distribution and independence of the residuals. Skewness and kurtosis was examined with the descriptive output and assessed with histograms, normal probability (P-P) plots, and detrended normal probability plots. One outlier was noted in each of the direct scales: PBC, attitude, and SN. The 5% trimmed mean was calculated and compared to the original mean as a measure to determine if the outliers strongly influenced the mean scores (Pallant, 2010). Since the means were very similar, the outliers did not appear to have a strong influence; the mean values for PBC ranged from 3.8 to 3.9, SN means ranged from 4.0 to 4.1, and attitude means ranged from 4.4 to 4.6. All of the variables appeared to have reasonably normal distribution as visualized with

the histogram and this is an adequate test of normality according to Tabachnick and Fidell (2007).

Most of the residuals where within the center of the plot at each value of the predicted score with a normal distribution of residuals trailing off from the center (Tabachnick & Fidell, 2007). From the descriptives output, the skewness and kurtosis values were examined. Skewness values indicate the symmetry and kurtosis provides information about the peakedness of the distribution (Pallant, 2010). When the distribution is normal the values of both skewness and kurtosis are zero. The skewness and kurtosis values were inspected on each variable and found the variables all maintained values close to zero with the exception of the direct attitude scale which was only slightly deviated with a -1.3 for skewness and 1.9 for kurtosis. This skewness does not indicate a problem according to Pallant (2010) because often scales used in social sciences will be skewed either way. This skewness is reflecting either agreement or disagreement with the constructs being measured. When kurtosis exists the variables variance is frequently underestimated (Tabachnick & Fidell, 2007). Comparisons were made between graphs and statistical values and the variables with low positive skewness values were clustered to the left and the low negatively skewed scores tended to cluster on the right hand side of the graph. The scales of self-exempting beliefs and control beliefs demonstrated slightly more positive skewness; whereas attitude, perceived behavioral control, and subjective norm scales were slightly negatively skewed.

Correlational Analysis

A Pearson product-moment correlation coefficient (r) was performed and intercorrelations of all the constructs were examined. A scatterplot was examined and assessed for violations of the assumptions, linearity and homoscedasticity. Because the assumptions were not significantly violated, this parametric test was selected to describe the strength and direction of the linear relationships between the variables. When interpreting this test, a correlation of zero indicates no relationship between the variables and a positive or negative correlation of one indicates a perfect relationship. Cohen's conventions for effect size were used for comparison (Polit & Beck, 2010).

Multiple Linear Regressions.

Multiple regressions were performed to answer the proposed research questions by determining the extent to which independent variables predict the intention to quit smoking. The variables were entered simultaneously with the dependent variable intention. The Adjusted R^2 was examined to determine the overall variance explained by the entered variables. The ANOVA provides the overall models significance. The standardized coefficients (Beta) provided the unique effect size for each variable.

Two models were examined to test the hypotheses of this study. The first model with only TPB variables was examined for the contributions of the direct measures and belief measures on the healthcare workers' intention to quit smoking. The second model was examined with the addition of self-exempting belief scores with the TPB variables to assess the added contribution of cognitive dissonance on intentions to quit smoking. The

Adjusted R^2 was calculated to explain the variance in intention to quit smoking from behavioral beliefs, normative beliefs, control beliefs, and self-exempting beliefs. To determine significance, all statistical tests used $p < 0.05$ as the determination of significance.

Mediational (Path) Analysis.

A four step mediation analysis proposed by Baron and Kenny (1986) and Judd and Kenny (1981) was calculated using multiple regression ordinary least squares. The purpose of this analysis was to determine the mediational relationship between direct and indirect effects from two models (with and without self -exempting beliefs) and to determine which model variables contribute the most in predicting intention to quit smoking. From the four steps undertaken to establish mediation, the first step establishes that there is an effect that can be mediated by indicating the indirect predictor variable (BB, SN, or CB) is correlated with intention. The second step involves a link in the relationship between the indirect predictor variable and the mediator (direct variables: Attitude, SN, or PBC). To document the second link in the causal path in step three, a relationship between the mediator (direct predictor variable) and intention must be established while controlling for the belief variable. If these three steps are met, then partial mediation is indicated. In the fourth step, to establish that the direct predictor mediates the belief and intention relationship, the relationship between the belief and intention should be reduced to zero (Judd & Kenney, 1981). In other words, the independent variables should be correlated with the mediators, and both should be

correlated with intentions (Louis, 2009). If the independent variable reduces at all, it is mediated by the direct variable and conducting the Sobel test is recommended to report significance (Preacher & Hayes, 2008).

Using Barron and Kenny's (1986) procedure for estimating mediational effects using a series of regression analyses, a regression equation was constructed from the standardized *beta* coefficients (path coefficients) from each of the belief and direct variables and the statistical significance was examined to determine if the variables make a significant contribution to the prediction of intention. As recommended by Barron and Kenny (1986), the Sobel test was used to determine if the reduction in prediction was statistically significant. The Sobel test provides the standard error of *ab* calculated with the equation of $b^2s_a^2 = a^2s_b^2$ (for more details see Kenny, 2011).

CHAPTER IV

RESULTS

The results from the data analyses are presented in four sections. The basic descriptive information for the study variables are discussed first followed by a description of the measures and correlations between the variables. The analytic outcomes of the research questions are examined next in which a series of multiple regressions were used to test the first two research questions. In the last section, a series of regression analyses were conducted to answer the third research question by determining which model variables contributes most in predicting intention.

Characteristics of the Sample

The respondents in this study were predominately healthy, white married females, ranging in age from 23 to 76. Fifty one percent of these participants were between the ages of 30 to 50 and most had received education beyond high school. Approximately 70% of the participants had incomes exceeding the region's average annual income and the majority had been in their current job at least five years. Fifty five percent of the respondents were nurses and 30% of those were registered nurses (RN). Medical technicians and nursing assistants accounted for 38%. Upon examination of the percentage of providers with associates degree or less (60%) as compared to bachelor's degree (12%) it would seem reasonable to assume more RN's had an associate degree. Consistent with National statistics (CDC, 2010c), most started smoking between 15 to 19

years of age, and have smoked more than 20 years. Fifty eight percent have children in the home while 34% have smoking partners, and at least one quarter of their friends smoke. The majority smoke between a half to a full pack per day and smoke more on the weekends. The first cigarette of the day is smoked within six to 30 minutes upon waking and other forms of tobacco are not generally used. Nicotine dependency is similar to the general population as measured by the Fagerstrőm dependence scale (CDC, 2010a; Fagerstrőm, 2002). Within the past year, 43% have attempted to quit with two or more attempts, 84% are contemplating smoking cessation, 57% lack confidence in their ability to quit smoking, and 62% report an unwillingness to quit. Cold turkey was used as the primary method of cessation (54%) therefore suggesting many have experienced nicotine withdrawal symptoms. Over the counter cessation aides, such as transdermal nicotine patches, nicotine gum or lozenges were used by only a relatively few while 34% have seen a prescribing provider and received prescription medications. While the telephone quit line receives recognition on the Carilion intranet and is advertised as a free service, 90% have not taken advantage of this cessation program. Overall, more than half of the respondents are contemplating quitting but lack confidence in their ability. Despite the Agency for Healthcare Research and Quality (AHRQ, 2011) findings that nicotine replacement products and counseling combined result in higher abstinence rates, most cessation attempts have been attempted without nicotine reducing products and without the assistance of the available telephone counseling support.

Personal and Health Characteristics.

Personal, occupational, tobacco use, and smoking cessation characteristics of the total sample (N = 90) are summarized in detail in Tables 3 to 6. The respondents were primarily female (82%), married (61%), White (94%), between the ages of 31 and 49 (M = 41.6, range 23 to 76), and with children in the home (58%). In general, the participants were healthy with 64% indicating no known medical disease followed by 17% with a diagnosis of asthma. This majority were fairly well educated with 60% having completed at least an associate's degree (AD), followed by high school graduates (17%), and bachelor's degrees (BS) (12.2%). An annual family income of $40,000 to $59,000 was reported by 24.4% of the subjects. This amount exceeds the $29,211 average annual income within the Southwest region of Virginia (Virginia Government, 2010).

Table 3

Personal and Health Characteristics of the Sample

Personal Characteristics	Frequency N=90	*Percent
Sex (N=90)		
Female	74	82
Male	16	18
Age (N=90)		
24 or less	4	4
25-30	16	18
31-49	42	47
50-60	24	27
61 or more	4	4
Race (N=90)		
White	85	94
Black	3	3
Other	3	3
Marital Status (N=90)		
Single	7	8
Live with partner and not married	10	11
Married	55	61
Widowed	4	4
Divorced	8	9
Highest Education (N=90)		
GED	4	4
High school graduate	15	17
Some college or trade (Associate degree or less)	54	60.
Bachelor's degree	11	12
Master's degree	6	7
Children Living in the Home (N=90)		
Yes	52	58
No	38	42
Total Family Annual Income (N=90)		
$ 0-14,999	1	1
15,000-29,999	19	21
30,000-39,999	13	14
40,000-59,999	22	24
60,000-79,999	19	21
80,000 and up	16	18

Table 3 continued

Health Status of the Sample		
No known disease	58	64
Cancer	4	4
COPD	5	6
Heart Disease	7	8
Diabetes Mellitus (Type 1 or 2)	6	7

*****No exclusion of missing data.

Occupational Characteristics of the Sample.

Occupational characteristics of the sample (*N*=90) are summarized in Table 4. Twenty five percent of the smoking healthcare workers have remained in their current job for 3 to 5 years (*M* = 5 to 10 years) and 55.5% of the respondents were nurses. Nurses responding to the questionnaire were identified as; nurse practitioners (2%), registered nurses (30%), or licensed practical nurses (23%). From the majority of the remaining population, 38% of the respondents were either nursing assistants (21%) or medical technicians (17%), and no respiratory therapists or physicians agreed to participate in the study.

Table 4

Occupational Characteristics of the Sample

Occupational Characteristics	Frequency N=90	Percent
Length of Time in Current Job		
less than one year	3	3
1-2 years	9	10
3-5 years	22	24
5-10 years	20	22
More than 10 years but less than 20 years	20	22
More than 20 years	16	18
Current Job		
Medical or Lab Technician tech	15	17
Nurse Practitioner	2	2
RN	27	30
LPN	21	23
Nursing Assistant	19	21
Social Worker, Therapist	2	2
Other	4	4

Smoking Status.

The characteristics associated with the participants smoking status are summarized in Table 5. The history of tobacco use among this population revealed 61% started smoking cigarettes between the ages of 15-19 years and 80% have smoked more than half a pack of cigarettes per day (54% for the last 15 years). These percentages compare with the general population of smokers with initiation beginning in adolescence (CDC, 2010a; MaGahee & Tingen, 2000). For the majority of smokers, the first cigarette is consumed within six to 30 minutes of awakening thus indicating a high degree of nicotine dependence as measured by the Fagerstrőm dependency scale. At least a quarter of their friends smoke and among the 72% either married or living with a partner, 34% of

those partners currently smoke. The majority of smokers do not use other forms of tobacco, and 62% smoke more during the weekend than they do on weekdays.

Table 5

Smoking Status of the Sample

Smoking Status Characteristics	Frequency N=90	Percent
Partner's Smoking Status		
Current Smoker	31	34
Ex-Smoker	20	22
Never Smoked	23	26
No Partner Now	16	18
How Many Friends Smoke		
None	5	6
One-Fourth	43	48
One-Half	35	39
All	7	8
Age Began Smoking		
10 years or Younger	3	3
11-14	15	17
15-16	28	31
17-19	29	32
20-25	7	8
26-39	7	8
40 or older	1	1
Number of Years Smoked		
Less Than One Year	2	2
2-5 Years	8	9
6-10 Years	18	20
10-15 Years	16	18
15-20 Years	16	18
More Than 20 Years	30	33
Time to First Cigarette (*Fagerstrőm Nicotine Dependency)*		
Within 5 Minutes	10	11
6-30 Minutes	35	39
31-60 Minutes	26	29
After 60 Minutes	19	21

Table 5 continued

Smoking Status Characteristics	Frequency N=90	Percent
Number of Cigarettes/Day		
5 or Less	11	12
1/2 Pack or Less	49	54
1 Pack	24	27
1.5 Packs	6	7
When Smoke the Most (N=88)		
Weekend	56	62
Weekday	32	36
Which Cigarette Hate Most to Give Up		
First One in the Morning	36	40
All Others	54	60
Use of Other Forms of Tobacco		
Yes	7	8
No	83	92

Smoking Cessation.

Smoking cessation attempts, confidence level, and interest in quitting were assessed. In the last year, 43% have attempted to quit smoking with two or more quit attempts in a lifetime. Table 6 provides a summary of the smoking cessation characteristics from this sample. A confidence level to quit smoking was measured with a scale of 1-10, with 10 being the most confident; 57% of the respondents scored below seven although 84% of the population are contemplating smoking cessation. Sixty two percent indicated an unwillingness to quit, 47% have sought prior treatment to quit and among the list of cessation trials, 54% were unsuccessful quitting cold turkey and 34% have used prescription medications. The telephone quit line provider by the employer has been underutilized with only 10% indicated prior participation and 62% are not interested in the service.

Table 6

Smoking Cessation Characteristics of the Sample

Smoking Cessation Characteristics	Frequency N=90	Percent
Attempted to Quit Within Past Year		
Yes	39	43
No	51	57
Interest in Smoking Cessation		
Not at All	4	4
Very Little	11	12
Somewhat	42	47
Very Much	33	37
Serious Attempts at Cessation		
None	10	11
One	18	20
Two or More	62	69
Confidence Level (1-10) of Quitting in Next 3 Months		
1 Less Confident	9	10
2-4	21	23
5-6	22	24
7	14	16
8-9	15	16
10 Most Confident	9	10
Sought Treatment to Quit Smoking		
Yes	42	47
No	48	53
Treatments Attempted to Quit Smoking (N=90)		
Cold Turkey	49	54
Patches, Gum, or Lozenges	37	41
Prescription Medication	31	35
Counseling	7	8
Hypnotism or Acupuncture	8	9
Prayer or Meditation	8	9
Smokeless Tobacco	5	6
Other- Responded with Electronic Cigarettes	2	2

Table 6 continued

Smoking Cessation Characteristics	Frequency N=90	Percent
Prior Participation in Telephone Quit Line		
Yes	8	9
No	82	91

Willingness to Try a Free, Telephone Quit Line		
Yes	34	38
No	56	62

Factor Analysis and Validity Assessment

An exploratory factor analysis with varimax (orthogonal) rotations was performed on all the TPB and self-exempting belief scales to explore the patterns of interrelationships among the items and to determine the factors of the constructs underlying items. The intent of the factor analysis was to examine the patterns of intercorrelations. A factor loading of .30 and above was the criterion set for accepting a scale item (Tabachnick & Fidell, 2007, p.649). This analysis resulted in eliminating items that were poorly correlated with other items.

The test for internal consistency was measured by Cronbach's alpha to determine the extent to which the items in each scale measure the same construct. Using Tabachnick and Fidell (2007) recommended criteria for scale reliability, the coefficients of all the direct and belief instruments scales were .70 or greater.

The internal consistency of the social desirability scale (Cronbach's alpha of .61) was lower than the other scales in this study but according to Strahan and Gerbasi (1972).this scale had good internal consistency.

Psychometric Findings of the Measures

This section provides a summary of the descriptive analysis of the model variables and the Pearson correlation coefficient analysis to determine if a relationship exists between the variables and the strength of the relationship. By squaring the

obtained correlation coefficient the percent of variance in the variable can be explained (Pallant, 2010).

Behavioral Beliefs Scale.

The mean score for the indirect measure of attitude (BB) was 17 (*SD* = 4.5). Means on the 12-item scale ranged from a low of 7 to a high of 25 on a scale from 1 to 25. The indirect measure of attitude indicates a strong belief that quitting smoking would lead to more favorable outcomes and those outcomes would be good. There was higher agreement with positive beliefs related to quitting smoking, such as saving money, smelling less like smoke, and improving health. The scores for the negative belief statements were all below the midpoint of the scale range. The highest agreement among the negative beliefs included the beliefs that smoking would be replaced with a worse habit, quitting smoking would lead to weight gain, and physical illness would be experienced with quitting.

Attitude Scale.

The direct measure of attitude had much less variance among the items. The mean for the direct measure, attitude was 4.4 (*SD* =.60), indicting the healthcare workers had a very positive attitude toward smoking cessation. Means on the 5 item scale items ranged from a low of 2 to a high of 5 on a scale of 1 to 5. Respondents' agreement remained high throughout the entire scale with the mean scores only deviating .4 of a point. The Pearson correlation coefficient for the direct and indirect measure of attitude was .51 ($p < .001$), indicating a positive and moderately strong and significant relationship.

Factor analysis revealed one factor loading and the inter-item correlation coefficients for the scale's seven items ranged from .38 to .68. Reliability analysis of the item-to-total correlations ranged from .73 to .84. The standardized Cronbach's alpha for the attitude scale was .85 with the elimination of unpleasant to pleasant due to the low inter-item correlation coefficient of .38. The possible range of scores was from 1 to 5, with higher scores indicating a more positive attitude toward smoking cessation. A factor analysis on the behavioral belief items on a rotated component matrix revealed three factors, accounting for 68% of the variance. Factor one loaded with six positive items (e.g., "I will live longer"), factor two had four negative outcome beliefs (e.g., "I will gain weight"), while the third factor included two positive outcome beliefs unrelated to factor one items (e.g., "saving time I could use for other things"). One item "I will control my weight" did not correspond to the outcome evaluation and was omitted therefore reducing the number of items to 12. The internal consistency of this scale was measured with a Cronbach's alpha score of .80 demonstrating a high level of reliability.

Normative Beliefs Scale.

The mean score for the indirect measure of subjective norm (normative beliefs) was 15.3 (*SD* = 4.2). Means on the 6 scale items ranged from a low of 6 to high of 25 on a scale of 1 to 25. The indirect measure of subjective norm indicated a modest amount of perceive social pressure and motivation to comply with this pressure to quit smoking. There was higher agreement among the subjects whose quitting was influenced first by their child, followed by their healthcare provider, then spouse or partner. Coworkers and religious advisors appear to have little to no influence on quitting.

Subjective Norm Scale.

The mean for the direct measure, SN, was 4.1(*SD* = 0.69) on a scale of 1 to 5. The variance in this direct scale also had much less variance among items than the belief measure. The mean score ranged from a low of 1.3 to a high of 5. The mean score indicates the workers have fairly strong opinions about the influence from important others on their quitting smoking. Respondent agreement was highest in feeling that the opinion of valued others and people important to them think they should stop smoking with less agreement on quitting smoking following major heart surgery. The Pearson correlation coefficient for the indirect and direct measures of subjective norm was .46 ($p < .001$), indicating a moderate and significant relationship.

SN loaded on one factor and the inter-item correlations for these three items ranged from .32 to .63 with an explained variance of 64%. The Kaiser-Meyer-Olkin Measure of Sampling (KMO) value of .61 met the recommended value of .60 and Bartlett's Test of Sphericity reached statistical significance, supporting the factorability of the correlation matrix (Tabachnick & Fidell, 2007). The Cronbach's alpha for the subjective norm scale also indicated a high reliability coefficient of .72. Normative belief was an eight item scale and was reduced to seven items after completing the factor analysis and Cronbach's alpha test for reliability. Two factors were identified by the rotated component matrix which accounted for 69% of the variance. After excluding "people who sell cigarettes"; partner, children, and family loaded on one factor. A second factor included coworkers, friends, healthcare provider, and religious advisor.

Item- to-total correlations ranged from .42 (partner influence) to .70 (friends influence). The Cronbach's alpha of reliability was high (.84) with the 7 item scale.

Control Beliefs Scale.

The mean score for the belief measure of PBC (CB) was 8.3 (*SD* = 1.96). The mean scores for the 12 scale items ranged from 4.5 to 13.7 on a scale of 1 to 25. Respondents reported having limited control over quitting and quitting smoking would be easier if they had support from family and friends, and greater smoking restrictions at home and work. These healthcare workers believed the habit of smoking and being around other smokers made smoking cessation more difficult.

Perceived Behavioral Control Scale.

The mean score for the direct, PBC, measure was 3.9 (*SD* = .74) on a scale from 1 to 5, indicating that healthcare workers perceive a moderate amount of control over quitting smoking. Although there was more worker agreement that they had some control over quit smoking, they were less confident they could quit or they wanted to quit. The Pearson correlation coefficient for the belief and direct measure of perceived control was .40 ($p < .001$), indicating a fair but significant relationship. This indicated that both the direct and belief scales of each variable are significantly and positively related to each other.

The Kaiser-Meyer-Olkin Measure of Sampling (KMO) value of .68 met the recommended value of .60 and Bartlett's Test of Sphericity reached statistical significance, supporting the factorability of this correlation matrix. The communalities table, which provides information on how much of the variance in each item is explained

(Pallant, 2010), was examined and the values ranged from .36 to .75. This indicates that the items do fit well with each other item on this one-factor solution. The Cronbach's alpha for this scale was also high with a value of .77. In the control belief scale, the KMO revealed an adequate sample size with value of .70 and the Bartlett's Test of Sphericity achieved a significant level. A factor analysis on the belief items initially loaded on 4 factors accounting for 60% of the variance with a Cronbach's alpha of .65. After items were assessed and eliminated based on their item-total correlation, seven of the thirteen items were retained increasing the reliability to .70. This strategy resulted in reducing the scale to two factors accounting for 53% of the variance.

Self-Exempting Beliefs Scale.

The mean score on the 9- item self-exempting belief scale was 2.2 (*SD* = .50) on a scale of 1(strongly disagree) to 5 (strongly agree) suggesting a lower self-exempting belief score. The means ranged from a low of 1.2 to a high of 3.6. Respondent agreement was highest that a cure for smoking related diseases would soon be found and they have not smoked long enough or enough cigarettes to be exposed to smoking-related diseases. Because there was less agreement among the respondents they may be less likely to experience a very high degree of cognitive dissonance with regard to smoking. The correlation of self-exempting beliefs with the direct and belief measure of attitudes revealed a significant but negatively weak correlation ($r = -.26$, $p < .05$) suggesting an inverse relationship. Therefore as self-exempting beliefs increased attitudes toward smoking cessation would decrease. PBC also demonstrated a significant but positive and weak relationship with self-exempting beliefs ($r = .13$, $p < .05$) suggesting as one's sense

of control over smoking cessation decreased so would the use of self-exempt beliefs. The relationships among self-exempting beliefs and the other variables were not significant.

The KMO and Bartlett's test on the self-exempting belief scale revealed adequacy and statistical significance indicating appropriateness of a factor analysis. The factor analysis loaded on three factors with six of the ten items loading on factor one. Based on other studies (Chapman & Rubinstein, 1987; Chapman, Wong, & Smith, 1993; Hansen & Malotte, 1986; Peretti-Watel, Halfen, & Gremy, 2007; Yong & Borland, 2008), the self-exempting beliefs scale had good internal consistency, with a Cronbach's alpha coefficient ranging from .63 to .86. In the current study, the standardized Cronbach's alpha coefficient was .70 based on all 10 items and .82 with 8 of the 10 items. The inter-item correlation with the ten items had low to negative low correlations and the item-total statistics ranged from .15 to .65. The results of the factor analysis and Cronbach's alpha are located in Table 7.

Table 7

Factor Analyses and Cronbach's Alpha of the Scale Items

Scale	Items	Factors (% Variance)				Cronbach Alpha
		1	2	3	4	
Behavioral Beliefs x Evaluation						**.80**
	Live longer	.810				
	Have more energy	.778				
	Breathing will improve	.813				
	Gain weight		.713			
	Save money	.780				
	Have more time			.805		
	Smell less like smoke	.694				
	Health will improve	.874				
	Feel better mentally			.654		
	Feel physically sick		.772			
	Replace smoking with worse habit		.586			
	Feel more anxious, irritable, angry		.728			
Control Beliefs x Power						**.718**
	Being around others who smoke			.658		
	Calming effect	.504				
	Having habits			.702		
	Having meds	.708				
	Support				.833	
	Healthy substitute		.729			
	Limits or restrictions			.699		
	Doing other activities	.672				
	Feeling pressure to quit		.748			
	High cost	.697				
	Concern about weight		.752			
	Desire to quit	.499				

Table 7 continued

Scale	Items	Factors (% Variance)				Cronbach Alpha
		1	2	3	4	
NB x Motivation to Comply						**.841**
	My spouse or partner		.806			
	My children		.790			
	Other family members		.707			
	Co-workers	.913				
	Friends	.765				
	Healthcare provider	.746				
	My preacher/religious advisor	.772				
Attitude						**.844**
	Wise/Foolish	3.4				
	Beneficial/Harmful	.66				
	Productive/Unproduct-ive	.58				
	Good/Bad	.54				
	Useful/Useless	.49				
	Valuable/Invaluable	.29				
SN						**.718**
	Most people who are important think I should quit	.827				
	Most people whose opinions I value would approve of me quitting	.877				
	Most people like me quit within 3 months of major heart surgery	.691				

Table 7 continued

Scale	Items	Factors (% Variance)				Cronbach Alpha
		1	2	3	4	
PBC						**.773**
	I am confident	.802				
	Quitting is completely up to me	.598				
	If I really wanted to quit	.867				
	Quit smoking is under my control	.804				
Intention						**.911**
	I intend to quit	.911				
	I will quit	.899				
	I am willing to quit	.890				
	I plan to quit	.854				
	I am afraid of weight gain		.873			
	I am afraid I will get more stressed		.831			
	Not smoked enough time to be exposed to smoking related diseases	.747				
	I don't smoke enough to be exposed	.832				
	My family ancestry protects me	.711				
	Physical activity protects me	.794				
	Living in fresh air climate is protective	.763				
	The way I smoke protects me	.846				
	Smoked so much quitting now not decrease personal risk			.734		
	Science and medicine will soon find treatment to cure diseases			-.66		

Intention to Quit Smoking Scale.

The mean score for the 4-item intention to quit smoking measure was 3.2 (*SD* = .91) on a scale from 1 to 5. Only 10% of healthcare workers reported they intended to quit smoking, 33% were unsure, and 31% had no intentions to quit.

Similarly, the likelihood of quitting had a mean of 3 (*SD* = 1.0) on a scale of 1 to 5. Overall, 22% indicated plans to quit and 33% were willing to quit. The majority of the respondents, 36 to 40%, were unsure, and 31% had no plans to quit. Generally these healthcare workers were ambivalent about quitting but more were willing to quit than those planning or intending to quit. This ambivalence and willingness suggests that smoking cessation programs specific to this population would be useful to improve their cessation attempts. The data suggested a limited relationship between attitudes and intention but a relationship exists between the sense of control over smoking and intentions to quit. The correlation between the direct (r = .26) and belief (r = .29) measures of attitude with intention revealed significant but weak relationships ($p < .001$). Whereas, perceived behavioral control had a large (r = .49) and significant relationship with intention.

The KMO on the intention scale was .83 representing the sampling adequacy and the Bartlett's Test was significant. The four item scale loaded on one factor ranging from .85 to .91 on the component matrix and 79% of the variance was explained. The Cronbach's alpha was .91 and the inter-item correlations ranged from .63 to .78.

Social Desirability Scale.

The mean score on the 10 item Marlowe-Crown scale of social desirability (Strahan & Gerbasi, 1972) was 6.8 (*SD* = 2.0) on a scale from 2 to 10, indicate that respondents had a fairly biased social desirability response. Pearson correlation coefficients for the social desirability scale and the measure of attitude (r = .02, p = .86) and behavioral belief (r =.12, p = .27) had low correlations and insignificant relationships. Items related to normative beliefs (r = .28, p = .008), control beliefs (r =.35, p = *.001*) and perceived control (r = .21, p = .047) revealed some social desirability bias as indicated by a significant relationship but the level of social desirability bias was overall very low. Overall, it appears the respondents answered honestly but their answers reflected a desire to appear less influenced by others and more control of quitting than in reality.

The content validity and reliability of the social desirability scale was examined and according to the KMO and Bartlett's test a factor analysis was supported and performed. The factor analysis loaded on 3 factors with the last five items representing non biased responses loading on factor one, followed by two positive items on the factor two, and three items of devaluing others loading on factor three. The total variance explained was 53%. The communalities scale revealed a range of .34 to .67 with the lowest score on "I can remember playing sick to get out of something." The Cronbach's alpha coefficient for this study was .61, less than desirable but similar to the internal consistency measured by others. According to (Strahan & Gerbasi, 1972), the Marlowe-Crowne social desirability scale has fairly good internal consistency, with a Cronbach's

alpha coefficient reported of .59 to .70. The item-total correlations ranged from .14 to.47 suggesting low correlations among the items. The inter-item correlation matrix also revealed low to low negative correlations which correspond to the low Cronbach's alpha.

Table 8 summarizes the descriptive findings of the study variables including the range, mean, and standard deviation. The totals for each scale variable are also provided.

Table 8

Range, Mean, and Standard Deviations for the Variables

Variable (N= 90)	Range	Mean	SD
Behavioral Beliefs			
have more energy	3-25	18.0	6.4
breathing will improve	4-25	17.0	6.2
gain weight	5-25	19.0	5.9
live longer	3-25	15.0	6.8
save money	5-25	21.2	5.2
have more time for other things	1-25	12.2	7.0
smell less like smoke	4-25	18.7	6.0
health will improve	5-25	18.7	5.7
feel better mentally or relieve stress	2-25	11.7	5.9
feel physically sick	1-25	9.6	4.5
replace smoking with worse habit	1-25	9.7	5.1
feel more anxious, irritable, or angry	4-25	14.8	6.1
Total Scale	**7-25**	**17.1**	**4.5**
Attitude			
Wise	1-5	4.5	.89
Beneficial	1-5	4.4	.78
Productive	1-5	4.1	.93
Good	1-5	4.4	1.1
Useful	1-5	4.3	.75
Valuable	1-5	4.6	1.0
Total Scale	**2 -5**	**4.4**	**.60**

Table 8 continued

Variable (N=90)	Range	Mean	SD
Normative Beliefs			
should or should not - spouse or partner	2-25	16.4	6.1
should or should not - children	3-25	18.5	5.8
should or should not - other family members	4-25	16.6	6.1
should or should not - people I work with	3-25	12.7	6.0
should or should not - friends	3-25	13.2	5.6
should or should not - healthcare provider	3-25	16.7	5.4
should or should not - preacher or other religious advisor	3-25	12.8	6.0
Total Scale	**6 -25**	**15.3**	**4.2**
Subjective Norm			
most people who are important think I should quit in next 3 months	1-5	4.4	.89
most people whose opinions I value would approve of me quitting	1-5	4.4	.78
most people like me quit within 3 months of major heart surgery	1-5	3.5	.93
Total Scale	**1.3 - 5**	**4.1**	**.69**
Control Beliefs			
need medications to decrease craving	2-25	8.8	3.9
have support from family and friends	4-25	14.8	5.4
have a healthy substitute for smoking	2-20	10.1	4.1
limits or restrictions on smoking	4-25	12.3	5.6
(Table 8 continued)			
others smoke around me	1-12	4.1	2.5
smoking has a calming effect	1-12	3.7	2.6
have to smoke when I do other activities	2-25	10.1	4.7
feel pressure from others	1-20	6.4	4.4
have a habit of smoking	1-16	2.7	2.5
cigarettes cost a lot of money	5-25	14.3	5.9
concern about gaining weight	1-20	4.4	3.6
lacking the desire to quit	1-25	8.0	4.3
Total Scale	**2.6 - 13.7**	**8.3**	**2.0**

Table 8 continued

Variable (N=90)	Range	Mean	SD
I am confident I can quit in next 3 months	1-5	3.1	1.1
My quitting in next 3 months is completely up to me	1-5	4.5	.75
If I really wanted to, I could quit	1-5	3.8	1.0
In the next 3 months, for me to quit is under my control	2-5	4.2	.83
Total Scale	**1.25 –5**	**3.9**	**.74**

(Table 8 continued)

Intention			
I intend to quit in next 3 months	1-5	3.0	1.0
I will quit in next 3 months	1-5	3.0	1.0
I am willing to quit in next 3 months	1-5	3.4	1.0
I plan to quit in next 3 months	1-5	3.0	1.0
Total Scale	**1-5**	**3.2**	**.91**
Self-Exempting Beliefs			
if I quit, I am afraid I will gain weight	1-5	4.0	1.0
If I quit, I am afraid I will get even more stressed	2-5	4.1	.94
I have not smoked enough time to be exposed to diseases	1-5	2.0	.97
I don't smoke enough cigs to be exposed to diseases	1-5	1.9	1.0
My family ancestry protects me	1-5	1.6	.90
Physical exercise protects me	1-5	1.8	.74
Living in a fresh air climate protects me	1-5	1.9	.85
The way I smoke protects me	1-5	1.6	1.0
I have already smoked so much that quitting now would not decrease my risk	1-5	2.0	.68
Science and medicine will soon find a treatment for disease	1-5	2.5	.94
Total Scale	**2.2**	**.51**	**1.2 – 3.7**

Table 8 continued

Variable (N=90)	Range	Mean	SD
Social Desirability			
I never hesitate to go out of my way to help someone in trouble	0-1	.88	.33
I have never intensely disliked anyone	0-1	.47	.50
When I don't know something, I don't at all mind admitting it	0-1	.96	.21
I am always courteous, even to people who are disagreeable	0-1	.81	.40
I would never think of letting someone else be punished for my wrong-doings	0-1	1.0	.18
I sometimes feel resentful when I don't get my way (Table 8 continued)	0-1	.44	.50
There have been times when I felt like rebelling against people in authority	0-1	.34	.48
I am sometimes irritated by people who ask favors of me	0-1	.43	.50
I can remember playing sick to get out of something	0-1	.48	.50
There have been times when I was quite jealous of others	0-1	.57	.50
Total Scale	**0-1**	**.63**	**.43**

The intercorrelation matrix of the TPB and self-exempting belief variables is displayed in Table 9. Upon examination of the correlation matrix, intention had a statistically significant relationship with all of the belief and direct variables indicating a positive, but weak to moderate relationship. All indirect predictor variables had a positive and moderate to strong statistically significant relationship with their corresponding direct variables.

Intention to quit smoking was influenced by both the direct and belief variables but the influence was weak except for strong and positive relationship with PBC (*r* =

.50). The respondents perceived social pressure and the willingness to comply with social pressure could impact both their attitude and beliefs about quit smoking. Perceived barriers to quitting were identified as weight gain, greater anxiety if they quit, and being around other smokers. Overall, despite positive attitudes toward quitting and the increased sense of control over quitting, their confidence in quitting was less.

Self-exempting beliefs had a weak but significant correlation with attitude, behavioral beliefs, and subjective norm. A positive but non-significant relationship existed between intentions and self-exempting beliefs.

Table 9

Intercorrelation Matrix for TPB and Self-Exempting Belief Variables

Variable	BB	ATT	NB	SN	CB	PBC	Intent	SEB
Behavioral beliefs (BB)	1.000							
Attitude (ATT)	.512** .000	1.000						
Normative beliefs (NB)	.479** .000	.481** .000	1.000					
Subjective norm (SN)	.239* .023	.375** .000	.456** .000	1.000				
Control beliefs (CB)	.257* .014	.161 .131	.360** .000	-.018 .865	1.000			
Perceived control (PBC)	.247* .019	.272** .009	.324** .002	.323** .002	.380** .000	1.000		
Intention (Intent)	.278** .008	.255* .015	.339** .001	.262* .013	.297** .004	.493** .000	1.000	
Self-exempting beliefs (SEB)	-.257* .014	-.266* .011	-.108 .309	-.051 .635	.131 .011	-.177 .095	.038 .723	1.000

Pearson *r* correlational matrix. *$p < .05$, two tailed. ** $p < .01$, two tailed.

Hypothesis Testing

The analyses used to test the research questions and hypotheses are described in this section. The analyses were used to examine two models; the theory of planned behavior, and the theory of planned behavior with self-exempting beliefs. Data was analyzed by multiple linear regressions and a mediational analysis was completed to answer the following research questions:

1. What is the relationship between behavioral beliefs, attitude, normative beliefs, subjective norm, control beliefs, and perceived control, and intention to quit smoking?
2. What is the relationship between behavioral beliefs, attitude, normative beliefs, subjective norm, control beliefs, perceived control, and self-exempting beliefs (an additional predictor) and intention to quit smoking?
3. Does the TPB and self-exempting beliefs explain more of the variance in intention to quit smoking than the Theory of Planned Behavior alone?

Multiple Regression Analysis

Analysis was performed using *SPSS* for the evaluation of assumptions. As discussed in the previous chapter, the evaluation of assumptions for multiple regression analyses was met and did not require transformation of the variables. Collinearity statistics were computed with all of the variables and tolerance remained less than one, ranging from .54 to .82. Multiple regression analysis requires multicollinearity be examined as one of the primary tests of assumption. Collinearity exists when the independent variables are highly correlated ($r \geq 0.90$). When the independent variables

are highly correlated and a near perfect linear relationship exists an inflated variance can result (Tabachnick & Fidell, 2007) and thus it becomes difficult to identify the unique contribution of each variable in predicting intention. As expected the direct and corresponding indirect measures were highly correlated because they measure the same constructs. However, correlations between the TPB independent variables did not exceed 0.5 and an examination of the collinearity diagnostics revealed the variables tolerance values remained high and VIF results remained low (not exceeding 1.2); therefore it was concluded multicollinearity did not exist.

Research Question 1: What is the relationship between BB, attitude, NB, SN, CB, PBC and the intention to stop smoking?

To answer this question, a least squares multiple regression was performed on Model 1, between the dependent variable, intentions to quit smoking, and the independent variables, the direct and indirect measures of attitude, subjective norm, and perceived behavioral control. The regression correlations between the variables, the unstandardized regression coefficients (B) and intercept, the standardized regression coefficients (β), are presented in Table 10. The analysis indicates R (for regression) was significantly different from zero $F(6, 83) = 5.77$, $p < .001$, and Model 1 explained 29% of the variance (R^2 of .29) in smoking intention. Model 1 included only the TPB variables and was statistically significant as evidenced by the statistical significance of the F test. The adjusted R^2 value of .24 indicates that about one quarter of the variability in intentions is predicted by the direct and indirect variables of BB, NB, CB, attitude, SN, and PBC.

Table 10

Standard Multiple Regression of Intention with TPB: Model 1

Predictors	B	Std. Error	β	*t*	Sig.
ATT	.028	.174	.019	.159	.874
BB	.023	.030	.083	.757	.451
NB	.023	.027	.104	.834	.407
CB	.049	.050	.105	.969	.335
SN	.088	.148	.67	.593	.555
PBC	.46	.132	.379	3.531	.001**

Notes: R^2 = .29, adjusted R^2 = .24; ATT= attitude, BB=behavioral beliefs, NB= normative beliefs, CB= control beliefs, SN=subjective norm, PBC=perceived behavioral control

Research Question 2: What is the relationship between BB, attitude, NB, SN, CB, PBC, and self-exempting beliefs and intention to quit smoking (Model 2)?

A second regression analysis included the addition of self-exempting beliefs with the direct and indirect TPB independent variables. The regression analysis of Model 2 is located in Table 11. Model 2 included self-exempting beliefs with the TPB variables. The *R* remained significantly different from zero, F (7, 82) = 5.41, $p < .001$, with 32% of the variance (R^2 = .32). The adjusted R^2 = .26 in Model 2 indicated a change from Model 1 with an adjusted R^2 =.24, revealing this second model contributed an additional 2% to the prediction of intentions above Model 1.

Overall, only one regression coefficient, PBC, was statistically different from zero in both models. PBC (β = .38, p < .001) made strong and significant contributions in the influence of intentions to quit smoking. The 95% confidence interval for PBC was .20 to .73 (Model 1) and .25 to.78 (Model 2). A regression analysis of PBC with intentions alone revealed 23% (R^2 = .23) of the models variance was explained by this one variable.

Table 11.

Standard Multiple Regression of Intention with TPB and SEB: Model 2

Predictors	B	Std. Error	β	*t*	Sig.
ATT	.076	.175	.051	.434	.666
BB	.031	.030	.115	1.040	.301
NB	.024	.027	.109	.885	.379
CB	.027	.051	.059	.525	.601
SN	.052	.148	.039	.347	.729
PBC	.516	.134	.419	3.841	.000**
SE	.293	.180	.164	1.623	.108

Notes: R^2 = .32, adjusted R^2 = .26; ATT= attitude, BB=behavioral beliefs, NB= normative beliefs, CB= control beliefs, SN=subjective norm, PBC=perceived behavioral control, SE=self-exempting beliefs

Research Question 3: Does the TPB and self-exempting beliefs explain more of the variance in intention to quit smoking than the TPB alone?

The addition of the self-exempting belief predictor variables was not statistically significance therefore; Model 2 did not explain more of the variance. However, to explore the third research question in greater detail a causal model analysis using mediation (path) analysis was calculated based on Barron and Kenny's (1986) four steps. By performing a mediation analysis, we can examine the belief predictor variables impact on intention and what the mediation effect of the direct variables is on the indirect and intention relationship.

Paths were estimated and the mediational results calculated. Table 12 below displays the direct, indirect, and total effects on intention to quit smoking. To establish if the attitude variable completely mediated behavioral beliefs and intention to quit relationship, a regression analysis was computed to estimate the effect of behavioral beliefs on intention, controlling for attitude. The behavioral belief did not predict intentions with attitude (β = .20, p = .202); therefore, attitude did not completely mediate this relationship. This same analysis was completed to determine if subjective norm completely mediated normative beliefs intention relationship. Normative beliefs also did not predict intentions with subjective norm (β = .10, p = .423); therefore, subjective norm also did not completely mediate this relationship. The same analysis was completed on the mediating effects of perceived behavioral control on the control belief intention relationship; it was determined that perceived behavioral control had a significant mediated effect on control beliefs with intentions (β = .45, p < .01). The coefficients that

had nonzero coefficients for the mediator (direct predictors), and the intention paths indicating mediation variables (Attitude, SN, and PBC) did not completely mediate the beliefs-intention relationship.

Table 12

Effects of Intention to Quit Smoking

Variable	Indirect Beliefs	Direct Beliefs	Total Effects
Attitude (ATT)	-	.20	.20
Behavioral Beliefs (BB)	.06	.22	.28
Normative Beliefs (NB)	.03	.34	.37
Control Belief (CB)	.38**	.30	.68
Subjective Norm (SN)	-	.10	.10
Perceived Behavioral Control (PBC)	-	.45**	.45

** = $p < .01$. * = $p < .05$

In Model 2, the addition of self-exempting beliefs is presented in Table 13. Self-exempting belief correlated only with direct and indirect variables of intention and therefore, did not meet the criteria for the mediation analysis. The calculation as predicted revealed ($\beta = .04$, $p = .72$) and the R^2 change was .26; indicating 26% of the variance in intention was explained by the addition of this variable.

Table 13

Direct Effects on Intention Adding Self-Exempting Beliefs to the Model and R^2 Change

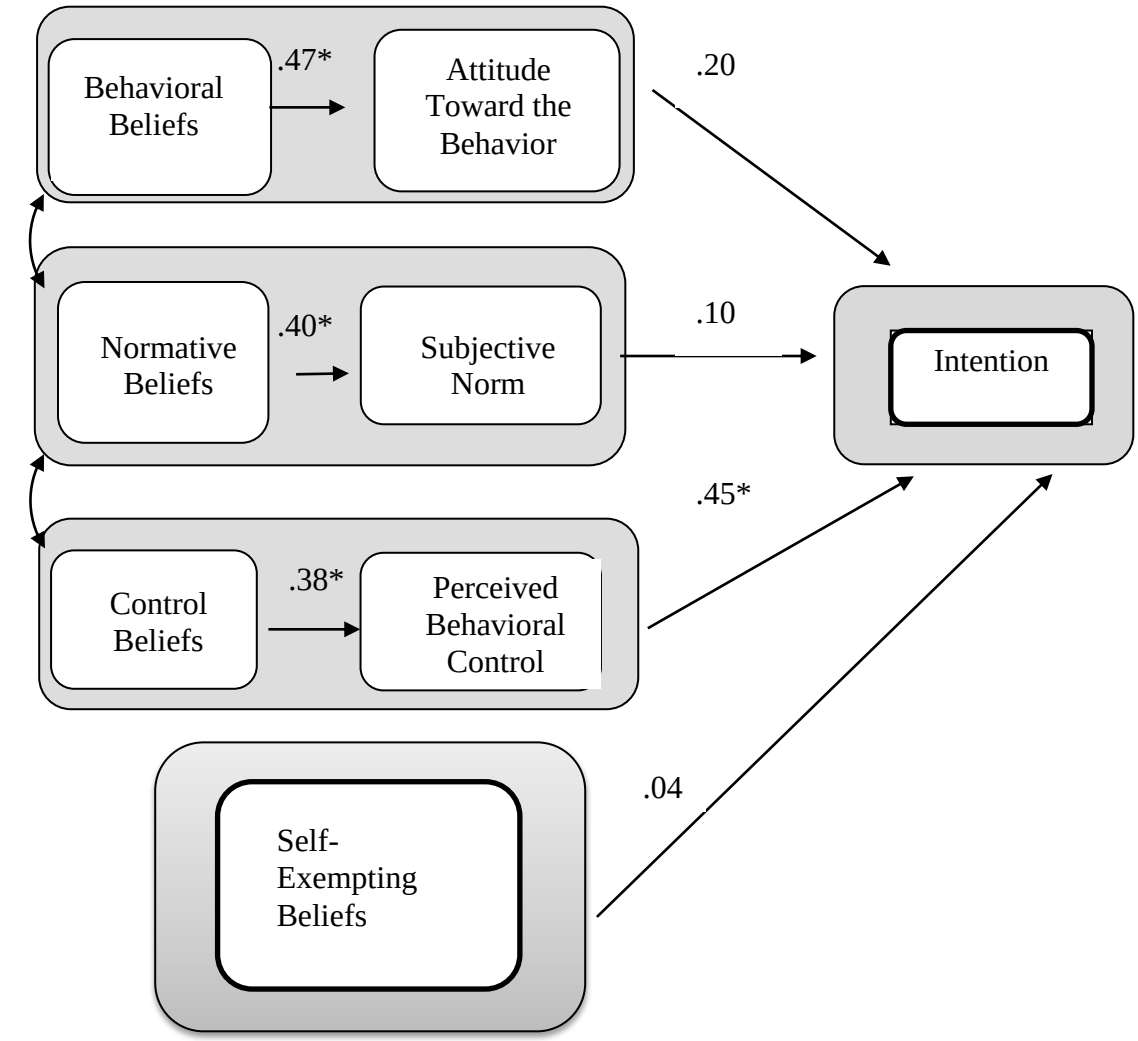
Variable	Direct Effects	Total R^2 Change
Attitude	.14	
Subjective Norms	.08	
Perceived Behavioral Control	.45	
Self-Exempting Beliefs	.15	.26

** = $p < .01$. * = $p < .05$

In Figure 2 below, the path diagram illustrates the indirect and direct effects of the variables on intention. All of the direct and indirect variables and the addition of self-exempting beliefs appear in boxes connected by lines with arrows indicating the independent variables prediction of intention to quit.

Figure 2. *Path Diagram of Mediated Analysis of the TPB variables and Self- Exempting Beliefs.*

This path analysis displays the results of the mediational analysis; the indirect predictor variables impact on intention and what the mediation effect of the direct variables is on the indirect and intention relationship.



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*$p < .05$ **$p < .01$

CHAPTER V

DISCUSSION, CONCLUSIONS, AND IMPLICATIONS

The study was designed to examine the extent to which TPB model variables (both direct and indirect measures of attitude, subjective norm, and perceived behavioral control) and self-exempting beliefs could explain and predict healthcare provider's intention to quit smoking. A summary of the study with an interpretation of findings are presented in this chapter. A discussion of the limitations associated with the study, implications of the study findings for nursing practice, and recommendations for future research are also included.

Discussion

Interpretation of the Findings

The literature suggests the TPB provides the most effective framework for predicting intentions to engage in a behavior (Ajzen, 2006a, Rise, Kovac, Kraft, & Moan, 2008). The present study was designed to evaluate the effectiveness of this model by examining the ability of the TPB variables to predict smoking cessation intention among healthcare providers and assess the influence of self-exempting beliefs on intention to quit smoking. Using Ajzen's well- defined methodology (2006a), an elicitation study was the first step in assessing smoking cessation beliefs followed by the development of a

reliable and valid questionnaire. Data analysis with correlational analysis, multiple regressions, and path analysis were used to interpret the variable's influence on the intention to quit smoking.

The TPB provided a reasonable prediction of smoking cessation in this population of smoking healthcare providers as compared to the general population. Both the direct and indirect belief variables accounted for nearly one-fourth of the variance in intentions. These results are similar to other TPB smoking studies accounting for 12% to 49% of variance in quitting intentions (Godin et al, 1992; Høie, Moan, & Rise, 2010; McMillian & Conner, 2003: Moan & Rise, 2006; Rise & Ommundsen, 2011; Wiium et al, 2006). Perceived behavioral control was significant and explained the greatest variance in intentions, in comparison to prior smoking cessation studies (Johnston et. al., 2004; Moan & Rise, 2005; Norman et al, 1999; Rowe & Mcleod-Clark, 2000b) in which PBC explained an average of 34% of the variance in intention. In two TPB meta-analyses, Godin and Kok's (1996) determined PBC contributed an additional 14% to intentions above attitude and SN among addictive behaviors, such as smoking. Armitage and Conner (2001) reported PBC contributed an additional 6% to intentions among a variety of health behaviors; as compared to this study in which PBC contributed 9% to intentions to quit smoking. PBC was the only variable in Model 1 to have any significant mediated effect, especially on the indirect (control) belief and intention relationship.

The healthcare providers in this study were predominately healthy, White married females and they exceeded the educational level and annual income level of the general population of smokers (CDC, 2008). These participants resemble the general population

with regard to the early age of smoking initiation, between 15 and 19 years of age (MaGahee & Tingen, 2000), and their level of nicotine dependence as measured Fagerstrőm Nicotine Dependence Scale (Molina, Fernández, Delgado, & Martín, 2010). The majority have children exposed to smoking in their home, despite the known health effects of second-hand smoke. C*old turkey* was the most common method used in past smoking cessation attempts suggesting previous experiences with the nicotine withdrawal symptoms. O'Donovan (2009) found similar results when examining the smoking prevalence among nurses in Ireland and reported the nurses did not take advantage of other available smoking cessation interventions.

At least half of the participants indicated an unwillingness to quit smoking within the next three months despite acknowledged personal health risks and the health impact of second-hand smoke on others. The fears of gaining weight the dreaded nicotine withdrawal symptoms of anxiety, irritability, and anger, and being around other smokers were factors perceived to make quitting smoking more difficult. Numerous other studies support these findings (Berkelmans et al, 2010; CDC, 2010; Chapman, Wong, & Smith, 1993; Kovac, Rise & Moan, 2010; Piasecki, 2006; Moan & Rise, 2005).

According to the TPB, smoking cessation begins with a positive attitude (Fishbein & Ajzen, 2010) and these providers overall maintained a favorable attitude toward smoking cessation. They also have available, but under-utilized smoking cessation assistance, such as the tobacco free quit-line and reduced costs for nicotine replacement products. These findings suggest this population has available but under-utilized smoking cessation resources (psychological and material) to quit.

Participations identified perceived benefits of cessation as better health outcomes and greater financial resources. Interestingly, the cost of cigarettes in Virginia, a tobacco producing state, are lower in comparison to other states ($4.43 average retail price per pack of cigarettes) and Virginia ranks 50th in excise tax rate and total tax rate (Tobacco-Free Kids, 2011). Perceived social pressures from significant others to quit was strong, but the anticipated ill health effects from smoking was less of a concern. The perception of social pressures to quit is understandable high given the current media influence advertising the health impact of smoking, the mandated labeling of the hazardous effects of tobacco use, and societal reactions to smoking. Although previous research studies found health concerns as motivating factors for quit attempts (Bursey & Craig, 2000; Johnston et al., 2004; Van De Ven et al., 2006), this was not a motivating factor among these participants. This may be due to their lack of a perceived susceptibility to illness and current health status.

Defense mechanisms, e.g. rationalizations or risk denial, can protect smokers from personalizing the health effects of smoking as seen in Young & Kornegay's (2004) study. A smokers' denial of risk or more specifically, self-exempting beliefs in smokers, are widespread (Peretti-Watel et al, 2007). Participants within this study engaged fewer self-exempting beliefs as anticipated although psychological justifications to minimize the harmful effects of smoking were present. For example, these healthcare providers displayed a significant correlation with self-exempting beliefs and attitude although it was negative and weak ($r = -.26$, $p < .05$). This relationship suggests self-exempting beliefs are used when negative attitudes toward quitting exist. The addition of self-

exempting beliefs to the TPB variables, as reflected in Model 2, demonstrated a R^2 change from 24% to 26%, but revealed a nonsignificant 2% change in variance. Previous studies measuring self-exempting beliefs had inconsistent results which may reflect issues with measurement according to Peretti-Watel et al. (2007). If a replication of this study is undertaken, a measurement of unrealistic optimism about the risk of smoking (Weinstein, Marcus, & Moser, 2005) may be a more reliable measure of cognitive dissonance associated with smoking among these healthcare providers.

The participants believed having support from significant others and restrictions on smoking, both at home and work, would be beneficial to quitting. However, the employment sites for all of the participants are tobacco free. Therefore, smoking restrictions exist, but access to off sites for smoking are available, although less convenient. Sarna et al. (2009) reported smoking employees make extraordinary efforts to locate places to smoke during work hours and many smoke-free hospitals fail to enforce smoking regulations (Shipley & Allcock, 2008). This survey revealed more cigarettes are smoked during the weekend than during the week suggesting more restrictions are needed in the home to reduce smoking behaviors and regulations at the worksites require greater enforcement.

The TPB relies on self-reports despite evidence suggesting potential bias may exist in the collected data. According to Armitage and Conner (2001), the TPB variables and a Marlowe-Crowne Social Desirability Scale (SDS) were applied by Beck and Ajzen (1991) to predict dishonest intentions. The SDS scale was entered into a regression equation and accounted for 5% of the variance in intentions, therefore suggesting

individuals may provide social desirable answers in terms of the direct TPB variables. The present study suggested the social desirability scale did not support the existence of strong bias in the answers as reported by Armitage and Conner (1999) and Pericas et al., (2009); however, it is reasonable to conclude that current societal norms against tobacco use could bias their answers.

Potential Limitations

There are several limitations of this study. First this study lacks the benefits of a randomized experimental design as well as the ability to control for confounding variables. Approximately three-fourths of the variance in intention was not explained by the measured variables therefore concerns related to the potential for influence by confounding variables should be consideration. Secondly, the gasoline gift card was provided as an incentive and compensation for participation in the study, but with the current cost of gasoline, the participants may have been unduly influenced to participate. Another limitation is the identified complexity of the questions to measure the variables as discussed by French et al., (2007). The TPB questions are often misinterpreted due to their complexity which might explain the missing data on the normative belief scale. Additionally, potential threats to the validity of this study may exist. The convenience sampling method may have created a selection bias by attracting a greater number of participants already contemplating smoking cessation. The demographic data might be inflated to reflect more socially acceptable responses and the potential for a recall bias when completing the tobacco history could have occurred.

Ajzen (1991) suggested the impact of the TPB may differ in different populations; therefore the generalizability of this study is limited to this group of smokers and the elicitation method to develop the indirect beliefs scale was normed to this population. However, the healthcare providers in this study may not differ significantly from the general population because the identified positive and negative beliefs related to smoking cessation resonated throughout the literature. Despite the mentioned limitations, much knowledge can be gained from a design that provides both qualitative and quantitative data.

Implications

Implications for Nurses and Other Healthcare Workers Who Smoke

Nurses have a mandated responsibility and health care expectations to advise patients to quit smoking (ANA, 2008). Additionally, healthcare workers' are in an ideal position to counsel patients they work with to quit smoking (Bodner, Miller, Rhodes, & Dean, 2011; Fagan, 2007; Sheahan, 2000). To address healthcare workers' lack of motivation in provide smoking cessation messages as identified by Schultze and Wittmann (2003); the evidenced based clinical guidelines to treat tobacco use and dependence are accessible to all providers including nurses. However, more education and practice using these cessation strategies are required and incentives are needed to improve the promotion of the guidelines.

The significance of modeling healthy behavior could be better emphasized within nursing journals and by nursing associations, educational institutions, and healthcare employers. Nurses need to be proactive in implementing existing evidenced based

interventions with both smoking nurses and patients to reduce the long term consequences of smoking. According to Sarna (2011), publications documenting nurses' contribution to research and practice are rare; therefore, more nurses must become active in contributing to the science of smoking with research studies (O'Connell, 2009). Given the political climate associated with tobacco, nurses can become more active in local and national policy making.

The ANA (2008) indicates 3.1 million registered nurses exist in the United States and this significant number can have a powerful influence on local and national tobacco policies. Bialous and Sarna (2009) discuss the major impact nurses can have on tobacco control policies. She suggests nurses can collectively and individually advocate for regulations and legislation to reduce smoking, facilitate tobacco cessation policy development, and implement smoke free workplaces within hospitals, healthcare organizations, and universities. Previous tobacco control policies have increased the tax on cigarettes and restricted advertisement of tobacco products to reduce smoking. In addition, clean indoor air measures have been imposed to decrease the impact of second hand smoke. Although Virginia has implemented the Clean Indoor Act, the tax on cigarettes remains the lowest in the nation. From this study, the financial savings associated with quitting smoking could provide an additional incentive to quit. Therefore, Virginia nurses can become more active in state legislation and advocate for higher taxes on cigarettes. Nursing researchers must evaluate the effectiveness of the tobacco control policies by examining the cost effectiveness and efficacy of smoking cessation to provide scientific evidence supporting policy implementation.

In summary, nurse researchers can contribute to the body of knowledge by developing and applying theoretical approaches to improve the understanding of factors that inhibit and facilitate smoking cessation. Researchers can conduct additional smoking cessation research studies and develop evidence-based intervention strategies, and evaluate their effectiveness in reducing smoking cessation among healthcare providers.

Implications for Research

The TPB provides a unique approach of collecting qualitative and quantitative data to assess intentions to perform specific behaviors. A future study, using another measure to elicit defense mechanisms used to minimize the risks of smoking, is needed. Additionally, it is recommended the current study be replicated with healthcare providers who have quit smoking to capture their attitude and beliefs influential in successful smoking cessation and make comparisons.

Since smoking contradicts healthcare providers' health promotion role, the development of targeted strategies sensitive to their struggle with smoking cessation are needed. Evaluation of interventions more specific to healthcare providers, with and without the use of the current Tobacco Cessation guidelines, could provide additional strategies for cessation. Despite the available interventions that currently exist for smoking cessation, participation is low and relapse rates continue to be high. Continued research examining factors that predict smoking cessation can provide important clues for designing more successful interventions.

Additionally, future studies are recommended to examine the differences in attitudes and beliefs from different levels of nurses to provide a better understanding of

why LPN's have higher rates of smoking than BSN nurses (Sarna et al., 2010) and most importantly, more research on the neurochemical effects of nicotine is needed since nicotine is a significant barrier to cessation. Studies indicating effective techniques to reduce these addictive properties would reduce perceived fears associated with symptoms of withdrawal.

This study adds to smoking cessation knowledge by providing descriptive statistics of the participants and identifying barriers such as, low self confidence in quitting, unwillingness to quit, and the underutilization of the available telephone quit line. In agreement with Webb et al. (2010), limitations to this theoretical framework include the inability to explain how to change the negative beliefs in order to facilitate behavior change. Although the theory proposes smoking cessation interventions will be more successful by focusing on changing one's sense of control over quitting, from a theoretical perspective, this seems reasonable. From a practical perspective, this provides only limited information to promote intentions. The elicitation study to capture beliefs provided more value to the practical application for smoking cessation than did the quantitative analysis. Although intention to quit smoking assumes to capture the motivational factors that influence a behavior and reveal how much effort one will exert to quit smoking, more information is needed to successfully apply this framework to encourage changes in tobacco use.

Conclusion

The TPB theoretical framework was beneficial in explaining and predicting intentions to quit for a number of reasons. The results from this study performed well in

relation to the effect sizes achieved in other smoking studies. The detailed methodology for developing the questionnaire and data analyses provided valuable qualitative and quantitative data. The findings from this study support other tobacco studies in which perceived behavioral control was the most significant predictor of intention (Armitage & Conner, 2001; Moan & Rise, 2006). Therefore, healthcare providers' perception of a lack of control over quitting and their limited confidence in controlling barriers to cessation, must be addressed to improve cessation efforts. The normative beliefs and social norm indicators reflected that persuasion messages would be ineffective strategies, but by increasing both confidence and sense of control over perceived barriers more success in cessation would be achieved. Although approximately 50% of healthcare smokers did not want to quit in the next three months, identifying population specific interventions are of great need to assist the remaining 50% who have attempted smoking cessation but relapsed. The continued reduction of smoking among all healthcare personnel must be continued in the future to improve their health and the health of the community.

The qualitative methodology for soliciting beliefs provided a rich source of data not attainable with the direct variable measures. According to the theory, the intention to quit smoking is the first step toward quitting with eventual success; therefore by changing beliefs that influence an individual's intention then smoking cessation will follow (Fishbein & Ajzen, 2010). In other words, for this population smoking cessation intentions would be improved by enforcing non-smoking regulations at work, promoting

smoking cessation support from significant others, and developing strategies to avoid other smokers, along with extinguishing the perceived barriers to cessation.

Tobacco cessation is vital in reducing the health consequences associated with smoking and the financial impact linked to treating smoking associated diseases. Healthcare providers have the greatest opportunity to promote smoking cessation and are influential in advising patients to quit (AAMC, 2007), but personal tobacco use is a significant barrier to providing smoking cessation messages. The use of evidenced-based tobacco cessation guidelines and interventions are available but the slow decline in smoking cessation among providers reveals flaws in the guidelines.

One aim of this study was to better understand the paradoxical smoking behaviors of healthcare providers and identify measures that could increase cessation and reduce the number of healthcare providers who smoking. Supportive and tailored multifactorial interventions are needed to focus on motivating smokers to quit and help them be more successful at remaining smoke free. These interventions require addressing and eliminating the beliefs associated with post cessation weight gain, nicotine withdrawal symptoms, stress reduction strategies, and the pleasures derived from tobacco use.

The descriptive statistics, qualitative, and quantitative data collected from this study can be of value to the healthcare employer for future planning, purchasing, and delivering of tobacco cessation programs.

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APPENDIX A

RECRUITMENT FLYER

QUITTING SMOKING IS HARD TO DO

Tell me about it

If you are:

- A current smoker- smoked 100 cigarettes in a lifetime
- A healthcare worker who can advise patients to stop smoking
- Employed by Carilion Clinic
- At least 18 years old
- Can read & speak English

With a 30 minute c*onfidential* research survey
You can give your opinion about quitting

All completed surveys will be compensated with a $15.00 gasoline gift card.

Contact Vicki Bierman at 540-392-0281 or vbierman@radford.edu
To discuss your interest in taking the paper survey

APPENDIX B

RESEARCH SUBJECT INFORMATION SHEET

Research Subject Information Sheet

Protocol Title:
Smoking Cessation in Health Care Workers: Applying the Theory of Planned Behavior in Predicting Intentions to Quit

Sponsor:
University of North Carolina at Greensboro and Carilion Clinic

Investigator: Vicki Bierman, FNP, PhD candidate
Carilion New River Valley, St Albans
2900 Lamb Circle, Christiansburg, VA
(cell) 540-392-0281 or (email) vhbierma@uncg.edu

What is the study about?
You are invited to be in a research study that will examine how likely healthcare workers will quit smoking based on their beliefs. There will be 90 subjects from the following Carilion Clinic locations taking part: Giles, Franklin, Roanoke, and the New River Valley.

Why are you asking me?
I have asked you to be in this study because you are a healthcare worker who smokes cigarettes.

What will you ask me to do if I agree to be in the study?
Your participation will involve answering survey questions about your attitudes and beliefs related to quitting smoking and some questions about yourself such as: your age, education, and tobacco history. The length of time you can expect to be in this study is approximately 60 minutes, the time it will take to receive information about the study and have questions answered, and the time for you to complete a survey.

What are the dangers to me?
The risks of this study can be compared to those ordinarily encountered in daily life and are either mild to none. Answering questions about your beliefs regarding quitting smoking might cause emotional upset for some participants. Your name will not be identified with the survey. All research materials will be stored in a locked file cabinet in the researcher's locked office. The survey data will be stored on a password-protected computer. All written materials will be kept for a period of five years and then destroyed by shredding. If you have any concerns about your rights, how you are being treated or if you have questions, want more information or have suggestions for the study, please contact Eric Allen in the Office of Research Compliance at UNCG at (336) 256-1482 or the staff at the Carilion IRB at (540) 853-0728. Questions, concerns or complaints about this project or benefits or risks associated with being in this study can be answered by Vicki Bierman who may be contacted at (540) 392-0281 or emailing her at

vhbierma@uncg.edu. You can also contact Dr. Carolyn Blue at (336) 334-4903 or clblue2@uncg.edu.

Are there any benefits to me for taking part in this research study?
You may not benefit personally from taking part in this survey.

Are there any benefits to society as a result of me taking part in this research?
Information you provide may help nurses and other healthcare professionals learn about health beliefs that contribute to smoking and smoking cessation. This knowledge can be used to develop interventions to help healthcare professionals like you quit smoking.

Will I get paid for being in the study?
Participation in this study is at no cost to you except for your time completing the survey. After you complete the survey, you will receive a *Quit Now* tote bag and a $15.00 gasoline gift card as compensation for taking part.

How will you keep my information confidential?
You will not be asked to write your name on the survey, so you and your answers to questions will be confidential. The surveys will be kept in a locked file cabinet in the researcher's office. Information from the surveys will be entered into a computer and will also be stored on a jump drive and kept in a locked file cabinet drawer in the researcher's office. All information obtained in this study is strictly confidential unless required by law. The surveys will be shredded after five years. Information on the computer and jump drive will be erased after five years.

What if I want to leave the study?
Your decision to be in this study is voluntary. Your alternative is to not participate. You will not be penalized if you decide not to participate or if you decide to stop participating.

This study is being funded by a grant from Carilion Clinic. None of the investigators will receive additional money or other benefits from the sponsor. Contact Vicki Bierman at (540) 392-0281 or by email (vhbierma@uncg.edu) or Dr. Carolyn Blue (336) 334-4903 (clblue2@uncg.edu) for questions about the research or if you think you have been harmed as a result of joining this research.

UNCG IRB
Approved Consent Form
Valid 2/7/11 to 2/3/12

APPENDIX C

GRANT AWARD LETTER

April 15, 2010

Victoria Bierman, M.D.

Re: Smoking cessation in health care workers: Applying the theory of planned behavior in predicting intentions to quit

Dear Dr. Bierman,
I am delighted to inform you that the Merit Committee has approved your RAP grant request in the amount of $2,978 to support your research proposal, "Smoking cessation in health care workers: Applying the theory of planned behavior in predicting intentions to quit"
In the short history of RAP grants the quality of proposals has markedly increased. Hence, the competition for funding has intensified. The awarding of a RAP grant is a signal accomplishment. Congratulations!
The following conditions apply to this award:
1. If applicable, a copy of IRB approval process must be submitted to the Merit Committee before the project can begin and any payments can be made.

2. The project must be complete and all funding spent or continued within 12 months of initial IRB approval. If IRB is not required, the project must be completed and all funding spent or committed within 12 months of this letter.

3.The grant funds are to be used solely for the research project "Smoking cessation in health care workers: Applying the theory of planned behavior in predicting intentions to quit"

4. Any funds not used or committed for the specific purpose of the grant will be returned to the Office of Sponsored Projects. All grant related purchased and invoices must utilize the Office of Sponsored Projects' forms (found on their website).

5. Grantee must provide two progress reports, at 4 months and 8 months post IRB approval. This summary must include status of grant objectives including how funds were expended to attain objectives.

Merit Committee c/o Office of Sponsored Projects 101 Elm Ave Roanoke, VA 24013

. Grantee must provide a final report within 2 months of completion of the project. This report must include a summary of findings and how the funds were expended to obtain the findings.

Please signify your agreement to the aforementioned terms and conditions by signing and returning the **original copy** to the Merit Committee c/o Office of Sponsored Projects.

Sincerely,

Bruce Johnson
Chair, Research Merit Committee

ACCEPTED:
By:
Date:
BJ/MR
Merit Committee c/o Office of Sponsored Projects 101 Elm Ave Roanoke, VA 24013

APPENDIX D

UNCG INSTITUTIONAL REVIEW BOARD INITIAL APPROVAL

THE UNIVERSITY of NORTH CAROLINA
GREENSBORO

OFFICE OF RESEARCH COMPLIANCE
2718 Beverly Cooper Moore and Irene Mitchell Moore
Humanities and Research Administration Bldg.
PO Box 26170
Greensboro, NC 27402-6170
336.256.1482
Web site: www.uncg.edu/orc
Federalwide Assurance (FWA) #216

To: Carolyn Blue
Community Practice
310 Moore Building

From: UNCG IRB

Authorized signature on behalf of IRB

Approval Date: 2/04/2011
Expiration Date of Approval: 2/03/2012

RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Submission Type: Initial
Expedited Category: 7.Surveys/interviews/focus groups
Study #: 11-0025

Study Title: Smoking Cessation in Health Care Workers: Applying the Theory of Planned Behavior in Predicting Intentions to Quit

This submission has been approved by the IRB for the period indicated. It has been determined that the risk involved in this research is no more than minimal.

Study Description:

The purpose of this research is to examine how likely healthcare workers will quit smoking based on their beliefs.

Regulatory and other findings:

This research meets criteria for a waiver of written (signed) consent according to 45 CFR 46.117(c)(2).

Investigator's Responsibilities

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

When applicable, enclosed are stamped copies of approved consent documents and other recruitment materials. You must copy the stamped consent forms for use with subjects unless you have approval to do otherwise.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented (use the modification application available at http://www.uncg.edu/orc/irb.htm). Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB using the "Unanticipated Problem/Event" form at the same website.

CC:Victoria Bierman, Chris Farrior, (ORED), Non-IRB Review Contact, (ORC), Non-IRB Review Contact

APPENDIX E

UNCG INSTITUTIONAL REVIEW BOARD APPROVAL REVISED

THE UNIVERSITY of NORTH CAROLINA
GREENSBORO

OFFICE OF RESEARCH COMPLIANCE
2718 Beverly Cooper Moore and Irene Mitchell Moore
Humanities and Research Administration Bldg.
PO Box 26170
Greensboro, NC 27402-6170
336.256.1482
Web site: www.uncg.edu/orc
Federalwide Assurance (FWA) #216

To: Carolyn Blue
Community Practice
310 Moore Building

From: UNCG IRB

Authorized signature on behalf of IRB

Approval Date: 1/19/2012
Expiration Date of Approval: 2/03/2012

RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Submission Type: Modification
Expedited Category: Minor Change to Previously Reviewed Research
Study #: 11-0025

Study Title: Explaining Intention to Stop Smoking with the Theory of Planned Behavior and Self-Exempting Beliefs

This submission has been approved by the above IRB for the period indicated. It has been determined that the risk involved in this modification is no more than minimal.

Submission Description:

This modification, dated 1/17/12, addresses the following:

- Change in study title to "Explaining Intention to Stop Smoking with the Theory of Planned Behavior and Self-exempting Beliefs".

Regulatory and other findings:

This research meets criteria for a waiver of written (signed) consent according to 45 CFR 46.117(c)(2).

Investigator's Responsibilities

Signed letters, along with stamped copies of consent forms and other recruitment materials will be scanned to you in a separate email. These consent forms must be used unless the IRB hasgiven you approval to waive this requirement.

CC:
Victoria Bierman
ORC, (ORC), Non-IRB Review Contact

APPENDIX F

CARILION CLINIC INSTITUTIONAL REVIEW BOARD APPROVAL

CARILION CLINIC

December 28, 2010

Approval Date: December 28, 2010
Continuing Review Due Date: December 27, 2011
Expiration Date: December 27, 2011

Victoria Bierman, FNP-BC, PhD candidate
CNRV, 2900 Lamb Circle
Christiansburg, VA

re: Smoking Cessation in Health Care Workers: Applying the Theory of Planned Behavior in Predicting Intentions to Quit

Dear Ms. Bierman:

I am pleased to inform you that the Carilion Institutional Review Board (IRB) has reviewed the above-mentioned protocol in an expedited manner according to 45 CFR 46.110 and 21 CFR 56.110. The research project was determined to present no more than minimal risk to human subjects and was found to have appropriate protections so that risks related to breach of confidentiality are no more than minimal. This research project met the expedited criteria outlined in 63 FR 60364-60367 category **(7)** - Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

According to 45 CFR 46.111, the following requirements were satisfied in order for approval to be granted:

- risks were minimized;
- risks to subjects are reasonable in relation to anticipated benefits, if any, to the subjects, and to the importance of the knowledge that may reasonably result from the study;
- selection of the subjects was equitable given the purpose of the research;
- informed consent will be sought from and documented for each prospective subject unless the conditions for a waiver of documentation for consent were met;
- when appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure safety of subjects; and
- adequate provisions to protect the privacy of the subjects and to maintain the confidentiality of the data were made.

The following research team members have received IRB approval to participate in the above-mentioned study: Victoria Bierman and Carolyn Blue.

The following documents are IRB-approved: Protocol (IRB Application), Survey Instrument, Recruitment Script, Recruitment Flyer and Research Subject Information Sheet.

We have waived the requirement of Documentation of Informed Consent as outlined in 45 CFR 46.117(c) as the research presents no more than minimal risk of harm to subjects and involves no procedures for

Institutional Review Board
2001 Crystal Spring Avenue, SW, Suite 202 Roanoke, VA 24014-2465 P.O. Box 13367 Roanoke, VA 24033-3367
540-853-0728 p 540-985-5323 f

which written consent is normally required outside of the research context.

The Carilion IRB, however, does mandate that subjects be provided with a written information sheet regarding the research. Please be sure to use only the Carilion IRB approved document for this purpose.

HIPAA does not need to be waived for this study as no protected health information will be used or disclosed from medical records from a covered entity.

Approval to the study is granted for a period of twelve months, effective today. Approval of your research by the Carilion IRB provides the appropriate review as required by federal and state laws governing human subjects' research. IRB approval does not apply to research activities including data analysis that take place prior to the date of this letter. This letter conveys IRB approval only and does not grant institutional approval. If your research involves any Carilion facilities, then separate arrangements must be made with the appropriate hospital or medical staff, departments or committees.

Additionally, the following documentation must be provided to the Carilion IRB:

- Continuing Review Application 30 days prior to the expiration date, providing a summary of the project to date and requesting continuation of the original project. If the original project is discontinued the IRB must be notified within seven business days.
- Serious adverse events and unanticipated problems that are unexpected and related, as outlined in the IRB Guidelines, within seven business days of the investigator becoming aware of them.
- Copies of reports from Data Monitoring Committees or auditing/monitoring reports from a sponsor are to be sent to the IRB Research Compliance Officer within seven business days.
- Any unplanned protocol variance that could adversely affect the safety or welfare of subjects, or the integrity of the research data, within ten days of becoming aware of the variance. Other unplanned variances may be recorded on a log and submitted with continuing review reports. Any changes to the research study must receive IRB approval before those changes can be implemented unless subject safety is directly affected.

Also, please find attached a form titled, "Carilion Clinic IRB Research Organization Checklist." The IRB is distributing this tool to provide guidance on maintaining research documentation for investigator-initiated studies.

The Carilion IRB would like to thank you for allowing us the opportunity to review this protocol. We look forward to learning of your results.

Sincerely,

Charles A. Hite, MA, CIP
Human Protections Administrator

APPENDIX G

QUESTIONNAIRE

Adult Self-Complete
Smoking Survey
Principal Investigator: Vicki Bierman, MSN, FNP
Department: UNCG School of Nursing

ALL THE INFORMATION IN THIS STUDY WILL BE KEPT CONFIDENTIAL AND USED FOR RESEARCH ONLY.

This survey deals with attitudes and beliefs you might have about quitting smoking between now and 3 months from now.

Smoking *is defined as smoking 100 or more cigarettes in a lifetime.*
Quit Smoking *is defined as smoking no cigarettes, for at least 3 months.*

For each question,

- circle the answer that **best describes your beliefs or feelings** about quitting smoking
- answer all of the items
- never circle more than one number on a scale

If you want to write in any comments, please feel free to do so using the space after each question.

The following questions refer to **your beliefs about quitting smoking** between now and 3 months from now.

Circle the number that **best describes your beliefs** on unlikely or likely each result will happen if you were to quit smoking now and for the next 3 months.

1. Quitting Smoking. . .

		Very Unlikely	Unlikely	Unsure	Likely	Very Likely
a.	I will live longer . . .	1	2	3	4	5
b.	I will have more energy…. . ……...	1	2	3	4	5
c.	My breathing will improve. . . . ……	1	2	3	4	5
d.	I will gain weight. . .	1	2	3	4	5
e.	I will save money. . .	1	2	3	4	5
f.	I will have more time I could use for doing other things ……..	1	2	3	4	5
g.	I and my things will smell less like smoke	1	2	3	4	5
h.	My health will improve. . ……..	1	2	3	4	5
i.	I will feel better mentally or relieve my stress ……..	1	2	3	4	5
j.	I will feel physically sick from quitting …….	1	2	3	4	5
k.	I will control my weight	1	2	3	4	5
l.	I will replace smoking with a worse habit	1	2	3	4	5
m.	I will feel more anxious, irritable, or angry	1	2	3	4	5

2. Under the answer below**, circle** the number that best describes **how bad or good things** would be **if you were to quit smoking**.

a. Helps me live longer . . . . . .

neither good nor bad	somewhat good	good	very good	extremely good
1	2	3	4	5

b.	Gives me more energy . . .				
	neither good nor bad	somewhat good	good	very good	extremely good
	1	2	3	4	5
c.	Improves my breathing				
	neither good nor bad	somewhat good	good	very good	extremely good
	1	2	3	4	5
d.	Gain weight				
	neither good nor bad	somewhat bad	bad	very bad	extremely bad
	1	2	3	4	5
e.	Saves me money . . .				
	neither good nor bad	somewhat good	good	very good	extremely good
	1	2	3	4	5
f.	Saves time I could use for other things . . .				
	neither good nor bad	somewhat good	good	very good	extremely good
	1	2	3	4	5
g.	I and my things would smell better				
	neither good nor bad	somewhat good	good	very good	extremely good
	1	2	3	4	5
h.	My health would improve				
	neither good nor bad	somewhat good	good	very good	extremely good
	1	2	3	4	5
i.	I would feel better mentally or relieve my stress				
	neither good nor bad	somewhat good	good	very good	extremely good
	1	2	3	4	5
j.	Feeling physically sick from quitting . . .				
	neither good nor bad	somewhat bad	bad	very bad	extremely bad
	1	2	3	4	5

k. Replace smoking with a worse habit . . . . . .

neither good nor bad	somewhat bad	bad	very bad	extremely bad
1	2	3	4	5

l. Feel more anxious, irritable, or angry . . . . . .

neither good nor bad	somewhat bad	bad	very bad	extremely bad
1	2	3	4	5

m. Improving my breathing is . . .

neither good nor bad	somewhat good	good	very good	extremely good
1	2	3	4	5

3. Some **people you know** may have different ideas about **whether you should or should not quit smoking**. After each person, **circle the number** under the words that best describes **what you believe** each person thinks you should or should not do about quitting smoking.

a. My spouse or partner thinks that I . . .

definitely should not	should not	neither should nor should not	should	definitely should
1	2	3	4	5

quit smoking in the next 3 months.

b. My children think that I . . .

definitely should not	should not	neither should nor should not	should	definitely should
1	2	3	4	5

quit smoking in the next 3 months.

c. Other family members think that I . . .

definitely should not	should not	neither should nor should not	should	definitely should
1	2	3	4	5

quit smoking in the next 3 months.

d. People I work with think that I . . .

definitely should not	should not	neither should nor should not	should	definitely should
1	2	3	4	5

quit smoking in the next 3 months.

e. My friends think that I . . .

definitely should not	should not	neither should nor should not	should	definitely should
1	2	3	4	5

quit smoking in the next 3 months.

f. My healthcare provider thinks that I . . .

definitely should not	should not	neither should nor should not	should	definitely should
1	2	3	4	5

quit smoking in the next 3 months.

g. My preacher or other religious advisor thinks that I . . .

definitely should not	should not	neither should nor should not	should	definitely should
1	2	3	4	5

quit smoking in the next 3 months.

h. People who sell cigarettes think that I . . .

definitely should not	should not	neither should nor should not	should	definitely should
1	2	3	4	5

quit smoking in the next 3 months.

4. How **strongly are you willing to do you** what each of the people in question 3 thinks you should do about smoking?

		Not at all	Not very much	Unsure	Quite a bit	Very much
a.	My spouse or partner.	1	2	3	4	5
b.	My children.	1	2	3	4	5
c.	Other family members. . . .	1	2	3	4	5
d.	People I work with.	1	2	3	4	5
e.	My friends	1	2	3	4	5
f.	My healthcare provider . . .	1	2	3	4	5
g.	My preacher or other religious advisor.	1	2	3	4	5
h.	People who sell cigarettes	1	2	3	4	5

5. Sometimes there are **conditions/** things that make **quitting smoking easy or difficult**. **Circle** the number under each condition that best describes **which of these conditions are present for you.**

a. I need medications to decrease the craving.

stronglydisagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

b. I reduce stress with smoking.

Strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

c. I have support from family and friends.

Strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

d. I have a healthy substitute for smoking.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

e. There are limits or restrictions on smoking where I live or work.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

f. Others smoke around me.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

g. Smoking has a calming effect.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

h. I have to smoke when I do other activities.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

i. I feel pressure from others

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

j. I have a habit of smoking

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

k. The high cost of cigarettes

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

l. I fear gaining weight

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

m. I lack the desire to quit

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

6. Now for the same conditions as in question 5, circle the number that best describes **how unlikely or likely it would be to quit smoking if the condition was present.**

a. When I have medication to decrease the craving of cigarettes, I am

Less likely	unlikely	unsure	likely	More Likely
1	2	3	4	5

to quit smoking.

b. When I have activities to reduce my stress, I am

Less likely	unlikely	unsure	likely	More likely
1	2	3	4	5

to quit smoking.

c. When I have support from friends and family, I am

Less likely	unlikely	unsure	likely	More likely
1	2	3	4	5

to quit smoking.

d. When I have a healthy substitute for smoking, I am

Less likely	unlikely	unsure	likely	More likely
1	2	3	4	5

to quit smoking.

e. Having limits or restrictions on smoking, I am

Less likely	unlikely	unsure	likely	More likely
1	2	3	4	5

to quit smoking.

f. Not being around other's smoke, I am

Less likely	unlikely	unsure	likely	More likely
1	2	3	4	5

to quit smoking.

g. When I don't have the calming effect from smoking, I am

Less likely	unlikely	unsure	likely	More likely
1	2	3	4	5

to quit smoking.

h. When I can do other activities and do not smoke, I am

Less likely	unlikely	unsure	likely	More likely
1	2	3	4	5

to quit smoking.

i. When I do not feel pressure to quit from others, I am

Less likely	unlikely	unsure	likely	More likely
1	2	3	4	5

to quit smoking.

j. If I did not have the habit of smoking, I am

Less likely	unlikely	unsure	likely	More likely
1	2	3	4	5

to quit smoking.

k. With the high cost of cigarettes, I am

Less likely	unlikely	unsure	likely	More likely
1	2	3	4	5

to quit smoking.

l. When I am concerned about gaining weight, I am

Less likely	unlikely	unsure	likely	More likely
1	2	3	4	5

to quit smoking.

m. When I have the desire to quit, I am

Less likely	unlikely	unsure	likely	More likely
1	2	3	4	5

to quit smoking.

7. I am interested in **your opinion** about quitting smoking. Please answer each question below by **circling the number** on a scale from 1 to 7 that best describes your opinion.
Some of these questions may appear to be similar but they address different issues.

In my opinion:

1. My quitting smoking in the next 3 months

wise: 1: 2: 3: 4: 5: 6: 7: foolish

2. My quitting smoking in the next 3 months is
   unpleasant: 1: 2: 3: 4: 5: pleasant

3. My quitting smoking in the next 3 months is
   harmful: 1: 2: 3: 4: 5: beneficial

4. My quitting smoking in the next 3 months is
   productive: 1: 2: 3: 4: 5: unproductive

5. Most people who are important to me think that I should quit smoking in the next 3 months.
   true: 1: 2: 3: 4: 5: false

6. Most people whose opinions I value would approve of me quitting smoking in the next 3 months.
   unlikely: 1: 2: 3: 4: 5: likely

7. Most people like me, quit smoking within 3 months following major heart surgery
   agree: 1: 2: 3: 4: 5: disagree

8. I am confident that I can quit smoking in the next 3 months.
   true: 1: 2: 3: 4: 5: false

9. My quitting smoking in the next 3 months is completely up to me.
   disagree: 1: 2: 3: 4: 5: agree

10. If I really wanted to, I could quit smoking in the next 3 months.
    likely: 1: 2: 3: 4: 5: unlikely

11. In the next 3 months, for me to quit smoking is under my control.
    not at all: 1: 2: 3: 4: 5: completely

12. I intend to quit smoking in the next three months.
    definitely do: 1: 2: 3: 4: 5: definitely do not

13.I will quit smoking in the next 3 months.
likely: 1: 2: 3: 4: 5: unlikely

14.I am willing to quit smoking in the next 3 months
false: 1: 2: 3: 4: 5: true

15.I plan to quit smoking in the next 3 months
agree: 1: 2: 3: 4: 5: disagree

---

8. Please answer each question by **circling the number** that best describes your level of agreement.

1. If I quit smoking, I am afraid I will gain weight.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

2. If I quit smoking, I am afraid I will get even more stressed.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

3. I have not smoked enough time to be exposed to smoking-related diseases.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

4. I don't smoke enough cigarettes to be exposed to smoking-related diseases.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

5. My family ancestry protects me from the health consequences of smoking.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

6. Physical exercise protects me against smoking-related disease.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

7. Living in a fresh air climate protects me against smoking-related diseases.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

8. The way I smoke protects me against smoking-related diseases.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

9. I have already smoked so much that quitting now would not decrease my personal risk for having a smoking-related disease.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

10. Science and medicine will soon find a treatment to definitely cure smoking-related diseases.

strongly disagree	disagree	unsure	agree	strongly agree
1	2	3	4	5

9. Please circle either true or false when answering the following questions about yourself.

1. I never hesitate to go out of my way to help someone in trouble.

True False

2. I have never intensely disliked anyone..

True False

3. When I don't know something, I don't at all mind admitting it.

True False

4. I am always courteous, even to people who are disagreeable.

True False

5. I would never think of letting someone else be punished for my wrong -doings.

True False

6. I sometimes feel resentful when I don't get my way.

True False

7. There have been times when I felt like rebelling against people in authority even though I knew they were right.

True False

8. I am sometimes irritated by people who ask favors of me.

True False

9. I can remember 'playing sick' to get out of something.

True False

10 There have been times when I was quite jealous of the good fortune of others.

True False

10. Instructions: Please provide some background information about yourself by **filling in the blank or checking (√)** your response.

1. What is your age? | | |

2. Sex: 0) Male ____ 1) Female_____

3. What is the highest level of education you have completed?
   _____1) Less than High School Graduate
   _____2) GED
   _____3) High School Graduate
   _____4) College (Associates degree or less)
   _____5) Bachelor's degree

_____6) Master's degree

__ ___7) Post Master's degree

4. Are you of Hispanic/Latino descent? 1) Yes ____ 2) No ____

5. What is your race or ethnic background (check all that apply)?
   ____ 1) White
   ____ 2) Black
   ____ 3) Asian or Other Pacific Islander
   ____ 4) Native American or Alaska Native
   ____ 5) Other _____

6. What is your marital status?
   ____1) Single
   ____2) Live with partner & not married
   ____3) Married
   ____4) Widowed
   ____5) Separated
   ____6) Divorced

7. How long have you been working in your current job?
   ____1) less than one year
   ____2) 1-2 years
   ____3) 3-5 years
   ____4) 5-10 years
   ____5) greater than 10 years but less than 20 years
   ____6) greater than 20 years

8. What is your current job?
   ____1) Medical or Lab Technician

____2) Office personnel

____3) Physician

____4) Nurse Practitioner

____5) Physician Assistant

____6) RN

____7) LPN

____8) Nursing Assistant

____9) Respiratory Therapist

____10) Social Worker, Therapist

____11) Maintenance

____12) Food Service

____13) Administrator

____14) Pharmacy personnel

____15) Other _____

9. If you have or had any of the following, check all that apply to you:

_____0) No known medical disease

_____1) Cancer

_____2) Chronic Obstructive Pulmonary Disease (COPD)

_____3) Asthma

_____4) Heart Disease

_____5) Diabetes Mellitus (Type 1 of Type 2)

10. What is the yearly income of your family?

(1) 0 - $14,999 ____

(2) $15,000-29,999____

(3) $30,000-39,999____

(4) $40,000-59,999____

(5) $60,000-79,999____

(6) $80,000 and up ____

11. Are there children living in the home? (1) Yes___ (2) No___

12. What is your partner's smoking status?

____ 1) Smoker

____ 2) Ex-smoker

____ 3) Never Smoker

____ 4) No partner now

13. How many of your friends smoke regularly?

____ 1) None Smoke

____ 2) About one-fourth of my friends smoke

____ 3) About one-half of my friends smoke

____ 4) All of my friends smoke

14. How old were you when you began smoking cigarettes?

____1) 10 years or younger

____2) 14-11 years old

____3) 16- 15 years old

____4)19-17 years old

____5) 25- 20 years old

____6) 39- 26 years old

____7) 40 years or older

15. How many years have you smoked cigarettes?

____ 1) less than 1 year

____ 2) 2-5 years

____ 3) 6-10 years

____ 4) 10-15 years

____ 5) 15-20 years

____ 6) more than 20 years

16. How soon after you wake up do you smoke your first cigarette?

____ 1) within 5 minutes

____ 2) within 6-30 minutes

____ 3) within 31-60 minutes

____ 4) after 60 minutes

17. How many cigarettes do you smoke per day?

____ 1) 5 or less

____ 2) half a pack or less

____ 3) a full pack

____ 4) a pack and a half

____ 5) 2 packs

____ 5) more than 2 packs

18. When do you smoke the most cigarettes?

____1) more cigarettes during the weekend

____2) more cigarettes during the weekday

19. Which cigarette would you hate most to give up?

____1) the first one in the morning

____ 2) all others

20. Do you use any other form of tobacco?

____ 1) Yes

____ 2) No

21. Did you try to quit smoking within the past year?

____ 1) Yes

____ 2) No

22. How interested are you in stopping smoking?

____1) Not at all interested

____ 2) Very little interest

____ 3) Somewhat interested

____ 4) Very much interested

23. How many times have you seriously tried to quit smoking?

____1) none

____ 2) one

____3) two or more

24. On a scale from 1 to 10, circle the number that best indicates **how confident you are that you could quit smoking** in the next 3 months?

1	2	3	4	5	6	7	8	9	10
Not confident								Very confident	

25. Have you ever sought treatment to help you quit smoking?

____ 1) Yes

____ 2) No

26. What treatments have you tried? (check all that apply)

____ 1) I have not tried

____ 2) Cold Turkey

____ 3) Patches, gum, or lozenges

____ 4) Prescription Medications such as Zyban or Chantix

____ 5) Counseling

____ 6) Hypnotism or Acupuncture

____ 7) Prayer or Meditation

____ 8) Switching to smokeless tobacco

____ 9) Other _____

27. Have you **ever called** *Free & Clear, Quit Now Virginia,* or any telephone quit smoking helpline?

____1) Yes

____2) No

28. Did you **participated** in the *Free & Clear, or Quit Now Virginia* telephone quit smoking program?

____1) Yes

____2) No

29. Would you be willing to try this free, telephone quit smoking service?

____1) Yes

____2) No

Thank you for your time in completing this survey.
Please do not hesitate to contact me with any questions.
Vicki Bierman

APPENDIX H

PERMISSION TO USE TPB DIAGRAM

From: Victoria Bierman [mailto:vhbierma@uncg.edu]
Sent: Friday, July 16, 2010 15:03
To: aizen@psych.umass.edu
Subject: Your theoretical framework for dissertation

[Quoted text hidden]

Icek Aizen <aizen@psych.umass.edu> **Sat, Jul 17, 2010 at 8:52 AM**
To: Victoria Bierman <vhbierma@uncg.edu>

Dear Ms. Bierman,

The theory of planned behavior is in the public domain. No permission is needed to use the theory in research, to construct a TpB questionnaire, or to include an original drawing of the model in a thesis, dissertation, presentation, poster, article, or book. However, if you would like to reproduce a published drawing of the model, you need to get permission from the publisher who holds the copyright. You may use the drawing on my website for non-commercial purposes so long as you retain the copyright notice.

Best regards,

Icek Ajzen, Professor and Head

Division of Social Psychology

University of Massachusetts

Amherst, MA 01003

http://www.people.umass.edu/aizen

From: Victoria Bierman [mailto:vhbierma@uncg.edu]
Sent: Friday, July 16, 2010 15:03
To: aizen@psych.umass.edu
Subject: Your theoretical framework for dissertation

APPENDIX I

PERMISSION TO USE SELF-EXEMPTING BELIEF SCALE

Of course:
Isabelle Grémy: i.gremy@ors-idf.org

Bierman, Victoria H. a écrit :
> Greeting from Virgnia, USA
>
> I am a PhD nursing student and my research interests are tobacco
> cessation in healthcare workers.
> I am interested in obtaining and using the questionnaire used in the
> ORSIF survey for my dissertation.
> Can you provide me with appropriate contact person to obtain this
> scale and permission to use?
>
> Respectfully
>
> Vicki Bierman, LCSW, FNP
> Nurse Practitioner, Carilion St Albans
> Department of Psychiatry & Behavioral Medicine
> 2900 Lamb Circle, Christiansburg, VA 24073
> 540-731-7311 Fax: 540-731-7377
>
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APPENDIX J

PERMISSION TO USE GATS CORE QUESTIONNAIRE

Spartan

Victoria Bierman <vhbierma@uncg.edu>

FW: GATS core Questionnaire [THREAD ID:1-1TSWOF] [SR No.:1-110531168]

1 message

NCCD/OSH/OSH Inquiries (CDC) <nccdoshinquiries@cdc.gov> **Tue, Aug 17, 2010 at 6:12 PM**
To: vhbierma@uncg.edu
Cc: CDC-INFO <CDC-INFO@cdc.gov>

Dear Ms. Bierman:

Thank you again for contacting the Centers for Disease Control and Prevention. Your inquiry about using the core GATS questionnaire was forwarded by CDC-INFO to the Office on Smoking and Health (CDC/OSH).

We appreciate your interest in this survey instrument. Questionnaires that are made available on the Smoking & Tobacco Use Web site are public domain; therefore, you are welcome to use the GATS survey for your dissertation.

Kind regards,

CDC/Office on Smoking and Health

[THREAD ID:1-1TSWOF] [SR No.:1-110531168]

-----Original Message-----

From: vhbierma@uncg.edu
Sent: 8/15/2010 06:40:48 PM
To: tobaccoinfo@cdc.gov
Subject: GATS core Questionnaire

I am seeking permission to use the GATS core questionnaire in my data collection instrument for my dissertation study.

Your response would be appreciated
--
Victoria Bierman, MSW, MSN, FNP
PhD Nursing Candidate