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GROWTH MINDSET AS A PREDICTOR OF SMOKING CESSATION

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## DEDICATION

This work is dedicated to the two most important people in my life. To M. T. Cusick who was tirelessly patient and supportive of my efforts but “will be happy to know me when I am not a doctoral student” and to S. D. Hopkins for the memories of support and encouragement that promoted a mastery-oriented response and helped me to persevere in this endeavor. As always “you are the wind beneath my wings!”

# GROWTH MINDSET AS A PREDICTOR OF SMOKING CESSATION

VICKI D. JOHNSON

## ABSTRACT

This study examines motivations to quit smoking within the theoretical context of self-theories (Dweck, 2000). It investigates whether self-theories play a significant predictive role in motivating adults to quit smoking. A convenience sample of 197 adult current smokers and ex-smokers in northeast Ohio completed on line or paper versions of the Smoking Questionnaire, an instrument which included the 6-item Fagerstrom Test of Nicotine Dependence, 3- items from the Self-Theory of Intelligence Self-Form for Adults, and 23 items constructed by the researcher. Descriptive analyses indicate that the sample was 66% female, 77% white, 83% college educated, and of varied ages and incomes. Stepwise logistic regression analyses reveal 4 predictors of smoking cessation success: self-theory of smoking, the presence of other smokers in the household, annual household income, and strength of intention (motivation) to stop smoking. Logistic regression analyses also indicate that self-theory of smoking and perceived helpfulness of nicotine replacement therapy are statistically significantly predictive of strength of intention (motivation) to stop smoking. Self-theory of intelligence was not a significant predictor of smoking cessation motivation or behavior. Data indicate that self-theory of smoking and self-theory of intelligence are independent and domain specific in this sample. This research indicates that self-theories play a significant role in smoking cessation and that self-theories of smoking are as potent as nicotine replacement therapy in motivating individuals to stop smoking. This research has important implications for cessation program planners and health educators and many implications for additional research on the role of self-theories in health behavior change.

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## CHAPTER I

### INTRODUCTION

Nearly twenty-one percent or approximately 45.3 million adults in the United States smoke cigarettes (CDC, 2007b; CDC, 2006). It is ironic that the devastating individual health and financial consequences of smoking are generally well known and yet smoking remains one of the most challenging behaviors to change (CDC, 2008; CDC, 2007b). It would be very useful if healthcare providers could easily identify what motivates people to quit smoking and apply this knowledge to develop intervention strategies that assist smokers in their cessation efforts. It would be even more advantageous to individual and public health if smokers themselves possessed the knowledge to increase their motivational processes and succeed in smoking cessation. This study examines smoking cessation motivations within the theoretical context of self-theories and attempts to answer the question: Do self-theories play a significant role in motivating adults to quit smoking?

Approximately seventy percent of smokers express a desire to quit, but the addictive nature of tobacco makes cessation a difficult and elusive goal for many smokers (CDC, 2002; CDC, 2006). Cessation may be an even more difficult challenge now as the average nicotine level across all brands of cigarettes increased by 11% from 1998 to 2005 (Roache, 2007; Smith, 2006). Despite the addictive nature of tobacco, more than half of all smokers do make attempts to quit. In the 2006 National Health Interview Survey, approximately 20 million current U. S. smokers (or 44.2%) reported quitting smoking for more than 1 day during the previous year in an attempt

to stop smoking. Out of the estimated 91 million individuals who had smoked more than 100 cigarettes in their lifetime, over 50% (or an estimated 45.7 million people) reported successfully stopping smoking at the time of the interview (CDC, 2007b). It is estimated that only 3% of smokers are able to quit as a result of physicians' cessation advice and treatment, and that less than 1% of smokers attend organized smoking cessation programs (Lichtenstein & Hollis, 1992; Prochaska & Prochaska, 1999). Consequently, most smokers who quit smoking do it on their own without professional assistance (Fiore, Bailey, & Cohen, 2000). However, research demonstrates that smoking cessation program attendance may be bolstered substantially by healthcare providers (nurses, physicians, etc.) who actively and repeatedly offer cessation resources to smokers (Prochaska & Prochaska, 1999). Regardless of the approach, cessation program drop-out and recidivism rates are very high (Lichtenstein & Hollis, 1992; Prochaska & Prochaska, 1999).

The literature reports varying smoking cessation success rates for different strategies. For example, cessation rates for people who use nicotine replacement therapy, regardless of the setting and with or without counseling, increase by 50 to 70% over those who use placebo (Stead, Perera, Bullen, Mant & Lancaster, 2008). Smokers who use multiple strategies such as a combination of nicotine replacement therapy and smoking cessation group support or individual behavioral counseling tend to be more successful at quitting than those who use only one strategy (Jorenby, 2001; Fiore, et al., 2000).

One of the most important factors reported in the literature that is associated with successful smoking cessation efforts is the smoker's motivation to quit. Individual motives for health behavior change have been characterized in different ways in the context of different theoretical frameworks (Ajzen, 1988; Ajzen, 1991; Deci, 1995; Dweck, 2000; Edberg, 2007; Glanz, Rimer & Lewis, 2002; Prochaska & DiClemente, 1983; Prochaska & Prochaska, 1999; Williams, McGregor, Sharp, Levesque, Kouides, Ryan & Deci, 2006). Many theories center on the individual and seek to explain health behavior motivations primarily in terms of factors within

the individual. Within the plethora of literature on motivation lies a large body of empirical research, conducted predominantly in educational contexts, which develops and tests the utility of a theoretical framework, the self-theories model. This research demonstrates that one's implicit beliefs influence the types of goals one adopts, and that these different goals lead to different patterns of behavior, cognition and emotional response. A self-theory is operationally defined in this prospectus (see the Glossary) as a changeable belief about one's self which creates one's mental world and broadly influences one's goals, outlook, attitude, motivation, and learning (Dweck, 2000; Dweck, 2006). This theoretical framework provides valuable insight into the factors which influence individuals' motivations, and holds potential for understanding the motivational processes in health behavior change.

A better understanding of factors contributing to individuals' motivations to quit smoking may lead to the development of appropriate interventional strategies that healthcare professionals might use to promote, enhance, and sustain smoking cessation behaviors in their clients. More importantly, possession of this knowledge may assist the many smokers who desire to quit smoking but for whatever reason do not seek professional help.

#### *Significance of the Study*

This study is unique because it investigates the relationships between self-theories and health behavior outcomes, specifically smoking cessation. While the literature supports the important role of self-theories in motivational achievement in educational settings, there is a paucity of research on the application of this psychological theory to health outcomes. A thorough review of the literature to date reveals an absence of research on the role of self-theories in any healthcare or health education context, and only one study related to exercise behavior. It is important to note that no published research could be found that relates to self-theories as predictors of individual motivation to stop smoking. Therefore this study will make an original and special contribution to the scholarly knowledge of the role, if any, that self-theories play in adults' attempts to quit smoking. This study will also generate information which is of potential

value to the many stakeholders involved in promoting health and wellness through smoking cessation programs and education. These stakeholders include nurses, health educators, counselors, physicians, employers, health insurance providers, governments, and most importantly, individuals trying to stop smoking.

#### *Purpose of the Study*

The purpose of this study is to investigate whether self-theories play a significant role in adults' motivations to quit smoking. Specifically, this study addresses the problem of whether an individual's self-theory is predictive of smoking cessation behavior. Of particular interest is the possibility that a growth mindset coupled with other variables such as age, education level, use of smoking cessation strategies, presence of smoking related illnesses, and the number of previous quitting attempts significantly predict the likelihood that adults will stop smoking cigarettes.

#### *Research Questions*

The main research question that this study seeks to answer is to what extent does an adult smoker's self-theory predict smoking cessation? Is an individual with a growth mindset more likely to stop smoking than an individual with a fixed mindset? Specifically the following research questions are addressed:

1. Which of the following variables best predict smoking cessation behavior: age, gender, sexual orientation, level of education, household income, years of smoking, use of smoking cessation strategies (medications, nicotine replacement therapy [NRT], participation in smoking cessation programs), presence of smoking related symptoms or illness, previous quit attempts, nicotine dependence, healthcare provider advice, other smokers in the household, intention to stop smoking, self theory of smoking, and self theory of intelligence?
2. What are the relationships between age, gender, sexual orientation, level of education, household income, years of smoking, use of smoking cessation strategies (medications, nicotine replacement therapy [NRT], participation in smoking cessation programs), presence of smoking related symptoms or illness, previous quit attempts, nicotine dependence, healthcare provider

advice, other smokers in the household, intention to stop smoking, self theory of smoking, and self theory of intelligence?

3. Which of these variables (age, gender, sexual orientation, level of education, household income, years of smoking, use of smoking cessation strategies (medications, nicotine replacement therapy [NRT], participation in smoking cessation programs), presence of smoking related symptoms or illness, previous quit attempts, nicotine dependence, healthcare provider advice, other smokers in the household, self theory of smoking, and self theory of intelligence) best predict self-reported intention to stop smoking?
4. Is there a statistically significant relationship between self theory of intelligence and self theory of smoking?

#### *Limitations*

Limitations are factors over which the researcher has no control. The limitations are “characteristics of the design or methodology that set parameters on the application or interpretation of the results of the study” (Cline, 2008, p. 1). Limitations are issues that affect the study’s internal and external validity. This study has several limitations which could potentially affect the study’s internal and external validity:

1. This study uses a convenience sample selected from the general population. Because the sample is not a random sample, this sample is unlikely to be representative of all smokers and ex-smokers. It is expected that samples with a different profile could show different results. Additionally, a sample selected from a different population of smokers would likely yield different results. This limits the generalizability of this study’s findings.
2. The data elicited from participants in this study is self-reported retrospective data, not current, objective, confirmable, measurable data. It is possible for participants to report inaccurate data, due to poor recall or a desire to provide “socially acceptable” responses for example, and the researcher will have no way to verify the accuracy of the self-report data. This may potentially affect the validity of the research.



3. This research is concerned with identifying correlational relationships among the variables under study and determining the probabilities of group membership (smoking status) based on predictor variables (mindset). In the present study it is not possible to determine causal relationships. For example it is not possible to determine whether a growth mindset preceded smoking cessation or developed after a participant quit smoking.

4. The survey used in this study was constructed by the author. Some survey questions, such as the beliefs about intelligence questions and the Fagerstrom Test of Nicotine Dependence, have been used by other researchers and have well established validity and reliability data associated with their use. However, other survey questions were invented or adapted from other sources by the author, and have no established record of performance. This limitation can not be eliminated; however it might be minimized by careful instrument development which includes review by content and survey experts, and pre-testing and modifying the instrument based on the results of pre-testing. A related limitation is that the beliefs about intelligence questions have never been used in the context of smoking behavior or among a sample selected from a population of adult smokers.

#### *Delimitations*

Delimitations are restrictions that the researcher imposes on the research to limit the scope or define the boundaries of the study. Delimitations are “determined by the conscious exclusionary and inclusionary decisions” that are made when planning and developing the prospectus (Cline, 2008, p. 1). Delimitations deal with the issue of generalizability or external validity (Dereshiwsky, 1999). This study has several delimitations:

1. The research questions were intentionally limited in number in order to make data collection and completion of this research attainable within a one-year timeframe.
2. The variables of interest were identified from previous research studies and the literature on health behavior, smoking cessation, and self-theories of intelligence. The variables were limited in number to those that played a significant role in smoking cessation and motivation. Many

more variables were considered, but were not included in the study in the interest of decreasing the overall length of the questionnaire, and increasing participants' willingness to complete the questionnaire. Because variables were limited in number, it is a possibility that one or more important variables were excluded. This would affect validity of the results.

3. Although there are many theories of health behavior change, this research is limited to exploring Dweck's (2000) Self-theories of Intelligence model and its potential usefulness in understanding the motivational processes of smokers to stop smoking cigarettes. The relative usefulness of other individual theories of health behavior are well documented in the literature, therefore the theoretical framework for this research is limited to the Self-theories model.

4. This research study is limited to exploring cigarette smokers' motivation to stop smoking. It does not relate to other types of health behavior or substance-use behavior.

#### *Glossary*

*Ex-smoker:* An individual who reports smoking cigarettes on a regular basis (every day or every other day) in the past but does not currently smoke cigarettes.

*Fixed mindset (AKA entity theory):* One of two types of self-theories. A belief that one's intelligence, abilities, talents, and attributes are permanent and unchangeable (Dweck, 2006).

*Growth mindset (AKA incremental theory):* One of two types of self-theories, a belief that, with effort, one's intelligence, abilities, talents, and attributes can develop, change, and improve over time (Dweck, 2006).

*Non-smoker:* An individual who reports never smoking cigarettes on a regular (daily, or every other day) basis.

*Self-theory (AKA mindset):* A changeable belief about one's self which creates one's mental world and broadly influences one's goals, outlook, attitude, motivation, and learning (Dweck, 2006).

*Smoker:* An individual who at the time of the survey reports smoking 1 or more cigarettes on a regular basis (every day or every other day).



## CHAPTER II

### LITERATURE REVIEW

#### *Introduction*

The literature review is divided into three main sections with subdivisions in each section. The first section of the literature review describes the demographics and consequences of cigarette smoking and many factors that influence smoking behavior. A vast amount of research exists on these topics and it would be very difficult, and beyond the scope of this prospectus, to cover these topics completely. Therefore, this section presents sufficient information to generally inform the reader, but does not attempt to cover these topics in a comprehensive way. The first section is divided into several subsections. Smoking demographics are described first. This information is organized in a global to local manner such that smoking demographics across the United States are presented before demographics about smoking in Ohio and the greater Cleveland area. Prevalence of smoking by ethnicity/race, age, gender, sexual orientation, income, education level, and geography are considered. A second subsection briefly describes the health consequences of cigarette smoking in the United States. Since these consequences are generally well known following decades of U. S. Surgeon Generals' education initiatives, and countless other public health initiatives, their description will be succinct (CDC, 2008). The third subsection briefly describes the costs or economic consequences of cigarette smoking. The fourth subsection describes research findings about other factors that influence smoking cessation, such as nicotine replacement therapy, prescription

medications, and physician advice.

The second section of the literature review provides an overview of health behavior and outlines several individual theories and models of health behavior. First, three well-known and well established models are summarized: (1) The Health Belief Model, (2) The Theory of Planned Behavior, and (3) The Transtheoretical Model. The major theoretical constructs are defined and examples are provided to illuminate the usefulness of these theories in understanding smoking behavior. At the end of the second section, the Self-theories Theory is introduced. Major constructs in the Self-theories Theory are also identified in this subsection.

Since the core of this research study investigates the role that self-theories play in smoking cessation behavior, the third section of the literature review presents key empirical research studies demonstrating the pervasive effect of self-theories on individuals' goals, and patterns of behavior, cognition and affect (Diener & Dweck, 1978 & 1980; Dweck, 1975 & 2000; Dweck & Leggett, 1988; Robins & Pals, 2002). The first three subsections describe empirical research studies that led to the formulation of the self-theories model. The first subsection presents early research findings about learned helplessness and persistence in the face of failure and success, and how distinct cognitive, affective and behavior patterns emerge from these common human experiences in learning achievement contexts. Subsection two discusses subsequent empirical research identifying two classes of goals that individuals pursue in achievement situations and links the goals to the helpless and persistent response patterns. Subsection three describes empirical research which identifies the self-theories that underlie the goals and different response patterns in grade school, high school, and college students in experimental laboratory and classroom settings. By describing the research supporting the existence of self-theories, the final components of the Self-theories model and their interrelationships are revealed. Subsection four describes research studies in which individuals' self-theories are manipulated in order to demonstrate a causal relationship between self-theories, goals, and response patterns. The next subsections present research on self-theories of

intelligence among adults, and research testing the entire framework. Research findings on self-theories in other contexts, such as social interactions, moral behavior, judgments, and stereotyping are described. The last subsection reviews existing scholarly literature concerned with the role that self-theories play in health behavior and smoking cessation.

### *Cigarette Smoking*

#### *Smoking Demographics*

Nearly twenty-one percent or approximately 45.3 million adults in the United States smoke cigarettes (CDC, 2008). Among current smokers, an estimated 80% smoke cigarettes on a daily basis, while nearly 20% smoke “some days” but not every day. Approximately 20 million (or 44.2% of) current smokers report quitting smoking for at least one day during the previous year in an attempt to stop smoking (CDC, 2006).

The first U.S. Surgeon General’s report on smoking was published in 1964, and since that year there has been a significant and steady decline in smoking among adults in the U.S.; from an average prevalence of 42.5% in 1965 to 20.9% in 2004. There have been no significant changes in mean overall adult smoking rates in the U.S. from 2004 through 2006, the last year that data are available (CDC, 2008). Smoking prevalence and cessation success rates do vary significantly among different U. S. population subgroups. These differences between subgroups are based on variables such as race/ethnicity, age, gender, sexual orientation, socio-economic level, education level, and geographical location.

Among racial/ethnic groups in the United States, American Indians and Alaska Natives have the highest prevalence of smoking at 32.4% and Asians have the lowest prevalence at 10.4%. Approximately 23% of black adults, and 21.9% of white adults in the U.S. smoke cigarettes. The prevalence of cigarette smoking among Hispanic adults is estimated at 15.2% (CDC, 2007b). The prevalence of smoking in Ohio among racial/ethnic groups resembles the national smoking prevalence patterns, although the rates are higher than the national averages. In 2007, approximately 25.9 % of black adults and 22.4% of white adults in Ohio smoked cigarettes.

Data describing smoking prevalence rates among other specific racial or ethnic groups in Ohio are not available (National Center, 2007a). In addition, smoking prevalence rates for ethnic/racial groups in the greater Cleveland Metropolitan Statistical Area are not available (National Center, 2007b).

Overall more adult men smoke cigarettes than adult women, and this has been the case each survey year between 1965 and 2007 as evidenced by data from the U. S. National Health Interview Surveys. In 1965, when the data were first collected, 51.9% of men and 33.9% of women smoked cigarettes. By 2006, approximately 24% of men and 18% of women in the U.S. smoked cigarettes (CDC, 2007b; CDC, 2007c). Adult smoking rates in Ohio are higher than the national average with 24.3% of men and 22% of women smoking cigarettes (National Center, 2007a). Data on adult smoking prevalence by gender in the greater Cleveland Metropolitan Statistical Area are not available (National Center, 2007b)

Although most government agencies do not collect tobacco use data related to citizens' sexual orientation, there are several population-based studies from California which suggest that the smoking prevalence among lesbian, gay, and bisexual (LGB) adults is significantly higher than the national average (Gruskin & Gordon, 2006; Gruskin, Greenwood, Matevia, Pollack, & Bye, 2007; Tang, et al., 2004).. In one study, researchers analyzed data from the California Health Interview Survey (n = 44,606), a population-based telephone survey. After controlling for demographic variables in logistic regression analyses, the researchers found that lesbians and bisexual women were significantly more likely to smoke than their heterosexual counterparts, (OR = 1.95 and OR = 2.08 respectively). Gay men in the sample were two times more likely to smoke than heterosexual men. Other predictors of cigarette smoking among LGB persons in this study were being age 35-44 years, white, low education, and low household income (Tang, et al., 2004). A second study analyzed data from a stratified random survey of over 22,000 Northern California Kaiser Permanente Medical Plan members. The researchers used logistic regression, adjusting for age, race, and education, and found that lesbians and gay men in the sample have a

significantly higher likelihood of being smokers (OR = 1.6 and OR = 2.4 respectively). A history of regular smoking was reported by a significantly greater proportion of lesbians (43.2%) than heterosexual women (31.2%) (Gruskin & Gordon, 2006). In other research, the authors examined 8 published studies about cigarette smoking among LGB adults. They found that the smoking prevalence ranged from 11% to 50% among LGB adults in the studies, compared to 28% for the general population (Ryan, Wortley, Easton, Pederson & Greenwood, 2001). Based on these studies, it is not unreasonable to conclude that smoking prevalence among LGB persons is significantly higher than the heterosexual population, at least in the regions of California where this research was conducted. This also suggests that additional research is needed to examine and document the differences in cigarette smoking prevalence based on sexual orientation in other regions/states. Furthermore, there is a need to identify factors that lead greater proportions of LGB persons to smoke and to identify interventions that are appropriate and effective in reducing cigarette smoking in this population sub-group.

The prevalence of smoking in the U.S. also varies by age group with younger adult men smoking more than older adult men. Among men age eighteen to twenty-four, approximately 29.5 % smoke cigarettes, while the rates for men age twenty-five to forty-four and forty-five to sixty-five are 26% and 24.5% respectively. Men over 65 have the lowest smoking prevalence among men at 12.6%. The prevalence of cigarette smoking among U. S. women is more consistent across age groups, and ranges from 19.3% to 21% for those persons ages eighteen to sixty-five. However, women older than sixty-five have the lowest smoking prevalence at 8.3% (CDC, 2007b). Ohio smoking prevalence by age group mirrors the national pattern. In Ohio, younger adults, ages 18 to 34, have the highest smoking prevalence at 32.3%. Ohioans age fifty five through sixty-four-years smoke at a rate of 17% and smoking prevalence of those Ohioans above 65-years-old is 8.6% (National Center, 2007a). Smoking prevalence data by age in the greater Cleveland Metropolitan Statistical Area are not available (National Center, 2007b). It has been suggested that the decline in smoking prevalence after age 54 is not caused by older adults'



increased ability to quit smoking, but rather the decline in prevalence is more likely attributable to premature mortality due to smoking related illnesses (Niaura & Abrams, 2002).

People living in poverty smoke in greater proportions than people with more economic resources (CDC, 2007b; National Center, 2007a). In 2006, the prevalence of smoking for individuals living below the federal poverty line was greater (30.6%) than those living above the poverty line (20.4%) (CDC, 2007b). In Ohio the smoking prevalence rate is highest (40.8%) among persons with an annual income of less than \$15,000. The prevalence of smoking decreases as annual income levels increase among Ohioans: 33% for those earning between \$15,000 and \$24,999, 30.3% for Ohioans earning \$25,000 to 34,999, 21.8% for those earning 35,000 to \$49,999, and 15.7% for Ohioans earning more than \$50,000 a year (National Center, 2007a). Smoking prevalence data by annual income in the greater Cleveland Metropolitan Statistical Area are not available (National Center, 2007b).

In the United States, smoking prevalence tends to decrease as the level of education increases. Individuals who hold general educational development diplomas have the highest prevalence of smoking at 46% (51.3% for men and 40.2% for women). In the general population, those persons with graduate degrees have significantly lower rates of cigarette smoking with the prevalence among men at approximately 7.3% while only 5.8% of women with graduate degrees smoke cigarettes (CDC, 2007b). The prevalence of smoking by education level in Ohio is also inversely related. Approximately 40.9 % of Ohioans with less than 12 years of schooling smoke cigarettes. Smoking prevalence among Ohioans with a high school diploma or GED is 29.2%, while the rate for those with some college is 25.3%. College graduates in Ohio have the lowest prevalence of smoking at 9.3% (National Center, 2007a). Smoking prevalence data by education in the greater Cleveland Metropolitan Statistical Area are not available (National Center, 2007b).

There is significant geographical variability in cigarette smoking in the United States. In 2007, three states had the highest prevalence of cigarette smoking: Kentucky (28.2%), West Virginia (26.9%), and Oklahoma (25.8%). Cigarette smoking rates were the lowest in Utah

(11.7%), California (14.3%), and Connecticut (15.4%). Of U.S. territories, Guam had the highest smoking prevalence at 31% and the U.S. Virgin islands had the lowest at 8.7% (National Center, 2007a). In 2000, the Cleveland-Elyria-Mentor, Ohio Metropolitan Statistical Area had the 4th highest prevalence of smoking among adults in U. S. metropolitan areas (29.8%), while La Cruces, New Mexico and Bergen-Passaic, New Jersey demonstrated the lowest prevalence of adult smoking in metropolitan areas (17.2%) (CDC, 2001). By 2007 the prevalence of smoking among adults in the greater metropolitan Cleveland area had declined to 20.9%, compared with the smoking rate across Ohio (23.1%). Of the Ohioans who smoked in 2007, 14.9% smoked everyday and 6% smoked some days (National Center, 2007a; National Center, 2007b). Although this decline in smoking prevalence from 29.8% to 20.9% in eight years for the greater Cleveland area is significant, it remains far from the Healthy People 2010 goal of 12% (CDC, 2008). Healthy People 2010 is a declaration of health goals for US citizens related to decreasing preventable risks to health status and improving health behaviors. It was developed by a consortium of federal and state health agencies and other organizations interested in improving public health (Office, 2008).

The literature also reveals that individuals with alcoholism, other substance abuse, depression, and other mental illnesses such as schizophrenia have a significantly higher prevalence of cigarette smoking and are significantly less likely to quit smoking and sustain abstinence (Lasser, et al., 2000; Niaura & Abrams, 2002; Saperstein, 2006).

#### *Consequences of Cigarette Smoking*

Between 1997 and 2001 there were approximately 438,000 premature deaths each year in the U. S. attributable to cigarette smoking or exposure to secondhand smoke (CDC, 2008). This accounts for approximately one of every five deaths (CDC, 2007a). In addition, an estimated 8.6 million Americans are diagnosed with smoking related illnesses each year (CDC, 2008). Major causes of death attributable to smoking and the annual death toll due to cigarette smoking (in parentheses) include: malignant neoplasms (158,529), cardiovascular diseases (147,979),

respiratory diseases (90,600), perinatal conditions (910), and burn deaths (318). There were also an estimated 38,112 deaths due to illnesses caused by secondhand smoke, such as lung cancer and ischemic heart disease (CDC, 2005).

#### *Costs of Cigarette Smoking*

In addition to the morbidity and mortality attributable to cigarette smoking, there are also enormous economic consequences. One estimate of the annual medical-related costs of tobacco use in the U.S. is \$96 billion, and the economic toll related to lost productivity is \$97 billion per year (CDC, 2008). Other estimates of tobacco related healthcare costs in the U.S. range from 0.46% to 1.15% of the gross domestic product, or from \$8.2 billion to \$72.7 billion (Lightwood, Collins, Lapsley, & Novotny, 2000).

#### *Factors Related to Cessation*

##### *Medications.*

Nicotine replacement therapy (nasal spray, inhalers, lozenges, patch, or gum) and medications, such as sustained release bupropion (Zyban) and varenicline (Chantix), are beneficial to smokers trying to quit. In one study comparing standard community care with an intensive autonomy support intervention, medication use by the participants was a predictor of smoking cessation for both the control and treatment groups. Regardless of their intention to quit at the beginning of the study, participants who used medication had a significantly greater chance of abstaining from cigarettes at 1 and 6 months than those who did not use medications (Williams, et al., 2006).

Although the exact mechanism of nicotine replacement medications is not known, they are used to manage the symptoms associated with nicotine withdrawal. Once only available to consumers by prescription, the nicotine patch, gum, and lozenge are now available over-the-counter. It is suggested that this availability has increased their use and effectiveness among smokers desiring to quit (Niaura & Abrams, 2002). The more rapid acting nicotine inhaler and the nicotine nasal spray are currently available by prescription only (Medication guide, 2008). In

a meta-analysis of 132 randomized trials ( $n > 40,000$ ) in which nicotine replacement therapies (NRT) were compared with placebo or no treatment, researchers found that NRT improved the likelihood of cessation for 6 months or greater by 50 to 70 percent. This beneficial effect of NRT was independent of the presence, intensity, or length of other treatments, and independent of the setting or circumstance (E.g. prescription versus non-prescription, concomitant counseling or no counseling). Research indicates little difference in effectiveness among the various types of NRT (Niaura & Abrams, 2002; Stead, et al., 2008). Odds ratios (and 95% confidence intervals) of nicotine replacement therapies relative to placebo are: Gum, 1.5 (1.3 - 1.8); patch, 1.9 (1.7 - 2.3); inhaler, 2.5 (1.7 - 3.6); and spray, 2.7 (1.8 - 4.1) (Niaura & Abrams, 2002). Some research suggests that cessation success rates may be even greater if quitters use a combination of the slower release patch and a rapid acting form of NRT together, and heavier smokers may require higher doses of NRT (Stead, et al., 2008). Several authors have suggested that it may be beneficial to promote the use of NRT or medications in clients who do not indicate a strong desire to stop smoking because medications may eventually enhance their ability to quit (Williams, et al., 2006). Others suggest that individuals should begin using NRT prior to the established quit date to increase their chance of success (Stead, et al, 2008).

Bupropion is an anti-depressant medication approved by the Food and Drug Administration for use in smoking cessation. Bupropion works by inhibiting the reuptake of neurotransmitter chemicals (dopamine, serotonin, and norepinephrine) by nerve endings, thus prolonging their effect. In a randomized controlled trial of Bupropion versus placebo in 615 subjects, the cessation success rates among the Bupropion groups were statistically significantly higher in a dose dependent way: 19% for placebo, 28.8% for those taking 100 mg/day, 38.6% for those taking 150 mg/day, and 44.2% for those taking 300 mg/day. Despite high recidivism rates, the positive effect of Bupropion persisted at one year such that almost twice as many persons in the Bupropion group remained smoke free compared with the placebo group (Hurt, Sachs & Glover, 1997). Another randomized trial among 244 smokers compared the effectiveness of the

nicotine patch, Bupropion, nicotine patch and Bupropion together, and placebo. The one-year abstinence rates were statistically significantly better for Bupropion than the nicotine patch, and better for the patch than placebo. The combination of Bupropion and nicotine patch was better than Bupropion alone, but the difference was not statistically significant (Jorenby, Leischow & Nides, 1999).

Another medication useful in helping smokers quit is Varenicline (Chantix). This medication works by selectively occupying the nicotinic acetylcholine receptors. In two randomized controlled trials, Varenicline 1 mg twice a day proved more effective than Bupropion 150 mg per day or placebo in continuous abstinence at 12 weeks and 24 weeks follow-up. Furthermore, in both studies, abstinence rates were 46% higher in the Varenicline group than the Bupropion group at 1 year. Subjects in the Varenicline groups reported side effects (primarily nausea) at much higher rates than those subjects in the Bupropion or placebo groups (Gonzales, Rennard & Nides, 2006; Jorenby, Hays & Rigotti, 2006).

#### *Physician's Advice*

The impact of physician advice to quit smoking has a small positive effect on smoking cessation rates. In a systematic evaluation of the Cochrane tobacco addiction group trials register, 41 trials conducted between 1972 and 2007 involving over 31,000 smokers were analyzed. Results revealed that brief physician advice to quit smoking has a small effect, increasing quit rates by an additional 1 to 3% (assuming an unassisted quit rate of 2 to 3%). Interestingly, there was no statistically significant difference in effectiveness of more intense physician advice compared with brief advice (Stead, Bergson & Lancaster, 2008).

#### *Intensive recruitment.*

In another study among smokers in a large managed health plan in Oregon, smokers were given either brief physician advice to stop smoking (reference group), or brief physician advice and then intensive recruitment efforts consisting of a visit to a health counselor and viewing a video (treatment group). Of the brief advice only group, a mere .006% (or 4 out of 706 smokers)

attended the program during the next 12 months. In contrast, 60% of the smokers in the intensive treatment group enrolled in the program, approximately 14% actually attended the program sessions, and about 35% of the attendees remained abstinent from smoking at 12 months. The smokers who were the most likely to attend program sessions were the smokers who were least confident in their ability to quit smoking, high in their desire to quit, and those who smoked the greatest number of cigarettes (most highly addicted). Nicotine dependence was negatively correlated with confidence in quitting ability in this sample (Lichtenstein & Hollis, 1992).

#### *Goals and intentions to quit.*

The goal of quitting smoking abruptly has been strongly correlated with actual follow through and making a quit attempt, but this goal did not significantly predict an increased likelihood of quitting after adjusting for the mean intention to quit (intention to quit ladder score). In other words, goals and ladder score may both represent valid indicators of quitting smoking in the future, however, the goal of quitting abruptly does not improve the prediction of quitting over and above the intention to quit ladder score (Peters, Hughes, Callas & Solomon, 2007). The intention to quit ladder score has been used in other studies to predict “motivation to quit smoking” (Carpenter, Hughes, Solomon & Callas, 2004; Hughes, Keely, Fagerstrom & Callas, 2005; Peters, et al., 2007, p.1158).

### *Health Behavior*

#### *Overview of Health Behavior*

Health behavior is a subset of human behavior. It includes what people do or do not do, what they believe, think, feel and emote, consciously and involuntarily in relation to maintaining or improving their level of wellness. Health behavior is broadly defined as

those personal attributes such as beliefs, expectations, motives, values, perceptions, and other cognitive elements; personality characteristics, including affective and emotional states and traits; and overt behavior patterns, actions and habits that relate to health maintenance, to health restoration, and to health improvement (Gochman, 1988, p. 3).

This definition encompasses individual personality characteristics and traits, cognitive and motivational processes, as well as objective (observable) human actions. Although this definition seems to emphasize the characteristics, processes, and behaviors of individuals, it does not exclude the influence of social and environmental factors on individual health behavior (Edberg, 2007; Gochman, 1988). Glanz, Rimer and Lewis (2002) identify health behavior as the “central concern of health education” and the “crucial dependent variable” in health intervention evaluation research.

In the broadest sense, health behavior refers to the actions of individuals, groups, and organizations as well as their determinants, correlates, and consequences, including social change, policy development and implementation, improved coping skills, and enhanced quality of life (Glanz, Rimer & Lewis, 2002, p. 10).

In defining health behavior it is important to understand what it does not represent. Health behavior is different from medical or pharmacological treatment and outcomes to treatment. It is not concerned with nursing process, medical interventions, psychological counseling, or health care structures and institutions. “Health behavior research is concerned with the way such interventions and institutional structures affect the health behavior of individuals” (Gochman, 1988, p. 6).

#### *Constructs Defined.*

Preventive health behavior is a subset of health behavior. First defined by Kasl and Cobb (1966), preventive health behavior refers to activities performed by individuals who perceive themselves to be healthy and asymptomatic for the purpose of maintaining wellness and preventing injury or illness. For example, an individual who recognizes that cigarette smoking is potentially harmful to their health and chooses not to smoke is engaging in preventive health behavior. A pregnant woman who smokes cigarettes, acknowledges the health consequences of smoking to her fetus, and consequently stops smoking for the duration of her pregnancy is engaging in preventive health behavior.

A second important concept is substance-use behavior, which refers to the use of legal or illegal “mood-altering substances” or drugs (Glanz & Maddock, 2008, p. 3 - 4). Cigarette smoking and other forms of tobacco use are examples of substance-use behavior. Substance abuse occurs when the substance-use is at an “extreme and unsafe level” and/or associated with addiction to the substance (Glanz & Maddock, 2008, p. 3 - 4). Since health care professionals generally consider any level of cigarette smoking to be harmful to the human body over time, and the addictive nature of tobacco is well established, one might reasonably refer to cigarette smoking as “substance-abuse behavior” or “tobacco-abuse” behavior. However the term “abuse” carries with it negative connotations that may be offensive to smokers. Therefore, for purposes of this research, the terms “tobacco-use” and “smoking behavior” will be used and the terms “substance-abuse” and “tobacco-abuse” will not.

#### *Health Behavior Research.*

Many disciplines are involved in seeking a better understanding of health behavior through empirical research and systematic scholarly investigation (Gochman, 1988). Practitioners among these disciplines are often focused on changing health behaviors to improve individual and public health, and include but are not limited to nurses, health educators, health psychologists, sociologists, epidemiologists, and public health physicians. Gochman (1988) identifies three approaches to researching health behavior. The first approach views health behavior as an antecedent or cause of illness. The second approach views health behavior as an outcome of interventions intended to change behaviors and eventually improve one’s state of wellness. This outcome perspective of health behavior is often held by nurses, health educators, and public health practitioners (Edberg, 2007; Glanz, Rimer & Lewis, 2002). The third approach, favored by Gochman (1988), involves investigating health behaviors as phenomena worthy of study in their own right and not placed in an “ancillary position” to health (p. 6). This approach according to Gochman (1988) “is more likely to generate basic, conceptually derived, rigorous,



systematic scientific investigations, and thus be more likely to lead to greater understanding of these behaviors” (p. 6).

Regardless of the approach that health behavior researchers take, many theories and models exist to guide their work. Health behavior researchers and practitioners who implement health programs find that no single theory is able to describe the complexities of human behavior in all circumstances (Edberg, 2007; Glanz, Rimer & Lewis, 2002; Glanz & Maddock, 2008). Therefore a basic understanding of several of the most frequently used health behavior theories and their constructs is important to this prospectus (Glanz, Rimer & Lewis, 2002). The following section summarizes three of these theories or models and their usefulness in understanding smoking behavior.

#### *Individual Health Behavior Theories*

Theories and models provide a way to organize knowledge about, and better understand health behavior and what motivates people to change their health behavior. Many of these theoretical frameworks fall within a broad category of behavioral and social theories, and as such they may also be thought of as theories about the individual and theories about the social, cultural and/or environmental contexts which influence people’s behavior (Edberg, 2007). Several theories about individual health behaviors have been developed and tested empirically over time, and continue to be useful in understanding health behavior and in formulating effective strategies for promoting health (Glanz, Rimer & Lewis, 2002). These theories include the Health Belief Model (HBM), the Transtheoretical Model (TTM), which is also known as the Stages of Change Model, and the Theory of Planned Behavior (TPB) (Ajzen, 1988; Ajzen, 1991; Clark & Becker, 1998; Edberg, 2007, Glanz, Rimer & Lewis, 2002; Prochaska & Velicer, 1997). The following subsections briefly summarize these theories and how they have been used to understand smoking behavior and/or guide health behavior interventions.

*The Health Belief Model.*

The origin of the Health Belief Model (HBM) dates to the 1950's. This theory was developed by members of the U. S. Public Health Service to identify why community members chose not to participate in a free tuberculosis screening program (Clark & Becker, 1998; Edberg, 2007). Originally the HBM described four components to explain why people engage in health behavior, but over time two additional explanatory factors were added (Edberg, 2007). Currently the HBM contains six factors to explain individual health-seeking behavior: (1) perceived susceptibility, (2) perceived severity, (3) perceived benefits, (4) perceived barriers, (5) cues to action, and (6) self-efficacy (Clark & Becker, 1998; Edberg, 2007; Janz, Champion, & Strecher, 2002). Several American Cancer Society (ACS) publications about smoking cessation contain direct references to the HBM, and it is clear in reviewing these publications that the HBM was used as a guiding theory in designing their content (American Cancer Society, 2008a & 2008b). Table 1 identifies the components in the current HBM and provides examples related to smoking that reflect each component.

Table I

Components of the Health Belief Model and Examples Related to Smoking Behavior

Components	Examples Related to Smoking Behavior
Perceived Susceptibility	The individual believes that there is a high probability that they could get a smoking-related disease such as lung cancer.
Perceived Severity	The person believes that getting a smoking-related disease will have a significant and negative impact on their life; i.e. that lung cancer will cause prolonged hospitalization, painful treatment, suffering, and death.
Perceived Benefits	The individual is aware that there are positive outcomes (benefits) to quitting smoking, such as saving money, pleasing a family member, and greater social acceptability.
Perceived Barriers	The individual is aware that there are negative aspects (barriers) to quitting smoking, such as the expense of nicotine replacement therapy, the inconvenience of attending group counseling, and the unpleasant side effects of nicotine withdrawal..
Cues to Action	Triggers that promote action. The person’s cousin died recently from emphysema having smoked for 20 years, and recently saw an anti-smoking poster on a billboard.
Self-Efficacy	The person believes they are competent to overcome the barriers to quitting smoking.

The Health Belief Model is the oldest, the most frequently cited in the literature, and the most extensively researched of all the existing models of health behavior (Clark & Becker, 1998;

Glanz, Rimer & Lewis, 2002; Janz, Champion, & Strecher, 2002). A 1984 review of findings from 46 HBM-related studies by Janz and Becker, (as cited in Clark and Becker, 1998, p. 10) found that each component of the HBM was “significantly associated with the health-related behaviors under study.” In prospective studies involving constructs in the HBM, “perceived barriers was the most powerful single predictor of the HBM dimensions across all studies and behaviors”, while “perceived susceptibility was a stronger predictor of preventive health behavior than sick role behavior”, and “perceived severity was the least powerful predictor” (Clark & Becker, 1998, p. 52).

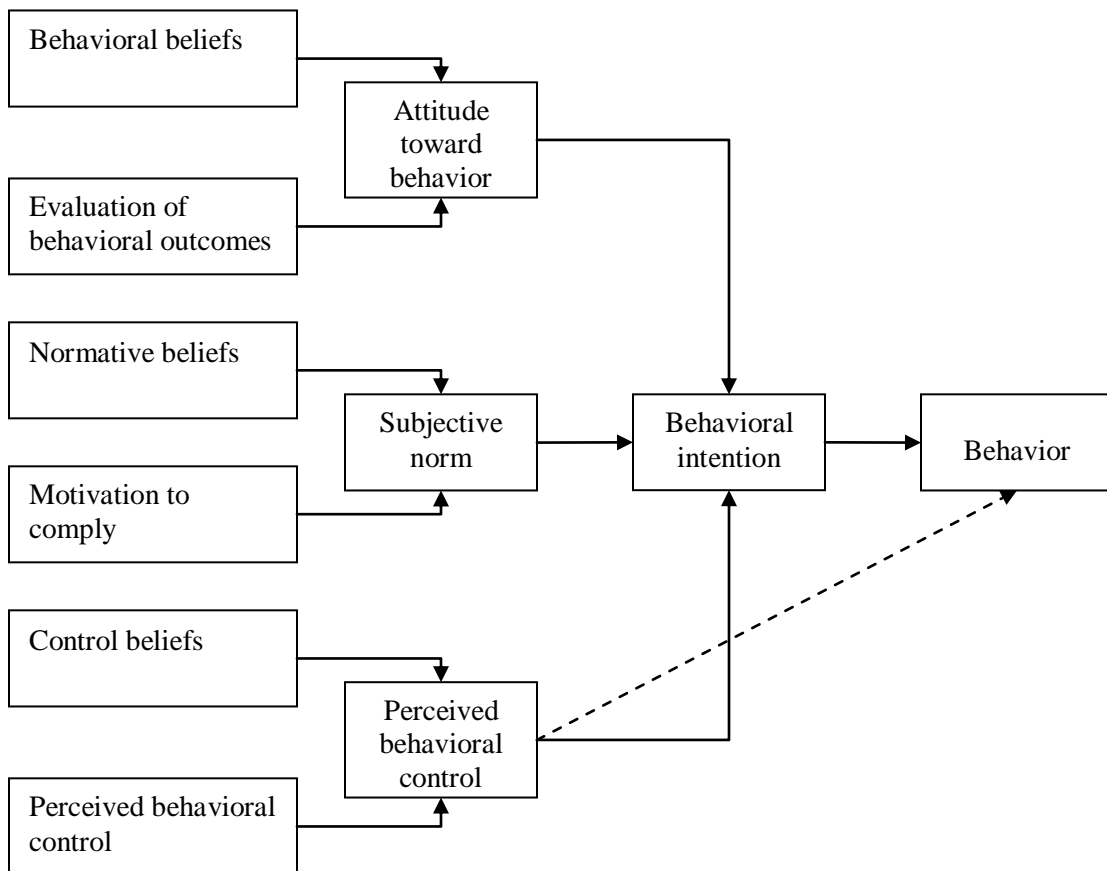
While the usefulness of the Health Belief Model in explaining preventive health behavior and behavior in response to symptoms is well established, the model is not without criticism (Edberg, 2007; Green, 2008; Janz, Champion, & Strecher, 2002). Critiques of the HBM expose five limitations: (1) the scope of the HBM is “limited to predisposing factors”; (2) it does not consider social, environmental, and other external factors which impact the individual’s health beliefs; (3) it assumes that all individuals have the same amount of information on which to base a decision; and (4) it lacks consistent predictive power for many behaviors including smoking behaviors (Edberg, 2007; Glanz & Maddock, 2008; Green, 2008, p. 1). A fifth criticism relates to “inconsistent measurement of HBM concepts” in research studies. Most studies that use the Health Belief Model “have failed to establish validity and reliability of measures prior to model testing” (Janz, Champion, & Strecher, 2002, p. 52).

#### *The Theory of Planned Behavior.*

The Theory of Planned Behavior (TPB) and its antecedent, The Theory of Reasoned Action, are predicted on the belief that individuals think before they act. Both theories describe the “rational, cognitive decision-making processes” which an individual undertakes when contemplating a behavior change (Ajzen, 1988; Ajzen, 1991; Edberg, 2007, p. 39). “Both theories focus on theoretical constructs that are concerned with individual motivational factors as determinants of the likelihood of performing a specific behavior” (Montano & Kasprzyk, 2002, p.

67). Figure 1 depicts the Theory of Planned Behavior and Table II defines the constructs in the TPB and provides a hypothetical example involving Sue, a divorced pregnant woman who is considering stopping smoking during her pregnancy.

Figure 1. The Theory of Planned Behavior



Adapted from: Health Behavior and Health Education: Theory, Research and Practice by Glanz, Rimer & Lewis, 2002, p. 68.

Table II

## Theory of Planned Behavior Constructs, Definitions and Examples

Constructs	Definitions	Examples
Behavioral intention	Central factor in theory; likelihood of performing the behavior of interest	Likelihood that Sue will stop smoking during her pregnancy
Attitude toward the behavior	Overall evaluation of the behavior	Sue has a negative attitude toward quitting smoking.
Behavioral beliefs	Belief that behavior is associated with certain attitudes or outcomes	Quitting smoking may improve my baby's health, but it will make me gain even more weight and I'll be less attractive.
Evaluation of behavioral outcomes	Value attached to behavioral outcome or attitude	I value my appearance more than anything.
Subjective norm	Belief about whether most people approve or disapprove of the behavior.	The people that mean the most to Sue disapprove of stopping smoking
Normative belief	Belief about whether referent approves or disapproves of the behavior	My ex-husband and doctor think I should stop smoking, but my best friend smoked through her pregnancy without any problems
Motivation to comply	Motivation to do what each referent thinks	I don't care what my ex-husband thinks, and I trust my best friend.
Perceived behavioral control	Perceived ease or difficulty of performing the behavior	Sue determines that it is too difficult to stop smoking.
Control beliefs	Perceived likelihood of occurrence of constraining and facilitating factors	The stress of my job makes me want a cigarette. All of my friends smoke. I don't have time or interest to attend a stop smoking support group. When I tried to quit before I failed and the nicotine withdrawal side effects were very unpleasant.
Perceived power over the behavior	Perceived effect of c & f factors on making the behavior easy or difficult	There are many constraining factors and no facilitating factors. Quitting smoking is very difficult.

Adapted from: Health Behavior and Health Education: Theory, Research and Practice by Glanz, Rimer & Lewis, 2002, p. 69.

The central concept in the Theory of Planned Behavior is "behavioral intention" (Ajzen, 1991, 181). Behavioral intentions are derived from one's attitude about a specific behavior and

one's beliefs about the "subjective norms" (what other people think) about that behavior (Edberg, 2007, p. 39). Behavioral intentions "capture the motivational factors that have an impact on behavior", such as how hard someone will try to perform a behavior, or the degree of effort they will exert (Ajzen, 1988, p. 113). In the TPB, behavioral intentions are more reliable predictors of behavior change than one's attitudes (Ajzen, 1988). Attitude about a behavior is determined by a combination of (1) the person's perception of the expected outcome of engaging in the behavior, and (2) their perception of whether the outcome is positive (e.g. beneficial) or negative (e.g. harmful). Subjective norm is determined by (1) the individual's perception of what other people who are important to them (referents) think about the behavior, and (2) how much weight the individual places on conforming to what other people think (Ajzen, 1988).

Another important component to the TPB is "perceived behavioral control", which is comprised of (1) control beliefs and (2) perceived power. "Perceived behavioral control refers to people's perception of the ease or difficulty of performing the behavior of interest", and it varies across time and in different situations (Ajzen, 1991, p. 183). It is a concept that differs from "locus of control" which is conceptualized as remaining constant across situations. According to Ajzen (1991) perceived behavioral control is "most compatible" with the concept of "self-efficacy" (p.184). Control beliefs may be "facilitating control beliefs" if they help the individual in performing the behavior, or "constraining control beliefs" if they make enacting the behavior more difficult (Edberg, 2007, p. 40). Perceived power refers to the individual's perception of the importance of the facilitating and constraining control beliefs in performing the behavior (Montano & Kasprzyk, 2002). Perceived behavioral control, together with behavioral intention, can directly predict performance of the behavior (Ajzen, 1991).

One advantage of the Theory of Planned Behavior over the Health Belief Model is that it takes into account the influence of the social environment (subjective norm, or one's perception of what others think about the behavior). The TPB is especially good at predicting "intention to

behave” across several types of behavior (Clark & Becker, 1998, p. 13). According to the theory’s formulator, Icek Ajzen (1991):

the theory is found to be well supported by empirical evidence. Intentions to perform behaviors of different kinds can be predicted with high accuracy from attitudes toward the behavior, subjective norms, and perceived behavioral control; and these intentions, together with perceptions of behavioral control, account for considerable variance in actual behavior.

Several limitations of the TPB are delineated in the literature. First, the theory assumes that behavior results from “rational, linear, decision-making processes”. Second, the construct of “perceived behavioral control” and its relationship to an individual’s actual ability to control their behavior is not clearly articulated (Edberg, 2007, p. 42). Third, the efficacy of the TPB to predict actual behavior (as opposed to intention) varies greatly across studies and situations. It is reported to be a stronger predictor for “addictive and HIV/AIDS-related behavior than for “clinical and screening behaviors” (Clark & Becker, 1998, p. 13).

*The Transtheoretical Model (TTM)/Stages of Change Model.*

The Transtheoretical Model, also known as the Stages of Change Model, describes health behavior change as a process that occurs over time (Prochaska & DiClemente, 1983; Prochaska & Velicer, 1997). The model uses “stages of change to integrate processes and principles of change from across major theories of intervention”, thus the name “Transtheoretical” (Prochaska, Johnson and Lee, 1998, p. 59). In an attempt to find common ground among hundreds of existing behavioral change theories, the researcher, James O. Prochaska, studied smokers involved in the process of quitting smoking and developed a model which describes six stages of health behavior change and ten important change processes (Prochaska, Johnson and Lee, 1998; Prochaska, Redding, & Evers, 2002). The six stages are: (1) Pre-contemplation; (2) Contemplation; (3) Preparation; (4) Action; (5) Maintenance; and (6) Termination (Prochaska & DiClemente, 1983; Prochaska & Velicer, 1997). Table III describes each stage of change and gives an example related to smoking-behavior.



Table III

Stages in the Transtheoretical Model of Health Behavior Change and Examples Related to Smoking-Behavior

Stage	Example
Pre-contemplation	No intention: No thought is given to quitting smoking because the individual is not aware of a problem related to smoking (denial) or has no intention to change their smoking behavior.
Contemplation	Getting ready: The individual is thinking about quitting smoking sometime in the future (within 6 months) and is weighing the pros and cons of changing (“Decisional balance”).
Preparation	Planning to change: The person intends to quit smoking within a month and has a plan (e.g. sets quit date, enrolls in a program, gets prescription medications).
Action	Overt behavior change: The person implements the plan and stops smoking.
Maintenance	Sustaining change over 6 months to 5 years: The individual works hard at remaining smoke-free and preventing recidivism.
Termination	“Zero temptation and 100% self-efficacy”: The person is not tempted to smoke and it’s as if they never smoked in the first place.

Adapted from The Transtheoretical Model of Health Behavior Change by J. O. Prochaska and W. F. Velicer. 1997. *American Journal of Health Promotion*, 12(1), 38-48.

There are ten change processes associated with the first five stages of change that individuals use to move from one stage to another. These change processes also serve to inform healthcare providers in designing appropriate interventions that match the individual’s stage in the smoking cessation process (Prochaska & Velicer, 1997). These processes of change are:

consciousness raising, dramatic relief, self-reevaluation, environmental reevaluation, self-liberation, social liberation, counterconditioning, stimulus control, contingency management, and helping relationships (Prochaska & Velicer, 1997). For example, self-liberation is the belief that one can stop smoking and the commitment to act on that belief. Another example of a change process is counterconditioning which involves substituting healthy behaviors in place of smoking behaviors to enhance coping. Using physical exercise to cope with feelings of stress, and using nicotine replacement therapy to take the place of cigarettes are two examples of counterconditioning (Prochaska & Velicer, 1997).

In addition to the stages and processes of change, the TTM also includes three important constructs: decisional balance, self-efficacy, and temptation. Decisional balance involves weighing the pros and cons of changing behavior. Originally based on a model of decision making that involved eight categories of pros and cons, Prochaska's analyses revealed a more parsimonious structure with just two factors, the pros and the cons of behavior change (Prochaska, Johnson and Lee, 1998). The construct of self-efficacy refers to a "situation-specific" self-confidence that, for example, ex-smokers utilize to cope with situations that may tempt them to relapse to smoking behavior (Prochaska, Johnson and Lee, 1998, p. 64). Temptation refers to "the intensity of urges to engage in a specific habit when in the midst of difficult situations" (Prochaska, Johnson and Lee, 1998, p. 64).

Six important assumptions guide the TTM. First, just as no single theory can explain all human behavior, the TTM assumes that no single theory can account for all the complexities of behavior change. Second, behavior change involves processes that occur over time; behavior change is not a single decision or act at one point in time. Third, the stages of change are "both stable and open to change, just as chronic behavioral risk factors are both stable and open to change" (Prochaska, Johnson and Lee, 1998, p. 64). It is important to understand that not everyone progresses through every stage, nor do they progress in the same sequence, and individuals may enter the process at different stages (Edberg, 2007; Prochaska & DiClemente,

1983). Fourth, unlike theories of human physiological and psychological development, the TTM assumes that there is no inherent motivation for behavior change. Fifth, most smokers are not ready to change (Prochaska, Johnson and Lee, 1998). As a general rule, approximately 40% of those at-risk are in the precontemplation stage, 40% are in contemplation and 20% are in the preparation stage (Prochaska, Johnson and Lee, 1998; Prochaska & Velicer, 1997, p. 38). Sixth, in order for change from one stage to another to occur, specific processes of change and intervention programs must be matched to the individual's stage. The authors note that "chronic behavior patterns" like smoking and over eating are usually under a combination of "biological, social, and self-controls", whereas the stage-matched interventions are primarily designed to only bolster the individual's self-control, (Prochaska, Johnson and Lee, 1998, p. 65). The authors emphasize the importance of developing the individual "core competency" of "self-change management" as it is critical to life-long health behavior change (Prochaska, Redding, & Evers, 2002, p. 115).

The reader is encouraged to consider the similarities among some of the constructs in the health behavior change theories presented thus far. For example, the construct of decisional balance in the TTM mirrors the constructs of facilitating and constraining control beliefs in the TPB and the constructs of perceived benefits and perceived barriers in the HBM. Similarly, the construct of self-efficacy is a commonality in all three health behavior change models and was adopted from the same source, Bandura's Self-Efficacy Theory (Ajzen, 1991; Prochaska, Johnson and Lee, 1998).

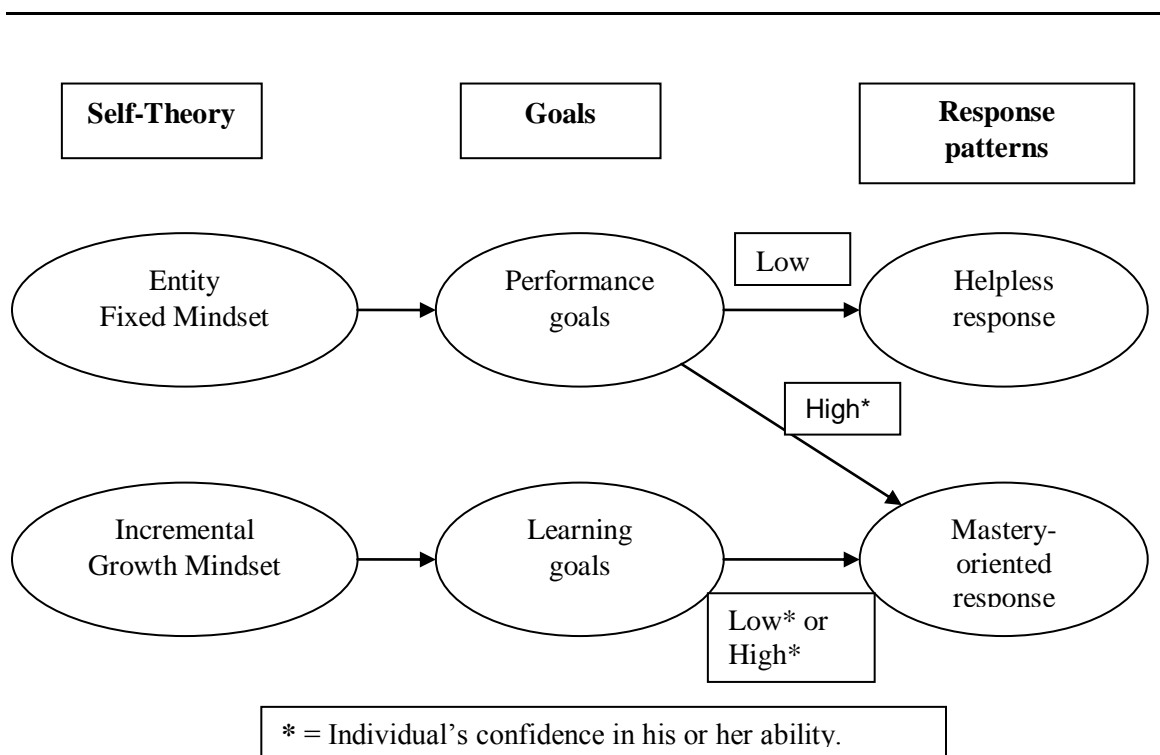
#### *Introduction to Self-theories.*

Self-theories of intelligence, also known as implicit theories of intelligence, were explored by psychologist, Carol S. Dweck, and colleagues over a lifetime of research (Dweck, 2000). Self-theories provide insight into the psychological (motivational) processes underlying achievement. Put simply, this theory posits that individuals hold one of two types of implicit beliefs about their intelligence. Individuals hold either an entity theory of intelligence (also

known as a fixed mindset) or an incremental theory of intelligence (also known as a growth mindset). The implicit belief one holds provides a “meaning system” or perspective that influences each individual’s view of their world. The implicit belief one holds also determines the type of goals one adopts, and causes different response patterns (behaviors, thoughts, and feelings) in identical situations (Dweck, 2000, p. xi). Figure 2 provides a diagram of the self-theories framework.

Figure 2

Self-theories Model



Adapted from: Dweck, C. S. (1986). Motivational processes affecting learning. *American psychologist*, 41(10), p. 1041.

An entity theorist, a person who has a fixed theory of intelligence, tends to adopt performance goals. Performance goals are focused on looking smart and intelligent, or on not appearing unintelligent in a situation. Performance goals cause the individual when faced with a challenging situation to respond in a characteristic manner. If the entity theorist has low

confidence in their ability then the individual will respond in a helpless manner that involves a pattern of typical behaviors, thoughts, and feelings. If the entity theorist has high confidence in their ability in that particular situation, then their response pattern tends to be mastery-oriented.

In contrast, a person who has an implicit belief that intelligence is malleable (an incremental theorist), believes that intelligence can grow and change with effort, and tends to adopt learning goals. Learning goals are focused on learning something new. The individual with learning goals, whether their confidence is high or low in the situation, will respond with a typical response pattern of thoughts, behaviors, and feelings called a mastery-oriented response. Table IV lists the characteristics of helpless and mastery oriented response patterns.

Table IV

Characteristics of Helpless and Mastery-Oriented Response Patterns

Helpless Response Pattern	Mastery-Oriented Response Pattern
Helpless Behaviors	Mastery-Oriented Behaviors
Surrendered when faced with failure Gave up rather than trying harder Performance deteriorated on subsequent easy tasks, and decreased use of effective problem-solving strategies Avoided further challenge and selected easy tasks	Remained steadfast and persistent when faced with failure Worked as hard or applied even more effort on subsequent tasks; increased use of effective problem-solving strategies Selected new challenging and difficult tasks
Helpless Cognitions/Thoughts	Mastery-Oriented Cognitions/Thoughts
Attributed failure to ability or lack of ability Helpless Response Pattern Took less responsibility for failure  Placed less importance on the role of effort Overemphasized failures and under-emphasized successes after failure	Attributed failure to lack of effort Mastery-Oriented Response Pattern Didn't regard their performance as a failure, focused on solutions Placed importance on the role of effort Accurate perceptions of success and "failure" after failure
Helpless Affect/Feelings	Mastery-Oriented Affect/Feelings
Negative feelings about self; believed they were no good; believed they were failures; made many solution-irrelevant statements; pessimistic outlook and predicted fewer successes. Believed that success was beyond their ability High anxiety and negative affect	Positive attributions, optimistic about outcome; used self-monitoring statements e.g. "you can do it", "you have to focus", "you have to try harder"; predicted future successes Believed that success would come with greater effort Lower anxiety and positive affect

*The Role of Motivation in Health Behavior*

No one disputes the important role that motivation plays in health behavior change. Motivation is referenced in many theories, articles, and books about human behavior and serves to answer the question "Why do humans do what they do" (Deci, 1995; Dweck, 2000; Ford, 1992). There are in fact more than thirty different theories of motivation and among these

theories there is little agreement on what motivation is (Ford, 1992). The many definitions or descriptions of motivation are contextually based and must be understood in the context of their overarching theories. For example, the definition of motivation within social cognitive theory differs from the definition of motivation in self-determination theory, and from the definition in causal attribution theory. Most theories of motivation include one, or a combination of two “motivational components”. The most common motivational components of theories are “goal concepts”, “arousal processes”, or “personal agency beliefs”, although few theories address all three motivational components (Ford, 1992, p.154). Motivational theories have been classified with these motivational components in mind ((Ford, 1992).

In light of this, it is important to understand the construct of motivation within the context of a particular (health behavior) theory. In the Theory of Planned Behavior, the construct of “motivation to comply” refers to the likelihood that an individual will do what each referent thinks they should do and is measured on a “unipolar unlikely-likely scale scored 1 to 7” (Montano & Kasprzyk, 2002, p. 69). In one communication theory related to health behavior change, motivation is broadly defined as “factors influencing individuals to attend to and act upon information and knowledge” (Finnegan & Viswanath, 2002, p. 370). In several health behavior theories there is no overt reference to “motivation.” In the Transtheoretical Model there is no reference to motivation per se, despite the models emphasis on progress, process and outcomes (goals). In the Health Belief Model there is no reference to motivation even though the model was designed to explain why individuals were not motivated to use free community-based tuberculosis screening programs (Janz, Champion, & Strecher, 2002).

Dweck (2000) writes that “a complete theory of motivation must deal with what motivates people to initiate behavior and what determines the direction, character, and intensity of that behavior even before an explicit outcome is experienced” (p. 141). Attributions play an important role within the self-theories framework. Helpless and mastery-oriented attributions are described as “fundamental motivational variables” and “critical motivators of persistence”

(Dweck, 2000, p. 140). In addition to attributions, the self-theories and goals that underlie these attributions also represent important motivational variables (Dweck, 2000). For example, entity theorists who believe that intelligence is fixed, also tend to think of intelligence as an inherent capacity; i.e. one has a certain amount of intelligence and that doesn't change. Entity theorists explicitly rule out effort and motivation as a part of intelligence. In contrast, incremental theorists believe in the malleability of intelligence, that it can develop and increase with effort.

Incremental theorists often describe intelligence as a person's current skills and knowledge.

Incremental theorists include effort and motivation as important parts of intelligence (Dweck, p. 61). Thus one's inherent beliefs about intelligence, as well as one's goals and attributions are important motivational variables in the self-theories framework.

### *Research on Self-Theories (Mindsets)*

#### *Introduction to Self-theories*

Through a lifetime of research, psychologist Carol S. Dweck and her colleagues amassed an enormous body of empirical evidence which provides insight into the psychological (motivational) processes underlying learning achievement. The bulk of Dweck's and colleague's research examines the processes involved in students' learning achievement. More recent research findings detail the potential applicability of the self-theories model to other challenging arenas of human activity where motivational processes play a key role, such as sports, business, parenting, science, and creative arts (Dweck, 1986; Dweck, 2000; Dweck, 2006). Noticeably absent from the literature on self-theories are studies which examine the role that self-theories play in motivating health behavior change.

#### *Helplessness and Persistence*

Two experiments investigated a phenomenon known as "learned helplessness" (Dweck, 1975; Dweck & Reppucci, 1973). In the first experiment the researchers were interested in the children's reaction to failure. Children were intentionally given a task that was beyond their current grade level and capabilities so that they would fail the task. The children reacted to



failure in two characteristic ways. First, it was noted that some children who failed demonstrated deterioration in their performance on subsequent easier tasks even when they had the problem solving skills and motivation to succeed. These “helpless children” tended to surrender in the face of failure, took less personal responsibility for failure, and attributed the cause of their failure to their ability or lack of ability (Dweck & Reppucci, 1973, p. 109).

Second, it was observed that other children reacted to failure in a diametrically different way; they remained steadfast and determined to achieve the desired outcome despite their failure. These children who persisted in the face of failure specified the cause of their failure as insufficient effort on their part. Thus in the face of failure the helpless children surrendered and believed that success was beyond their ability, while “persistent children” tried even harder because they believed that success would come with greater effort (Dweck & Reppucci, 1973, p. 109).

The second experiment investigated whether it is possible to change helpless children’s perception of the relationship between behavior and failure (attributions for failure), and thereby alter their response to failure (Dweck, 1975). Children in several classrooms, ages 8 to 13 years, were tested for their math problem solving ability and reaction to failure (helplessness). Twelve “extremely helpless children” were randomly assigned to 2 groups: (1) The Attribution Retraining Treatment group (AR), and (2) The Success Only Treatment group (SO). A comparison group of persistent children of the same age and gender were also selected from the same classrooms as the helpless children. Members of the treatment groups and comparison group were all subject to baseline testing and matching during the pre-treatment period. All subjects completed 3 measures: The Intellectual Achievement Responsibility Scale (IAR), 2 parts of the Test Anxiety Scale, and a repetition-choice task (Dweck, 1975).

During the treatment phase which extended over 25 daily sessions, all children were presented with a series of increasingly difficult math problems and given 1 minute to solve each problem. The situation was manipulated so that the children experienced both success and failure

in the treatment phase. During success trials, researchers told the children in both treatment groups that they had been successful. Then children in the AR group were subjected to “programmed failure trials” where they worked problems and then were told they had not been successful in solving the problems within the allotted time and that they “should have tried harder” (p. 679). All children also experienced unscheduled failures when they failed to answer the problem successfully and/or within the allotted time. At the mid-treatment point and at post-treatment all subjects completed the comparison measures again (Dweck, 1975).

The findings of this study support those of Dweck & Reppucci (1973) and demonstrate that helpless children differ significantly from persistent children on the measured variables and in several distinct ways. Compared to persistent children, helpless children take less responsibility for the results of their behavior, place less importance on the role of effort in achieving success or failure, demonstrate higher levels of anxiety, and lower levels of self-evaluation. In addition, seventy-five percent of the helpless children chose to avoid challenge. It was noted, when offered a choice of puzzles, 9 helpless children re-assembled the puzzle that they had successfully assembled on a previous attempt. In contrast, 9 out of ten of the persistent children selected a new puzzle to assemble. According to the researcher, “The helpless subjects evidenced a clear tendency to avoid failure, while the persistent children showed a tendency to strive for success.” (Dweck, 1975, p. 680)

Helpless children in the two treatment groups also differed significantly from pre-training to post-training on problem solving scores. Helpless Children in the Attribution Retraining Treatment group had significantly higher problem solving scores than subjects in the Success Only group (Dweck, 1975).

To summarize, this study supports the notions that: (a) helpless children differ from persistent children in characteristic ways and (b) it is possible to teach helpless children to attribute failure to insufficient effort, and this idea elicits greater effort and achievement (Dweck, 1975). In subsequent studies children who persisted in the face of failure are referred to as

“mastery-oriented children” (Diener & Dweck, 1978, p. 451; Diener & Dweck, 1980).

Two studies examine the reactions of children following failure by analyzing and classifying their “vocalizations” (Diener & Dweck, 1978, p. 451). In the first study, seventy 5th graders were assigned to either the helpless group or the mastery-oriented group based on their score on the Intellectual Achievement Responsibility Scale, a questionnaire with “thirty-four forced-choice attributions.” All children received training in finding the correct solution to each “three-dimensional, two choice discrimination problem” by searching for the answer on one card out of a deck of 20 cards (Diener & Dweck, 1978, p. 453). During training, the experimenters gave the children feedback, such as “right” or “wrong.” If a solution was incorrect the researchers offered hints to help the child find the correct answer, and hone their problem-solving strategies. During the testing phase, the children were presented with four problems and after each problem they were only told “wrong”. After receiving this “failure feedback” the children were asked “Why do you think you had trouble with these problems?” (p. 454). The children’s answers were recorded verbatim (Diener & Dweck, 1978).

In the second study, a different group of 5th graders, 30 females and 30 males were assigned to either the mastery-oriented or helpless group, and trained in the same fashion as the first study. The only difference in methods was that during training the subjects were asked “to think out loud” with each problem they received. Their verbalizations were monitored verbatim on training and testing to determine any changes. The children’s verbalizations in both studies were analyzed by 2 independent raters who were unaware which children belonged to which group. Only the verbalizations on which the raters agreed were used in the analyses. Raters determined 9 distinct verbalization categories and the results showed striking differences between helpless children and mastery-oriented children when confronted with failure (Diener & Dweck, 1978).

The statements of helpless children were characterized by attributions for their failure, by a large number of solution-irrelevant statements, and by statements of negative affect. In contrast, mastery-oriented children were less concerned about the cause of their failures than they were with a remedy for the failure. Their statements revealed a marked absence of attributions and the presence of self-monitoring and self-instructions. Moreover, following failure, the mastery-oriented children maintained their positive affect towards the task and a positive prognosis about the eventual outcome (Diener & Dweck, 1978, p. 459-460).

In a parallel study investigating differences between helpless children's and mastery-oriented children's behaviors and perceptions of failure and success, the researchers' results supported their previous findings and also contributed additional knowledge (Diener & Dweck, 1980): Specifically, following success there were no significant differences between helpless and mastery oriented children's performance or their own evaluations of their performance. Both groups used similar problem-solving strategies and made use of hints at similar rates following success. However, following failure, mastery-oriented children continued to use effective problem-solving strategies, while the behavior of helpless children was characterized by a significant decline in the use of effective strategies and a significant increase in the use of ineffective strategies (Diener & Dweck, 1980).

Although there were no significant differences in the children's behaviors following success, there were significant differences between mastery-oriented and helpless children's cognitions. The groups differed on their forecast of future success. Mastery-oriented children predicted getting 90% of future problems correct while the helpless children predicted they would get only 50% correct. Helpless children also expressed a pessimistic outlook when they predicted that they would get fewer problems correct compared with other children. Mastery-oriented children remained optimistic and predicted that they would get more problems correct compared to other children. It is also interesting to note that, following failure, the children's perception of past successes and failures was significantly different between groups. Following failure, mastery-oriented children accurately recounted the number of problems they got right or wrong, while helpless children underestimated their successes and overestimated their failures. No

significant effects were found for gender (male versus female) or race (white versus black) in this study (Diener & Dweck, 1980). Research shows that helpless and mastery-oriented responses occur in children as young as three and a half years old (Dweck, 2000).

To summarize, early research differentiated two distinctly different response patterns to failure and success among children. The first was a maladaptive pattern, the helpless response. The second was an adaptive pattern, the persistent or mastery-oriented response. Each pattern involves different cognitive, affective, and behavioral components and is characterized by different self-attributions, or beliefs about one's self. Researchers postulate that these self-beliefs influence children's perceptions of, and interactions with, their environments and occur in children as young as three and a half years old. Additionally, researchers find that it is possible to change children's self-beliefs and thus change their resultant response pattern (Diener & Dweck, 1978; Diener & Dweck, 1980; Dweck, 1975; Dweck, 2000; Dweck & Leggett, 1988; Dweck & London, 2004; Dweck & Reppucci, 1973).

#### *Performance Goals and Learning Goals*

Based on prior research findings which identified two different patterns of response to success and failure, it was thought that mastery-oriented and helpless children might be pursuing very different goals, and that the different goals might actually determine the children's response patterns. It was further hypothesized that helpless children pursue "performance goals" in which they attempt to demonstrate their own competence and avoid any appearance of incompetence. In contrast, mastery-oriented children pursue "learning goals" in which they attempt to improve their ability and competence (Eliot & Dweck, 1988, p. 5). Performance goals take the form of "approach" or "avoidance" goals. They are about trying to look good or avoiding looking bad; Demonstrating that one is smart or avoiding situations where one might appear unintelligent. On the other hand, learning goals are about getting better, learning and improving ones capabilities, mastering challenges, and understanding new ideas (Dweck, 2000). In Dweck's view, goals do not just represent desired outcomes. Goals are much more than "the outcomes people strive for,"

they represent the reasons “behind the particular outcomes individuals strive for” and “the purpose for which an individual is pursuing a behavior” (Dweck, 1992, p. 165; Dweck, 1996, p. 350). Many researchers regard goals as fundamentally important in understanding human behavior, personality and motivational processes (Dweck, 1992).

In an experimental study, Elliot and Dweck (1988) demonstrated that performance goals create a helpless response and learning goals create a mastery-oriented response. The researchers asked 5th graders to read one of two passages that gave students either a performance goal or a learning goal. The performance goal passage emphasized that the students would be given a task in which their performance and competence at solving the task would be judged. The learning goal passage emphasized that students would be given a task that would provide them with an opportunity to learn something of value or gain greater understanding. Then the children were presented with two easy problems and then several difficult problems, and were asked to verbalize their thoughts and feelings about the problem-solving experience. Children given a performance goal responded in a characteristically helpless way, while children provided with a learning goal responded in a mastery-oriented fashion (Elliot and Dweck, 1988). This experimental study demonstrates the important role of goals in causing patterns of cognition, affect and behavior. It is significant to note that in the beginning of the study children were not grouped by helpless or mastery-oriented response patterns, rather the children were given a performance or learning goal and one of two typical response patterns resulted from that goal (Elliot and Dweck, 1988).

#### *Self-theories and Mindsets*

What causes students to choose a performance goal or a learning goal? Researchers hypothesized that students might have one of two implicit views of their intelligence (Dweck, 2000; Dweck & Leggett, 1988). They believed that students who choose performance goals have an entity self-theory. Entity theorists believe that intelligence is fixed and unchangeable. In other words, one has the intelligence one is born with and intelligence does not change throughout ones

life. In contrast, students who choose a learning goal have an incremental self-theory.

Incremental theorists believe that intelligence is changeable, and that one's intelligence can develop and grow with study and effort throughout life (Dweck, 2000; Dweck & Leggett, 1988).

To test the hypotheses that entity theorists select performance goals and incremental theorists select learning goals, researchers conducted two studies; one with fifth and sixth graders and the other with eighth graders. After measuring the students' self-theories, researchers offered the students short written descriptions of several tasks to choose from and instructed the students that they would be working on the task they chose. The first and second tasks were designed to represent a performance goal, and the third task represented a learning goal. One performance goal, for example was described as "easy enough so you won't make mistakes", and another performance goal was characterized as "like something you're good at but hard enough to show you're smart". The learning goal task was described as "hard, new and different - you might get confused and make mistakes but you might learn something new and useful" (Dweck, 2000, p. 21). The researchers' hypotheses were supported by the results of both studies. A statistically significant number of children with an entity self-theory chose the performance goal tasks and a statistically significant number of children with an incremental self-theory chose the learning goal tasks. In the study with eighth graders, 82 percent of those with an entity self-theory chose a performance goal, while 61 percent of the students with an incremental self-theory chose a learning goal (Dweck, 2000; Dweck & Leggett, 1988, p. 263). In two other studies, one by Leggett (as cited in Dweck, 2000) among junior high school students, and the other study among grade school children in a classroom setting, results again confirmed that children's self-theories were significant predictors of their goal orientation (Dweck, 2000; Dweck & Bempechat 1983).

#### *Manipulating Self-theories, Goals, and Response Patterns*

It is important to note that prediction of goal orientation and causation are not the same thing. Therefore, researchers designed an experiment to demonstrate a causal relationship between self-theory and goal choice. In a lab setting, children were given passages to read which

manipulated their goal orientation. One type of passage was about fixed intelligence. The other passage was about malleable intelligence and growth. When the children were subjected to failure at a task and then were asked to select among learning or performance goals, those children who had read the incremental passage were significantly more likely to select a learning goal than they were to select a performance goal (Dweck & Leggett, 1988).

### *Exploring Self-theories in College Students and Adults*

Research demonstrates that self-theories determine goal preferences and types of attributions among adults as well as children (Aronson, Fried & Good, 2002; Dweck, 2000; Hong, Chiu, Dweck, Lin & Wan, 1999; Robins & Pals, 2002). In one study, researchers surveyed college students to determine their predominant self-theory, and then asked all participants to complete the following statement. “If I had to choose between getting a good grade and being challenged in class, I would choose...” Students circled one of two responses, either “good grade” or “being challenged”. Results highlighted a statistically significant difference in choices between entity and incremental self theorists. Sixty-eight percent of the college students with an incremental self-theory chose “being challenged”, while only 35 percent of the entity self-theorists chose that response (Dweck, 2000, p. 22). A study conducted among Hong Kong university students also found that incremental theorists are significantly more inclined than entity theorists to pursue remedial coursework in a subject in which they are deficient. This research supports the idea that self-theories “play a causal role in effort attributions, persistence, and remedial effort after failure” (Hong, et al., 1999, p. 597). Aronson, Fried, and Good (2002) manipulated African American and White college students’ ideas about intelligence in an attempt to mediate the maladaptive behaviors associated with stereotype threat. African American students, and to a lesser degree white students, who believed that intelligence was changeable reported greater engagement and enjoyment of their studies and achieved higher grade point averages than those students in the control groups.

In another study of undergraduate’s self-theories of intelligence, the researchers



examined the relationship between goal orientation and academic achievement in traditional and nontraditional students. Learning goals were a better predictor of academic achievement than student status, and nontraditional students tended to endorse learning goals more than traditional students (Eppler & Harju, 1997).

In a study that links cognitive neuroscience to the self-theories model, researchers used an functional magnetic resonance imaging (fMRI) machine to scan the brains of entity and incremental theorists during a learning task. The subjects, 47 university students, were not aware that it was a learning task until they were tested. Results showed distinct physiological differences in the brain activity of incremental and entity theorists. Incremental theorists exhibited more effort in “sustained deep semantic processing of learning-relevant information” compared to entity theorists. In other words the brains of subjects with a growth-mindset were focused externally on learning during the task, and their brain scan showed greater activity in the learning centers of the brain. Entity theorists were focused internally and their brains showed significantly less activity in the learning centers and more activity in the limbic system, a part of the brain concerned with regulating emotion (Hall, 2007; Mangels, Butterfield, Lamb, Good & Dweck, 2006, pp. 8-9). This study is the first that demonstrates physiological differences between entity and incremental theorist’s brain activity during a learning task.

#### *Testing the Entire Framework*

In another study among a diverse sample of college students, the investigators tested all of the interrelations in the self-theory model as well as the stability of self-theories of intelligence in adolescents and adults through high school and college. Up until the time this longitudinal study was conducted, only portions of the self-theory model had been tested during any one research study. For example, a study would test the connection between self-theories and goals, or another study examined the relationship between goals and response patterns, but no one had investigated all the linkages in the model, from self-theories to goals to response patterns during a single experiment. Additionally the researchers examined the relationship between individuals’

self-theory and self-esteem during college (Robins & Pals, 2002).

The results supported previous research and showed that among this sample of college students, entity theorists endorsed performance goals and incremental theorists favored learning goals. Performance goal choice among entity theorists was moderated more by perceived failure than by perceived success. In other words, students who believe that their intelligence is fixed were more likely to select performance goals when faced with failure than when faced with success. In addition, the researchers found that students' self-theories tend to be stable over time. There were no statistically significant differences in mean level of self-theories from high school through college, or any statistically significant individual changes in self-theory during college. Also, there were no significant differences in self-theory based on gender. This supports the notion that self-theories remain relatively unchanged through adolescence and young adulthood. College students who enter college with an entity (or incremental) self-theory tend to maintain an entity (or incremental) self-theory respectfully throughout their undergraduate program. However, Robins and Pals (2002) carefully note "the fact that implicit self-theories show no mean-level change and relatively high stability over time does not preclude the possibility of change at the individual level." (p. 329).

College students in this study attributed their successes and failures in a way that is consistent with previous research on attributions and the self-theory model. Entity theorists displayed the typical helpless response pattern to failure and blamed the cause of their failure and success on "external" or "uncontrollable" variables, such as their "luck", inherent "ability", "class difficulty", and the relative "ability of other students" (p. 323-324). In contrast, college students holding an incremental self-theory demonstrated the typical mastery-oriented response and attributed success to controllable factors such as "effort", "hard work", and "study skills and strategies" (Robins & Pals, 2002, p. 324). The students' affective responses were also consistent with previous research on the self-theories model. Although there was no significant difference in the entity and incremental students' grades, entity theorists were more likely to report negative

feelings while incremental theorists were more likely to report positive feelings, and these affective differences were not moderated by gender, perceived performance, or academic self-confidence. The students' behavioral responses were also consistent with the self-theories model and previous research. There was a statistically significant correlation between entity self-theory and helpless behaviors, and this correlation increased in the face of failure. Entity and incremental theorists showed clear differences in self-esteem, with students who believe in fixed intelligence reporting lower self-esteem and exhibiting a downward trajectory while incremental theorists' self-esteem reflected a positive increase over time. This "self-esteem gap" widened throughout the students' four years of college (Robins & Pals, 2002, p. 325).

Using path analyses, Robins and Pals (2002) tested the entire self-theory model and their findings generally endorse the model, and suggest several additional insights. First, "in real world contexts," as opposed to psychology laboratories, performance and learning goals are not necessarily mutually exclusive, but may make "independent contributions to psychological outcomes" (p. 331). Second, there is a clear connection between self-theory and patterns of response and this connection may occur independently of the goal orientation (p. 331). Finally, among the subjects in this study, self esteem diminishes in college students with an entity self-theory despite perceptions of, or actual, success or failure and tends to increase in incremental theorists (Robins and Pals, 2002).

The results of another study demonstrate a similar pattern of attributions among undergraduate university students. Entity theorists tend to blame their poor performance on their fixed-ability while incremental theorists tend to attribute failure to low effort and their current (but changeable) ability (Hong, et al., 1999).

#### *The Self-theories Model in Other Contexts*

As demonstrated by decades of previous research, the self-theories model is useful in explaining motivational processes in learning achievement situations in the laboratory and classroom. The model posits that individuals hold relatively stable self-beliefs that intelligence is

either fixed (entity self-theory) or malleable (incremental self-theory). One's self-theory may determine performance or learning goal orientation, and causes either a helpless or mastery-oriented (cognitive, affective and behavioral) response pattern (Dweck, 1986; Dweck, 2000; Dweck and Leggett, 1988). In the 1980's, it was recognized that the self-theories model might be useful in generating "new lines of research in the future" (Dweck & Leggett, 1988, p. 271). This subsection identifies research and artifacts in other than education contexts where the model's explanatory power has been tested or asserted. These areas include the social interactions, moral behavior, stereotyping of individuals and groups, and in many other human activities from the arts and sciences through parenting and coaching (Dweck, 2000; Dweck, 2006; Dweck Chiu & Hong, 1995; Dweck & Leggett, 1988, p. 264, Erdley, Cain, Loomis, Dumas-Hines, & Dweck, 1997; Erdley & Dweck, 1993; Gervery, Chiu, Hong & Dweck, 1999; Goetz & Dweck, 1980; Levy, Plaks, Hong, Chiu, & Dweck, 2001; Levy, Stroessner & Dweck, 1998).

#### *Self-theories and Social Interactions.*

The self-theories model was tested in several studies which investigated the associations among children's self-theories, social goals, and patterns of responses to social rejection during a pen pal letter tryout (Erdley, et al., 1997; Goetz & Dweck, 1980). The first experimental study identified that children who are faced with social rejection display the typical helpless and mastery-oriented response patterns that were observed in learning achievement situations (Goetz & Dweck, 1980). The second experiment was designed to test whether the children's social goals (performance or learning goals) caused the helpless and mastery-oriented responses, and indeed the findings supported this idea (Erdley, et al., 1997). Children's goals were manipulated by the experimenters and then the children's attributions, affect, and behaviors after social rejection were classified and evaluated by a blind coder. The experiment demonstrated that children who were given a performance goal showed a helpless response pattern which included negative affect, fewer attempts at social interaction, and attributed their social setback to their "inability to make friends" and being "too different" from the evaluator (p. 268). In contrast, after social

rejection, children who were primed with a learning goal showed a mastery-oriented response which included an increase in positive feelings, greater effort in writing their letters, and more openness in reaching out to their pen pal. Children with the learning goal attributed their rejection to a lack of effort and therefore tried harder to make friends on their second letter-writing attempt (Dweck, 2000; Erdley, et al., 1997).

A third experiment, also by Erdley and colleagues (1997) investigated another connection within the self-theories model in a social situation, the relationship between student's self-theories of personality (entity and incremental) and their social goals (performance or learning). Children's self-beliefs about their personality, in other words whether they believed that their personality was unchangeable or able to grow and develop, were identified by survey questionnaire and then compared with the student's choice of social goals. Findings revealed that entity theorists differed significantly from incremental theorists in their selection of performance goals. Students who believed that their personality was unchangeable were most interested in avoiding social rejection and negative judgments, seeking safe and unchallenging social situations, and gaining social approval compared to students who thought that their personality could develop over time (Dweck, 2000; Erdley, et al., 1997). A fourth study by Benenson (1987) (as cited in Dweck & Leggett, 1988, p. 265) also lends support to the self-theory model and the notion that children's self-beliefs about personality predict their social goals.

*Self-theories, Moral Behavior, and Domain Specificity.*

Dweck and Leggett (1988) hypothesized that an individual's implicit beliefs about morality will also determine the reasons for one's choice of moral behavior. Bempechat and Dweck (as cited in Dweck & Leggett, 1988) found that children view many personal traits as changeable and that other children view the same traits as unchangeable, whether it be intelligence, physical attractiveness, morality, or physical skills. It is also important to understand that an individual may have a fixed self-belief in one domain and a malleable self-belief in another domain. For example Bempechat (1986) (as cited in Erdley & Dweck, 1993, p.

867), found that school aged children demonstrated “domain specificity”, and that their self-theories might vary depending on the domain in question. This finding does not mean that the self-theories always vary from one domain to another. It means that self-theories might vary or might not vary between domains. In other words it is possible for one individual to have an entity view of intelligence, and an incremental view of personality, while another individual has an incremental view of intelligence and personality. Regardless of the domain, “For any personal attribute that the individual values, viewing it as a fixed trait will lead to a desire to document the adequacy of that trait, whereas viewing it as a malleable quality will foster a desire to develop that quality” (Dweck & Leggett, 1988; p. 266).

*Self-theories, Judgments, and Stereotyping.*

Research also shows that holding an entity theory about the attributes of other people (both individuals and groups), believing that their attributes are not malleable, may play a fundamental role in stereotype formation, judging others, and discriminatory behavior (Dweck, 2000; Dweck, Chiu & Hong, 1995; Dweck and Leggett, 1988; Erdley & Dweck, 1993; Gervery, Chiu, Hong & Dweck, 1999; Levy, Plaks, Hong, Chiu, & Dweck, 2001; Levy, Stroessner & Dweck, 1998). An individual with an entity theory of personality is significantly more likely than an incremental theorist to make a stronger, quicker, and more global judgment of another individual’s character traits based on minimal information, and these global snap judgments can be negative or positive (Dweck Chiu & Hong, 1995; Erdley & Dweck, 1993). Furthermore, the entity personality theorist is more likely than the incremental personality theorist to predict that the individual will behave in a similar way in another type of situation (Chiu, Dweck, Tong & Fu, 1997; Dweck, 2000; Dweck, Chiu & Hong, 1995; Erdley & Dweck, 1993). In addition, when entity theorists make a snap judgment, they are much less likely to consider subsequent contradictory information and may even attempt to avoid the new information because it does not conform to their notion that personality traits are fixed (Dweck, 2000; Erdley & Dweck, 1993). People who view the world through a fixed self-theory of personality also make rapid judgments

about other individuals' personality and moral character based solely on their physical appearance (Gervey, Chiu, Hong & Dweck, 1999). In contrast, incremental personality theorists are less likely to make global trait inferences, take greater time to make judgments, focus less on personal traits as causes of behavior, and instead, favor understanding the mediating circumstances that may have caused the behavior (Dweck, Chiu & Hong, 1995; Erdley & Dweck, 1993).

It logically follows that an entity theorist, who believes that their self and others are not likely to change, would treat wrong doers differently than an incremental theorist. Indeed research bears this out. Entity theorists, more than incremental theorists, emphasize the inherent "badness" of the wrongdoer, and tend to select goals involving revenge and punishment, while incremental theorists emphasize education, rehabilitation, and understanding the reasons behind the offenders' behaviors (Erdley & Dweck, 1993; Gervey, Chiu, Hong & Dweck, 1999).

Individual's beliefs about groups (group stereotypes) are also influenced by their self-theory. These group stereotypes can be positive or negative. Entity theorists tend to emphasize the same traits across all individuals in a group, make more assumptions about group traits, are more likely to attribute a group member's behavior to assumed group traits, exaggerate the similarities within groups, and exaggerate between group differences significantly more than incremental theorists (Hong, Chiu, Yeung, and Tong, 1999; Levy, Plaks, Hong, Chiu, & Dweck, 2001; Levy, Stroessner & Dweck, 1998). These stereotypical beliefs about groups have been demonstrated in samples of college students in the United States, Hong Kong, China, and France (Begue & Apostolidis, 2001; Chow, 1996 as reported in Levy, Plaks, Hong, Chiu, & Dweck, 2001; Hong, Chiu, Yeung, and Tong, 1999).

Experimental research demonstrates that entity theorists endorse common stereotypes of African Americans at significantly higher rates than incremental theorists, and also tend to believe that these traits are inborn and resistant to change. In contrast, incremental theorists attribute stereotypes to African Americans at significantly lower rates than entity theorists, and tend to believe more strongly that these traits originate from the social environment, vary within

groups, and are subject to change (Levy, Stroessner & Dweck, 1998).

Individual perceptions (stereotyping) of group members can also be influenced by manipulating an individual's self-theory (Dweck, 2000; Levy, Stroessner & Dweck, 1998). In one experiment, researchers randomly assigned college students to two groups and had one group read an article which emphasized an entity viewpoint while the other group members read an incrementally-focused article. Later the students in each group were asked to identify from a list the personality traits that they associate with various ethnic groups (African American, Asian and Latino) and occupational groups (politicians, lawyers, doctors, and teachers). The results demonstrated that students given an entity theory were significantly more likely to endorse stereotyped group traits than students exposed to an incremental theory and "that implicit theories can have a causal effect on endorsement of stereotypes" (Dweck, 2000; Levy, Stroessner & Dweck, 1998; p. 1431).

#### *Self-theories in Other Contexts.*

Recent popular literature cites research and anecdotal evidence that implicit self-theories can influence an individual's world view and achievement in many other areas of human activity (Dweck, 2006; Eisenberg, 2005; Hall, 2007; Krakovsky, 2007; Park, 2007, Rae-Dupree, 2008). In *Mindset: The New Psychology of Success*, the author, Carol S. Dweck (2006), recounts aspects of her lifelong empirical research program and anecdotal evidence from interviews about the mindsets of successful and unsuccessful people in the arts, sciences, business, leadership, professional sports, personal relationships, parenting, teaching and coaching. In the introduction, Dweck (2006) states that the outlook one adopts, whether it is a "fixed-mindset" (entity theory), or a "growth-mindset" (incremental theory), can have a profound and transforming effect on your life. One's self-theory "can determine whether you become the person you want to be and whether you accomplish the things you value" (p. 6). Dweck (2006) implies that changing one's self-theory is as easy as changing one's mind and that through awareness, education, and appropriate feedback individuals can cultivate a growth mindset.



### *Changing Response Patterns with Feedback*

The empirical research which is highlighted in this paper is important in establishing a model that provides insight into motivational processes. Implicit self-theories influence the types of goals people adopt and directly determine their behaviors, thoughts and feelings. These study results and the ones cited in this subsection are also important because they demonstrate that self-theories are capable of being altered. It is possible to change a person's self-theory and change their behaviors, thoughts and emotions.

Given the fact that we have been successful in manipulating theories, these findings suggest that it is more appropriate to view implicit theories and their allied judgments and reaction patterns as relatively stable but malleable personal qualities, rather than as fixed dispositions (Dweck, Chiu & Hong, 1995, p. 279).

As previously mentioned, research shows that helpless and mastery-oriented response patterns occur in children as young as three and a half years old (Dweck, 2000). Furthermore, it is believed that the origin of these helpless and mastery-oriented response patterns lies with the kind of feedback that children receive in their formative years. Regardless of a child's self-theory and their proclivity to behave in a helpless or mastery-oriented way, certain types of feedback will elicit a helpless response and other types of feedback will elicit a mastery-oriented response (Kamins & Dweck, 1999; Mueller & Dweck, 1998). To be specific, person-centered feedback that emphasizes trait judgments of a child, for example "You are so smart", signals to the child that she is being judged on her personal attributes, that her self-worth is contingent on always being smart. This creates vulnerability when faced with failure or even a perceived setback. Person-centered feedback that is focused on personal attributes such as intelligence, social skills, physical appearance, etc. causes the individual to adopt and maintain a fixed-mindset or entity self-theory. Person-centered feedback engenders the adoption of performance goals, and elicits behaviors such as avoiding challenges (in an attempt to avoid failure and to appear in a favorable light), using less effective strategies, and not achieving outcomes. Person centered feedback elicits negative emotions, pessimism about future performance, self-criticism ("I've never been

good at \_\_\_\_\_”, and decreases enjoyment in learning (Aronson, Fried & Good, 2002; Diener & Dweck, 1978; Diener & Dweck, 1980; Dweck, 1975; Dweck, 2000; Dweck, 2006; Dweck & Reppucci, 1973; Hong, Chiu, Dweck, Lin & Wan, 1999; Kamins & Dweck, 1999; Mueller & Dweck, 1998; Robins & Pals, 2002).

In contrast, feedback that emphasizes effort and strategies conveys to the individual that there are other effective ways of coping with a problem or mistake, and elicits hardiness and persistence in the face of failure. Effort-centered feedback focuses the individual on development and learning and causes the individual to adopt and maintain a growth-mindset or an incremental self-theory. Effort-centered feedback engenders the adoption of learning goals, and behaviors such as seeking-out challenges in an attempt to continue learning and developing, and being persistent even in difficult times. Effort-centered feedback elicits positive emotions, such as joy, excitement, and enthusiasm; self-monitoring behaviors and self-encouragement, such as “I can do it”; an optimistic outlook about outcomes; and increases enjoyment about learning. This type of feedback is both the origin of children’s response patterns, and it also serves to perpetuate or to change the helpless and mastery-oriented response patterns in childhood and adulthood (Aronson, Fried & Good, 2002; Diener & Dweck, 1978; Diener & Dweck, 1980; Dweck, 1975; Dweck, 2000; Dweck, 2006; Dweck & Reppucci, 1973; Hong, Chiu, Dweck, Lin & Wan, 1999; Kamins & Dweck, 1999; Mueller & Dweck, 1998; Robins & Pals, 2002). Empirical evidence suggests that African American college students might benefit the most from interventions that promote an incremental view of intelligence (Aronson, Fried & Good, 2002). Other research suggests that regardless of gender, ethnicity, or urban or rural setting, individuals who possess or acquire an incremental self-theory of intelligence will benefit from that viewpoint in the area of achievement motivation (Dweck, 2000; Hong, Chiu, Dweck, Lin & Wan, 1999; Kamins & Dweck, 1999; Mueller & Dweck, 1998; Robins & Pals, 2002).

#### *Self-theories and Health Behavior*

By using person-centered or effort-centered feedback researchers are able to manipulate

subject's self-theories, goals and response patterns in laboratories and classrooms. Moreover, the knowledge that self-theories are malleable, that researchers are able to manipulate individual's beliefs and actions, even temporarily, could have profound implications for healthcare providers, health educators and their clients. Is it possible that healthcare providers could be taught to utilize effort-centered feedback to encourage health behavior change in their clients? Is it possible that health educators can develop other strategies that effectively alter clients' self-theories and in turn cause them to adopt smoking cessation goals and adaptive health behaviors? Is it possible that smokers could practice effective strategies to change their self-theory and to change smoking behavior on their own? These questions fall within the realm of this author's imagination and the realm of possibilities based on Dweck's (2000) self-theories model. Unfortunately, answers to these questions do not exist in the current scholarly literature. There is no evidence to date that researchers have been able to change individual's self-theories in a context other than an educational context or psychology laboratory.

Only one existing research study investigates the role of implicit theories in promoting healthy behavior; a study concerned with testing the self-theories model relative to physical activity levels (Lochbaum, Bixby, Lutz, Parsons, & Akerheim, 2006). Specifically, this study investigates the relationships between implicit self-theories, goals, response patterns, perceived physical ability, and strenuous physical activity in male and female college students.

Unfortunately no data is provided regarding ethnic composition of the 539 participants, or ethnic or gender differences in the findings. Results of this study provide partial support for the self-theories model. Researchers in this study found that an entity orientation was not significantly correlated with performance goals. This finding is inconsistent with previous tests of the self-theories model (Dweck & Leggett, 1988; Robins and Pals, 2002). However, other results of this study do support the self-theories model. Researchers found a significant negative correlation between entity self-theory and learning goals ("task orientation"), and significant positive correlations between learning goals and participant's perceptions of personal control over

exercising, positive affective response to exercise, and amount of strenuous exercise participation. For participants who regard themselves as high in physical ability, the model accounted for 29% of the variance in affect and 15% of the variance in strenuous physical activity. For participants with low physical ability perceptions, the model accounted for 21% of the variance in affect and 7% of the variance in exercise participation. The authors found a mediating effect of learning goals and perceived personal control on the relationship between self-theory and exercise participation and this is consistent with the self-theories model (Lochbaum, et al., 2006, pp. 63-64). The researchers' findings are consistent with experimental studies demonstrating that there is a causal relationship between self-theory and goals and goals and response patterns. As described earlier, an incremental self-theory is associated with a learning goal orientation, and causes a persistent response pattern that is characterized by positive emotions and cognitions (such as task enjoyment, and a sense of optimism and control of the outcomes), and higher levels of effort and achievement (Diener & Dweck, 1978, Diener & Dweck, 1980; Dweck, 2000; Dweck & Leggett, 1988; Elliot and Dweck, 1988; Robins & Pals, 2002).

There is no research to date on the role that self-theories play in smoking cessation. Therefore the present research study attempts to investigate the role that self-theories play, if any, in smoking cessation.

## CHAPTER III

### METHOD

The planned research methodology is described in this chapter. The research questions are presented first, followed by a description of the sampling method and study participants. Next the development of the questionnaire (The Smoking Questionnaire) and the rationale for items on it are described. This section also includes validity and reliability data on the survey questions that have been used and reported in previous research. A table is presented that lists the research questions, and corresponding survey questions. Data collection methods and variables are described next. Finally this section ends with a description of plans for data analyses.

#### *Research Questions*

This study attempts to answer the following four research questions:

1. Is an individual with a growth mindset more likely to stop smoking than an individual with a fixed mindset?
2. Which of the following variables best predict smoking cessation behavior: age, gender, sexual orientation, level of education, household income, years of smoking, use of smoking cessation strategies (medications, nicotine replacement therapy [NRT], participation in smoking cessation programs), presence of smoking related symptoms or illness, previous quit attempts, nicotine dependence, healthcare provider advice, other smokers in the household, intention to stop smoking, mindset of smoking, and mindset of intelligence?
3. What are the relationships between age, gender, sexual orientation, level of education, household income, years of smoking, use of smoking cessation strategies (medications, nicotine

replacement therapy [NRT], participation in smoking cessation programs), presence of smoking related symptoms or illness, previous quit attempts, nicotine dependence, healthcare provider advice, other smokers in the household, intention to stop smoking, mindset of smoking, and mindset of intelligence?

3. Which of these variables best predict self-reported intention to stop smoking?

4. Is there a statistically significant relationship between self-theory of intelligence and self-theory of smoking?

#### *Population/Sample*

This study uses a convenience sample of at least 100 persons, among which are an approximately equal number of smokers and ex-smokers. Participants in this study will be adults (age 18 and older) who are currently smoking (smokers) or have stopped smoking (ex-smokers) in the past 5 years.

#### *Inclusion Criteria*

Participant inclusion criteria are: (1) able to read and write English, (2) adults age 18 years and older, (3) current cigarette smokers or ex-smokers, and (4) volunteers who consent to participate by completing the consent form and the Smoking Questionnaire.

#### *Sampling*

Participants will be solicited to participate in the study in two ways. The first involves face-to-face contact, obtaining consent, and administering a questionnaire. The second method involves distributing an e-mail link to the online questionnaire and a type of “snowball sampling technique” among on-line respondents. Using two sampling strategies may maximize the sample size, maximize the number of completed questionnaires, and make the data collection process less time consuming for the researcher than one which involves only face-to-face data collection.

#### *Face-to-Face Sampling*

Once approval is obtained from the Cleveland State University (CSU) Institutional Review Board (IRB), in-person sampling will occur at two public locations on the CSU campus.

The first location is on the first floor of the Main Classroom Building where many students gather for socializing and group study. It is a busy location adjacent to an outside area where students and faculty routinely go to smoke. Sampling on a weekday between the hours of 9:00 a.m. and 5:00 p.m. in the Main Classroom Building is most likely to obtain respondents who are representative of college students at CSU. The researcher plans to engage in face-to-face sampling at this location for a minimum of two different morning and two different afternoon sessions in the months of January and/or February 2009.

A second face-to-face sampling location is the Wolstein Center. The Wolstein Center is a large urban arena which hosts conferences, sporting, and entertainment events for the general public and accommodates up to 14,000 people. The Wolstein Center is located at 2000 Prospect Avenue, Cleveland OH 44115; Phone: 216-687-9272. According to the Wolstein Center's website, a designated smoking area is usually set up outside at the Gate C Plaza, or for certain events, another area may be designated in its place. During January and February 2009, several popular events are scheduled at the Wolstein Center and these may provide a large general population from which to sample. These events include, but are not limited to, Dancing with the Stars Tour (January 13th), Monster Nationals Monster Truck and Thrill Show (January 17th), World Wrestling Entertainment Monday Night Raw (January 26th) and Winter Jam '09 Spectacular (January 30). Permission to collect data at the selected events will be obtained from the researcher's dissertation committee chairperson, Dr. Sheila Patterson, and the General Manager of the Wolstein Center, Ron Willner, prior to beginning data collection. The researcher will solicit study participants in an area adjacent to the smoking area. Sampling at the Wolstein Center may elicit smokers and ex-smokers who are representative of the general population in and around Cleveland. The intent behind selecting these two urban university locations is to obtain a diverse sample of respondents from different racial groups, incomes, ages, genders, and lifestyles. Since this sampling methodology is not randomized, it is likely that the

convenience sample may not represent the general population of CSU or Cleveland nor represent of all smokers and ex-smokers at CSU and in the Cleveland area.

Of the total student enrollment at CSU in 2007, 57% are female, 60% are white, 18% are black, 3% are Asian, and 3% are Hispanic. The average age of students enrolled at CSU is 29 years (CSU, 2007). The racial makeup of Cleveland, according to the U. S. Census Bureau (2006), is approximately 38.3% White, 53.2% African American, 1.7% Asian, 0.3% Native American/Alaskan Native, and 4.2% “some other race” (p.2). Approximately 27% of Clevelanders had incomes below the poverty threshold (\$10,294 for individuals in 2006) (U.S. Census Bureau, 2006).

#### *On-line Sampling*

A second sampling technique to be used in this study involves sending an e-mail invitation to complete an on-line version of the Smoking Questionnaire to all persons in the CSU e-mail directory. In this e-mail potential participants will be asked to complete the Smoking Questionnaire and to forward the e-mail and questionnaire link to anyone else that they know to be a smoker or an ex-smoker. In this way a snowball-type sampling technique will be used to contact known smokers and ex-smokers and ask them to complete the Smoking Questionnaire. In addition, an invitation for smokers and ex-smokers to complete the Smoking Questionnaire will be published in the CSU Alumni E-Newsletter. Additionally, the researcher will e-mail a link to the Smoking Questionnaire to known smokers and ex-smokers, and they will be asked to forward the survey to any smokers and ex-smokers that they know. The e-mails and e-newsletter will also provide information about the incentives for participation, a “chance to win a \$25.00 gas card.” Finally, the researcher will hand-out invitations printed on business cards to any smoker or ex-smoker she encounters in her daily activities. These personalized invitations will also include information about the incentive for participation in the research. It is hoped that these personalized sampling strategies will generate a sufficient sample of at least 100 and up to 150 completed questionnaires from smokers and ex-smokers.



### *Instrument*

A questionnaire, entitled “Smoking Questionnaire”, was designed for this study (see Appendix B). The questionnaire complies with general survey and questionnaire development guidelines in the research literature regarding appropriate organization and spacing of items (Alreck & Settle, 1985; Di Iorio, 2005; Portney & Watkins, 1993; Sommer & Sommer, 2002; Sudman and Bradburn, 1982).

### *Advantages and Disadvantages of Questionnaires*

One advantage of a questionnaire is that it can be customized to collect the data of interest to the researcher (Alreck & Settle, 1985). Since there are few existing and valid instruments to collect information that will answer the research questions in this study, a custom designed questionnaire seemed the best choice. An alternative, such as interviewing, would be less efficient and effective in attaining the desired sample of 100 to 150 participants.

Interviewing takes more time to accomplish, requires more resources (people and dollars) to implement, and is usually more inconvenient for study participants. A self-administered questionnaire, particularly one that is administered on-line, is more convenient for participants since they can complete it on their own time. Convenience might translate into a willingness to participate, although the return rates for on-line surveys are generally considered to be low at approximately 10 - 13%. Factors that may increase the return rates of on-line surveys include using reminders, offering financial incentives, and using personal promotion (Cooper, 2007).

A second advantage of a questionnaire is efficiency. A questionnaire is efficient in that data can be collected from a relatively small randomized sample that may be reflective of the larger population (Alreck & Settle, 1985). Such efficiency allows researchers to make inferences about the population based on sample characteristics. However it is important to note that the sample chosen for this research is not randomly selected and therefore the sample may not reflect characteristics of the general population.

Another significant advantage of a self-administered questionnaire is that “there is no

more direct way to obtain information” about “individual psychological variables such as perceptions, fears, motivations, and attitudes” (Portney & Watkins, 1993, p. 251). Because questionnaires are standardized, i.e. all the questions are asked in the same way to all the participants, there is minimal risk of bias from interactions with interviewers. Anonymous questionnaires will promote more candid and honest responses from participants than interviews (Portney & Watkins, 1993). This is especially important when the researcher is attempting to collect data of a sensitive nature.

A major disadvantage of questionnaires is that the questions may be written in a way that leads to confusion and misinterpretation by the respondents (Portney & Watkins, 1993). This disadvantage highlights the need to carefully develop and test the Smoking Questionnaire before beginning data collection. In order to maximize validity and reduce measurement error, the researcher will ask 3 to 5 experienced health behavior researchers to evaluate the questionnaire for face validity and then the researcher will revise the questionnaire based on their feedback. Then the questionnaire will be piloted among a small group of approximately 5 smokers and ex-smokers to determine how participants understand and answer the items, to identify problems with terminology, vagueness, and ambiguity of items, and to learn if respondents interpretation is what was intended by the researcher. Based on the respondents’ feedback the questionnaire will be revised as needed to maximize validity of the questionnaire items. Appendix C contains a list of experts who were asked to evaluate the Smoking Questionnaire. Appendix D is the cover letter requesting the expert reviewers to evaluate the questionnaire and provide feedback.

A copy of the paper-version of the Smoking Questionnaire is located in Appendix B. It consists of 32 items. Items on the instrument are designed to elicit information to answer the research questions. Table V identifies the research questions, variables of interest, and corresponding items on the questionnaire.

Table V

Research Questions, Variables, and Corresponding Questionnaire Items

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Research Questions and Variables	Items on the Smoking Questionnaire
1. Which of the following variables best predict smoking cessation behavior?	
Variable: Self-theory of intelligence	<p>Self-theory of intelligence questions:</p> <p>You have a certain amount of intelligence, and you can't really do much to change it.</p> <p>Your intelligence is something about you that you can't change very much.</p> <p>You can learn new things, but you can't really change your basic intelligence.</p> <p>Response options are on a 6-point scale consisting of strongly agree, agree, slightly agree, slightly disagree, disagree, and strongly disagree</p>
Variable: Self-theory of smoking	<p>Self-theory of smoking questions:</p> <p>You are either a smoker or a non-smoker, and you can't really do much to change it.</p> <p>Smoking cigarettes is something about you that you can't change very much.</p> <p>To be honest you can't really change that you smoke cigarettes.</p> <p>Response options are on a 6-point scale consisting of strongly agree, agree, slightly agree, slightly disagree, disagree, and strongly disagree</p>
Variable: Smoking status	<p>Do you currently smoke cigarettes on a regular basis?</p> <p><input type="checkbox"/> no</p> <p><input type="checkbox"/> yes</p>

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Research Questions and  
Variables

Items on the Smoking Questionnaire

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Variable: Age

What is your age?

- 18 to 24 years
- 25 to 44 years
- 45 to 64 years
- 65 to 84 years
- 85 years and higher

Variable: Gender

What is your gender?

- Male
- Female

Variable: Race/ethnicity

What is your race/ethnicity?

- African American/Black
- American Indian
- Asian
- Hispanic
- White
- Other (please specify:

Variable: Education level

What is your education level?

- less than 12 years
- high school diploma or GED
- some college
- college graduate
- some graduate school
- graduate degree

Variable: Sexual orientation

What is your sexual orientation?

- heterosexual
- gay
- lesbian
- bisexual
- transgendered

Variable: Annual household  
income

What is your estimated annual household income?

- \$0 to \$10,999
- \$11,000 to \$19,999
- \$20,000 to \$34,999
- \$35,000 to \$49,999
- \$50,000 to \$74,999
- \$75,000 to \$99,999
- \$100,000 to \$149,999
- \$150,000 to \$199,999
- \$200,000 and higher



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Research Questions and  
Variables

Items on the Smoking Questionnaire

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Variable: Longest quit attempt

Think back to the time you made a serious attempt to stop smoking cigarettes. Estimate how long you went without smoking cigarettes?

- not applicable; I did not try to stop smoking
- less than 1 day
- 1 day to 1 week
- more than 1 week but less than 4 weeks
- at least 1 month but less than 6 months
- at least 6 months but less than 1 year
- at least 1 year but less than 5 years
- 5 years or more

Variable: Smoking related symptoms or illness

Do you have symptoms or illnesses that you believe are caused by smoking and/or that your healthcare provider told you were caused by smoking?

- No
- Yes

Variable: Distress about smoking-related symptoms and/or illness

Using the following scale circle the number that best indicates the total amount of distress that the smoking-related conditions cause you.

1    2    3    4    5    6    7    8    9    10

no distress

maximum distress

Variable: Nicotine dependence

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

Fagerstrom Test for Nicotine Dependence (FTND) score

- after 60 minutes
- 31 - 60 minutes
- 6 - 30 minutes
- within 5 minutes

2. Do you find it difficult to refrain from smoking in places where it is forbidden?

- No
- Yes







Research Questions and Variables	Items on the Smoking Questionnaire
Variable: Self-theory of intelligence	same questions as above
Variable: Self-theory of smoking	same questions as above
2. What are the relationships between age, gender, sexual orientation, level of education, household income, years of smoking, use of smoking cessation strategies (medications, nicotine replacement therapy [NRT], participation in smoking cessation programs), presence of smoking related symptoms or illness, previous quit attempts, nicotine dependence, healthcare provider advice, other smokers in the household, intention to stop smoking, self theory of smoking, and self theory of intelligence?	same questions as above
3. Which of these variables (age, gender, sexual orientation, level of education, household income, years of smoking, use of smoking cessation strategies (medications, nicotine replacement therapy [NRT], participation in smoking cessation programs), presence of smoking related symptoms or illness, previous quit attempts, nicotine dependence, healthcare provider advice, other smokers in the household, self theory of smoking, and self theory of intelligence) best predict self-reported intention to stop smoking?	same questions as above

Research Questions and Variables	Items on the Smoking Questionnaire
4. Is there a statistically significant relationship between self-theory of intelligence and self-theory of smoking?	Self-theory of intelligence questions listed previously. Self-theory of smoking questions listed previously.

*Guidelines for Questionnaire Development*

Several guidelines from a review of the literature are important to consider in constructing a questionnaire. The first consideration is to develop items that address each of the research questions. This is necessary not only for the purpose of answering the research questions but also to strive for validity, that the questions measure what they are intended to measure (Portney & Watkins, 1993). Table V attempts to satisfy this issue by designating specific items on the questionnaire for each variable and research question. Additionally, in order to maximize validity and reduce measurement error, the researcher will ask 5 experienced health behavior researchers and one measurement expert to evaluate the questionnaire for face validity and then the researcher will revise the questionnaire based on their feedback. Then the questionnaire will be piloted among a small group of approximately 5 smokers and ex-smokers to determine how participants understand and answer the items, to identify problems with terminology, vagueness, and ambiguity of items, and to learn if respondents interpretation is what was intended by the researcher. Based on the respondents' feedback the questionnaire will be revised as needed to maximize validity of the questionnaire items.

A second important consideration in questionnaire development is to utilize, if possible, existing research instruments. One should determine if these instruments have been used with similar populations and for similar purposes (Portney & Watkins, 1993). The researcher should also review and report all data in the literature on the existing instruments' validity and reliability, to lend support to their use in the proposed study.

A third consideration concerns the organization of the questionnaire including the sequencing of items on the questionnaire. Items on the questionnaire should be grouped together by category, topic, or scaling technique and flow in a logical way (Alreck & Settle, 1985; Portney & Watkins, 1993). Questionnaires may be organized like a good paper with an introduction, body and conclusion (Alreck & Settle, 1985). The cover letter or first part of the questionnaire serves as an introduction by preparing the respondent for what's to come. "A thoughtful and engaging introduction can determine whether or not a person agrees to participate in the study and can also affect the mental attitude of the person" (Di Iorio, 2005, p. 50). It is recommended that the first items on the questionnaire be "applicable to all respondents and fairly quick and easy to answer" (Alreck & Settle, 1985, p. 159). Questions that elicit sensitive data should not be placed at the beginning of the survey (Alreck & Settle, 1985; Di Iorio, 2005).

There is some disagreement in the literature about where demographic questions should be located. Some researchers recommend placing demographic questions at the beginning of the survey (Portney & Watkins, 1993). Other experts recommend that demographic items be placed at the end of the survey, particularly if any questions are of a "delicate" nature (Alreck & Settle, 1985, p. 159; Di Iorio, 2005). The rationale for putting sensitive items at the end of the questionnaire is that respondents will answer most items before reaching the sensitive questions. Should participants decide not to answer the sensitive questions, or to leave the questionnaire incomplete, the researcher may still be able to use most of their responses (Alreck & Settle, 1985).

Proper phrasing of a sensitive question and prefacing it with a non-judgmental statement may increase respondents' willingness to answer the item (Portney & Watkins, 1993). For example, "Many health professionals believe that using habit-forming substances or drugs can make it difficult to stop smoking cigarettes. Are you using, or have you ever used, habit-forming substances or drugs other than cigarettes?" Phrasing questions in a way that assumes that respondents engage in a socially unacceptable behavior may also increase their willingness to

admit to such behavior (Portney & Watkins, 1993). For example, “Using the following scale, circle the number that describes your dependence on nicotine.” Respondents are also more likely to answer sensitive questions honestly when they are clearly informed that the data will remain anonymous (Di Iorio, 2005). However, regardless of the care one uses in wording sensitive questions there is always the possibility of under or over reporting of the behavior in question (Sudman & Bradburn, 1982).

Another consideration in item development also determines the time it takes for respondents to complete the questionnaire. Closed questions, also known as multiple-choice, are often used to make survey completion easy and quick. Respondents need only select an answer and mark it, as opposed to taking the time to think of an answer and write it out. Closed questions are favored by researchers when (1) there are many subjects and questions, (2) when answers are scored by a machine, and (3) when the answers from several groups are being compared (Sommer & Sommer, 2002). It is important that the response choices be mutually exclusive, exhaustive, clearly worded, meaningful, culturally appropriate, and balanced (Di Iorio, 2005; Sommer & Sommer, 2002). Closed questions may also increase the accuracy of the responses (Di Iorio, 2005).

A final consideration in questionnaire development relates to the education and reading-level of the respondents. As a general rule, if respondents are from the general public, questions and instructions must be written in a simple, complete, and easily understandable way (Alreck & Settle, 1985). The questionnaire, consent form, and instructions used in the present research study will be written at the eighth to tenth grade reading level as determined by readability statistics in Microsoft Word (Flesch-Kincaid grade level) and Simple Measure of Gobbledygook (SMOG) grading (McLaughlin, 1969; McLaughlin, 1974). This seems appropriate considering that approximately 83% of adults in the U.S. have completed 8th grade and approximately 54 % have completed some high school (University of Texas, 2008). Newsweek magazine and Sports Illustrated are examples of lay publications that are targeted at persons who read at the eighth to

tenth grade reading level.

With the aforementioned guidelines for questionnaire development in mind, specifically to use a previously developed and tested instrument if possible, the questionnaire for the present study includes two previously tested instruments. The first instrument is the Fagerstrom Test for Nicotine Dependence (FTND) (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991). The second instrument is the Implicit Theories of Intelligence Scale - Self Form for Adults (Dweck, 2000).

#### *Fagerstrom Test for Nicotine Dependence*

The FTND is a modified and improved version of the Fagerstrom Tolerance Questionnaire (FTQ) which was initially developed in 1978 to “provide a short, convenient self-report measure of dependency on nicotine” (Fagerstrom, 1978; Heatherton et al., 1991). Perceived psychometric problems with the FTQ, specifically “low levels of reliability” and “multifactorial structure” prompted development and testing of the FTND (Heatherton et al., 1991, p. 1119). The FTND was tested on 254 adult smokers (ages 17 - 77) from among the general population of visitors to the Ontario Science Center (Heatherton et al., 1991, p. 1121). In addition to completing the FTND questionnaire, the subjects provided a breath sample and a saliva sample for carbon monoxide measurement and cotinine level testing respectively. Cotinine is a stable metabolite of nicotine and salivary cotinine is a quantifiable measure of active and passive exposure to nicotine in tobacco smoke (Etter, Due, & Perneger, 2000; Heatherton et al., 1991).

Results indicate that the FTND is a better predictor of cotinine level than the FTQ, accounting for 25.6 percent of the variance compared with 17.5 percent for the FTQ (Heatherton et al., p. 1124). Internal consistency of the FTND (alpha coefficient = 0.61) was higher than the FTQ (alpha coefficient = 0.48). This improvement is significant considering that the FTND contains fewer items than the FTQ and that fewer items tend to lead to lower reliability (Heatherton et al., 1991). Principle axes factor analysis of the FTND items showed that the items

loaded on a single factor and the overall measure of sampling adequacy (MSA) was 0.70. By comparison, factor analysis of the FTQ showed that most items loaded on 2 factors, while 2 items did not load on either factor. The total scale mean MSA for the FTQ was 0.65. The authors concluded that the FTND; (1) “corrects some of the psychometric and conceptual problems of the FTQ”, (2) “has acceptable levels of internal consistency”, and (3) “is closely related to biochemical indices of heaviness of smoking” (Heatheron et al., 1991, p. 1126).

### *Implicit Theories of Intelligence Scale*

The second tested instrument appropriated directly for this research is the Implicit Theories of Intelligence Scale - Self Form for Adults (Dweck, 2000). To determine the participant’s mindset (beliefs about intelligence), the present questionnaire includes the following three statements and asks the participants to indicate how much they agree with each statement on a 6-point scale consisting of: “strongly agree, agree, slightly agree, slightly disagree, disagree, and strongly disagree.” Participants are asked to rate their agreement and write the number in a space provided before each of the following statements.

1. You have a certain amount of intelligence, and you can’t really do much to change it.
2. Your intelligence is something about you that you can’t change very much.
3. You can learn new things, but you can’t really change your basic intelligence (Dweck, 2000, p. 178). The questions are scored by computing an average on the three items (ranging from 1 to 6) with higher scores (4.0 or above) representing incremental theorists and lower scores (3.0 or below) representing entity theorists. As in Dweck et al., 1995, scores falling between 3.1 and 3.9 will be excluded (an estimated 15% of the participants) to ensure that only participants with “clear theories” are included (p. 269). These same questions and others were developed by Dweck and Henderson (1988) (as cited in Dweck, 2000), and were used in previous research studies to identify children’s and adult’s implicit self-theories about intelligence. They were also used with slight modifications in wording to elicit self-theories in other domains such as personality, morality, and beliefs about changing the world (Chiu, Hong & Dweck, 1997; Chiu,

Dweck, Tong & Fu, 1997; Dweck, 2000; Erdley, et al., 1997; Henderson & Dweck, 1990; Hong, Chiu, Dweck, Lin, & Wan, 1999; Levy, Stroessner & Dweck, 1998).

The following information relates the psychometric properties of the three implicit theories of intelligence questions as used with adult research participants, primarily undergraduate college students (Dweck, Chiu & Hong, 1995; Hong, Chiu, Dweck, Lin & Wan, 1999). In six validation studies with different samples comprised of 32 to 184 participants these implicit theory of intelligence measures demonstrated high internal reliability, ranging from 0.94 to 0.98. The test-retest reliability over a 2 week period was 0.80. As in previous research, the exclusive use of entity-theory-type questions is intentional in this study. Previous research shows that when both entity and incremental-type questions are used, respondents tend to drift toward the incremental choices across items and over time (Dweck, 2000; Dweck, Chiu & Hong, 1995; Hong, et al., 1999). It has been proposed that the incremental items are more attractive to respondents because of the items' "social desirability" (Hong, et al., 1999, p. 590). Other researchers have also documented this occurrence and have designed their questionnaires solely with entity statements (Dweck, 2000; Erdley et al., 1997; Hong, et al., 1999). It is important to note that in previous research, respondents who disagreed with the entity orientation described intelligence in a way that mirrors the incremental self-theory. Also there is a strong negative correlation between entity items and incremental items in previous research (Dweck, 2000; Dweck, Chiu & Hong 1995a, 1995b). Therefore, there is general agreement among researchers using these implicit theory questions that individuals who disagree with the entity items are of the opposite viewpoint and would agree with the incremental items (Dweck, 2000; Dweck, Chiu & Hong 1995, Hong et al., 1999).

Previous research investigating and comparing the use of implicit theory measures of intelligence, morality, and world view with adults indicates that although the measures are similar in format they reveal clearly distinct factor loading (Dweck, Chiu, & Hong, 1995). This suggests that they do not represent an acquiescent set or response set (Dweck, Chiu, & Hong, 1995, Hong,

et al., 1999). Furthermore, Dweck (2000) reports that the implicit theories of intelligence scales are not correlated with other personality factors such as self-esteem, “measures of self-presentation”, political affiliation, choice of religion, or “measures of cognitive or motivational styles”. “Implicit theories represent assumptions about the self that have cognitive, motivational, emotional, and behavioral consequences, but they are distinct from other cognitive and motivational constructs.” (p. 176). However, as mentioned in the literature review, Robins & Pals (2002) did identify a negative correlation between entity orientation and self-esteem and a positive relationship between incremental self-theory and self-esteem among their sample of 363 undergraduate college students during their 4-year educational program.

#### *Development of Other Items*

To determine the participant’s mindset relative to smoking (beliefs about smoking), the questionnaire includes the following three statements and asks the participants to indicate how much they agree with each statement on a 6-point scale consisting of: “strongly agree, agree, slightly agree, slightly disagree, disagree, and strongly disagree.” Participants are asked to rate their agreement and write the number in a space provided before each of the following statements.

1. You are either a smoker or a non-smoker, and you can’t really do much to change it.
2. Smoking cigarettes is something about you that you can’t change very much.
3. To be honest you can’t really change that you smoke cigarettes.

This set of questions was constructed by the researcher to explore self-theories about smoking. No data is available on reliability or validity of these questions, although previous researchers have developed similar questions to measure children’s and adult’s implicit theories in other domains such as personality, morality, and “theory of the world” (Dweck, 2000, p. 181). These items will be scored in the same manner as the scoring of the implicit theory of intelligence questions. An average of the three items will be computed (ranging from 1 to 6). An incremental theory of smoking will be represented by higher scores (4.0 or above), and an entity theory of



smoking will be represented by lower scores (3.0 or below).

Other questions on the smoking Questionnaire were constructed by the researcher to answer the research questions, and optimize participants' ability to complete the questionnaire in a timely manner. General guidelines for question item development in the literature were considered in this process and they will not be reiterated here (Alreck & Settle, 1985; Di Iorio, 2005; Portney & Watkins, 1993; Sudman & Bradburn, 1982; Sommer & Sommer, 2002).

### *Consent Form*

Prior to completing the paper-version of the Smoking Questionnaire, participants will be asked to read and sign a consent form. The consent form will be printed in black, 11-point font, on white 8 ½ x 11 inch paper to facilitate ease of reading. The consent form will be placed face-up on a clipboard, followed by the Smoking Questionnaire. The consent form (Appendix A) will explain the purpose and procedures of the study, its risks, benefits, and IRB approval to potential participants. The consent form also includes a statement that participation is entirely voluntary and confidential. It includes a statement that signing the consent form indicates that each subject has read and understands information about the study and the respondent consents to participate. Toward the bottom of the consent form is a line for participants to write their signature.

On page two of the paper version of the consent form participants will have an opportunity to indicate whether or not they want information about the study, once it is completed, by checking "Yes" or "No". There will also be a space on this page for participants to indicate whether or not they want to be entered into a drawing for one of four \$25.00 gas cards. The statement will read, "Check the box to show whether you want to be entered in the drawing to win a \$25.00 gas card?  Yes I want to win a \$25.00 gas card, or  No, do NOT enter me in the drawing." The following statement will ask participants to supply contact information: "Please print your e-mail address or postal address and phone number so that you may be contacted with study information and/or if you are one of the lucky gas card winners." The instructions will prompt the respondents to keep one consent form for their records and detach the

other consent form from the clip board and return it to the researcher before starting to complete the Smoking Questionnaire.

The electronic version of the consent form will contain information that is identical to that of the paper version. The only difference is that participants will read the information and then check a box that indicates their consent before proceeding to the electronic Smoking Questionnaire. At the end of the online questionnaire participants will have an opportunity to supply contact information for the gas card drawing.

#### *Data Collection Methods*

Permission to proceed with data collection will be obtained from the researcher's dissertation committee, and the Cleveland State University Institutional Review Board (IRB). Scheduling of survey days and permission to survey on the premises will be coordinated by the researcher with the manager of each of the two public university locations selected for data collection. Potential participants at these locations will be solicited by the researcher verbally and/or using a sign "advertising" a research study of smokers and ex-smokers and a chance to win one of two \$25.00 gas cards. Smokers in the act of smoking will be the easiest to identify. The researcher will ask potential participants if they are at least 18 years old, and a current smoker or an ex-smoker having quit within the past 5 years. Those that answer in the affirmative will be told: "This questionnaire should take less than 15 minutes to complete." Then the researcher will hand each potential participant a clip board and a pen with the consent form and Smoking Questionnaire attached. The researcher will say "The first paper on this clip board explains the purpose of the study and asks you to sign your name to consent to participate. If you have any questions after you read this I will be happy to answer them."

After reading, signing, and returning the consent form to the researcher, each participant will complete the anonymous Smoking Questionnaire. The signed consent form will be placed in a large manila envelope marked "Consent Forms". The completed survey questionnaires will be placed in a different manila envelope marked "Surveys".

All completed forms and data files will be secured in the researcher's locked academic office (RT 928). At the end of each week of data collection, the researcher will record data from each survey into an SPSS database on her password protected office computer. No one else has access to this office (other than cleaning personnel), and no one else uses this computer.

When the researcher has completed face to face and online data collection and has 120 to 150 (or more) completed surveys she will randomly select two participants from among all respondents and mail a \$25.00 gas card to each of them.

### *Variables*

The variables under consideration in this study are derived from the purposes of this research and the research questions. One purpose of this research is to determine if a growth mindset significantly predicts smoking cessation behavior or intention. Another purpose is to determine if other variables, such as age, gender, sexual orientation, level of education, household income, years of smoking, use of smoking cessation strategies, presence of smoking related symptoms, previous quit attempts, nicotine dependence score, healthcare provider advice, and other smokers in the household significantly predict smoking cessation behavior or intention. A third purpose of this study is to explore the relationships that exist among these same variables that have been identified as relevant in previous research on smoking cessation.

The primary dependent variable in this study is "smoking status". It is a dichotomous/categorical variable which represents whether participants are current cigarette smokers or ex-smokers (people who have stopped smoking in the past 5 years). Several independent (or predictor) variables are considered in this study. The independent or predictor variables are either continuous (quantitative) variables, categorical, or dichotomous variables. Table VI describes the independent variables, the types of variables, and operational definitions of the variables in this study.

Table VI

## Independent Variable Names, Types, and Definition

Variable Name	Type	Categories or Possible Values	Definition
age	categorical	18 to 24 years 25 to 44 years 45 to 64 years 65 to 84 years 85 years and higher	Respondent's self-identified age in years
gender	dichotomous	male female	Respondent's self-identified sense of self as male or female.
ethnicity	categorical	African American/Black American Indian Asian Hispanic White Other	Respondent's self-reported sense of identity with a social-cultural group.
sexual orientation	categorical	heterosexual gay lesbian bisexual transgendered	Respondent's self-identified personal and unique view of his or her own sexual desires and sexual expressions.
education level	categorical	less than 12 years high school diploma or GED some college college graduate some graduate school graduate degree	Respondent's self-reported estimate of the amount of formal education he/she has received.
annual household income	categorical	\$0 to \$10,999 \$11,000 to \$19,999 \$20,000 to \$34,999 \$35,000 to \$49,999 \$50,000 to \$74,999 \$75,000 to \$99,999 \$100,000 to \$149,999 \$150,000 to \$199,999 \$200,000 and higher	Respondent's self-reported estimate of the total combined income of everyone in their household during one year.
other smokers in household	dichotomous	yes no	Respondent's self-report of the presence of other people who currently smoke in their household.

Variable Name	Type	Categories or Possible Values	Definition
years of smoking	categorical	less than 1 year 1 to 5 years 6 to 10 years 11 to 20 years 21 to 30 years 31 to 40 years more than 40 years	Respondent's self-report of an estimate of the number of years that they have smoked cigarettes on a regular basis.
previous quit attempts	categorical	0 (None) 1 time 2 to 5 times 6 to 10 times more than 10 times	Self-reported estimate of the number of times in the previous year that a respondent who smokes has tried to stop smoking cigarettes
intention to quit	continuous	1 to 10	Respondent's self-report of motivation to stop smoking cigarettes at a time when they made an earnest attempt to stop smoking.
longest quit attempt	categorical	less than 1 day 1 day to 1 week more than 1 week but less than 4 weeks at least 1 month but less than 6 months at least 6 months but less than 1 year at least 1 year but less than 5 years 5 years or more	Respondent's self-report of the longest period of time that they stopped smoking cigarettes during an earnest attempt to stop smoking.
smoking related symptoms or illness	dichotomous	no yes	Respondent's self-report of smoking related symptoms or illness
distress about smoking related symptoms and/or illness	continuous	1 to 10	Respondent's self-report of the amount of distress that they have about smoking related symptoms or illness
nicotine dependence	continuous	0 to 10	Total score on the Fagerstom Test for Nicotine Dependence, a sum of respondent's answers to 6 questions.
perception of dependence on nicotine	continuous	1 to 10	Respondent's self-reported dependence on nicotine at a time they regularly smoked cigarettes

Variable Name	Type	Categories or Possible Values	Definition
use of habit-forming substances	dichotomous	no yes	Respondent's self-report of their history of use of other substances that are habit forming besides cigarettes
cessation program	continuous	1 to 10	Respondent's self-report of perceived helpfulness of attending a smoking cessation program at a time s/he made an earnest attempt to stop smoking cigarettes
health care advice	categorical	0 (none) 1 time 2 to 4 times 5 or more times	Respondent's self-reported estimate of the number of times that healthcare providers have advised respondent to stop smoking in the previous 12 months
nicotine replacement therapy	continuous	1 to 10	Respondent's self-report of the helpfulness of using nicotine replacement therapy to quit smoking at a time s/he made an earnest attempt to stop smoking cigarettes
medication	continuous	1 to 10	Respondent's self-report of the helpfulness of using prescription medication to quit smoking at a time s/he made an earnest attempt to stop smoking cigarettes
Self-theory of intelligence	continuous	3 to 18	Respondent's score (sum of 3 items) on the Implicit Theories of Intelligence scale.
Self-theory of smoking	continuous	3 to 18	Respondent's score (sum of 3 items) on the Implicit Theories of Smoking scale

### *Data Analysis*

Data will be analyzed using Statistical Package for the Social Sciences (SPSS) Version 16. Correlational analyses will be used to explore and describe the relationships that exist among demographic variables and other variables under study. Stepwise logistic regression analysis will be used to determine the extent to which a particular behavior or characteristic predicts smoking status. Typically logistic regression, a “mathematical modeling approach” is used to quantify the

influence of multiple predictor variables and to predict group membership by calculating the probability that a case will belong to one group (Kleinbaum, 1994, p. 5; Meyers, Gamst & Guarino, 2006). The logistic regression model is non-linear. The assumptions of logistic regression are (1) an absence of perfect multicollinearity, (2) all relevant predictors are included and all irrelevant predictors are excluded from the model, and (3) independent variables are measured at the dichotomous, summative, interval or ratio level (Meyers, Gamst & Guarino, 2006). The recommended sample size for logistic regression analysis is thirty times as many cases as parameters being estimated (Meyers, Gamst & Guarino, 2006). Therefore for purposes of this research study in which stepwise logistic regression analysis with 3 predictor variables per model will be utilized, the minimal recommended sample size is 120 cases (4 parameters times 30). The researcher's goal is to collect between 120 and 150 completed surveys.

## CHAPTER IV

### RESULTS

#### *Introduction*

This chapter describes the results of the current study. It is divided into six subsections. The first subsection relates the results of reliability analyses of the Smoking Questionnaire. The second subsection presents an overview and a descriptive profile of the sample under study. Subsections three through six correspond to the four research questions under study. The results of stepwise logistic regression analyses are presented in the third subsection and reveal the strongest predictors of smoking cessation behavior. In subsection four the statistically significant relationships between variables in this study are explored, namely those factors which are and are not related to smoking cessation behavior in the sample under study. In the fifth subsection those variables which best predict intention to stop smoking are identified in the results of logistic regression analysis. The sixth subsection presents results of correlational analyses which explore the strength of association between mindset of intelligence and mindset of smoking. All quantitative analyses in this study were completed using Statistical Package for the Social Sciences (SPSS) version 16.

#### *Reliability of the Smoking Questionnaire*

Several reliability analyses were conducted on the Smoking Questionnaire to determine if it was consistent in measuring the intended constructs. In the first reliability analysis ( $n = 195$ ), the six items which constitute the Fagerstrom Test for Nicotine Dependence, an instrument



intended to measure dependence on nicotine, displayed a Cronbach's alpha of .691. There were no items that if deleted would improve the reliability of the scale. The reliability coefficient of .691 for the FTND items in the current research study is higher than the reliability coefficient (alpha = .61) cited in previous research (Heatherton et al., 1991).

In a second reliability analysis (n = 197), the 3 questionnaire items that were borrowed from the Self Theory of Intelligence Form for Adults (Dweck, 2000) and intended to measure respondent's self theory of intelligence had a Cronbach's alpha of .935. There were no items that if deleted would improve the reliability of the scale. In previous research these implicit theories of intelligence measures demonstrated reliabilities ranging from .94 to .98 (Dweck, Chiu & Hong, 1995; Hong et al., 1999).

In a third reliability analysis (n = 197), the 3 items written by the researcher and intended to measure self theory of smoking had a Cronbach's alpha of .916. The analysis revealed that the alpha could be increased to .920 if the first item were deleted; however this increase was not large enough to warrant removing the question.

The reliability of a questionnaire, a measure of the internal consistency of items, is affected by the number of underlying constructs it attempts to measure, the variety of measurement scales it uses, and the number of respondents per item (Field, 2005; SPSS Tutorial, 2005). Since many items on the Smoking Questionnaire used different measurement scales and measured a variety of constructs, and several items had low response rates, it was not possible to obtain meaningful reliability statistics on the remaining items. This finding has implications for future research and will be discussed in Chapter 5.

#### *Sample Profile*

The convenience sample for this study is comprised of 197 respondents who completed a paper or online version of the Smoking Questionnaire between January 30 and February 23, 2009. Paper questionnaires were included in the study if they contained 4 or fewer incomplete items. Paper questionnaires with 5 or more incomplete items were not included in the study. The

researcher shredded exactly 5 paper questionnaires which were submitted by participants and contained 5 or more incomplete items. Because the online survey program only accepted complete questionnaires, all online questionnaires are included in the sample. Of the 197 complete questionnaires, 80 (41%) were paper questionnaires and 117 (59%) were online questionnaires. All paper and online questionnaire item responses were merged into one online Excel database which was imported to SPSS for data analysis.

Of the 197 total respondents, 66% (n = 129) were female and 34% (n = 66) were male. Seventy-eight percent (n = 151) of the respondents were white, 19% (n = 37) were black/African American, and approximately 3% (n = 6) identified with other ethnicities. Nearly half (47%) of the respondents ranged in age from 25 to 44 years, and more than a third (35%) were between 45 and 64 years old. There were no people older than 85 years among the questionnaire respondents.

Overall the respondents were highly educated with 163 (83%) reporting that they had attended college or graduate school. Eighty-seven percent of the respondents identified their sexual orientation as heterosexual, and 13% identified as LGBT. The reported annual household incomes of respondents varied across the response categories with 28% (n = 55) reporting less than \$20,000, 29% (n = 57) reporting between \$20,000 and \$49,999, and 28% (n = 55) reporting between \$50,000 and \$99,999. Nearly fourteen percent of the individuals completing the questionnaire (n=27) reported an annual household income greater than \$100,000. Table VII presents an analysis of the demographic characteristics of the Smoking Questionnaire respondents.

Table VII

## Demographic Characteristics of Smoking Questionnaire Respondents (n = 197)

Characteristic	N (respondents per item)	% of total
Gender	195	99.0
Male	66	33.5
Female	129	65.5
Age	196	99.5
18 to 24	28	14.2
25 to 44	93	47.2
45 to 64	69	35.0
65 to 84	6	3.0
85 and older	0	0.0
Race/Ethnicity	194	98.5
African American/Black	37	18.8
American Indian	1	0.5
Asian	1	0.5
Hispanic	1	0.5
White	151	76.6
Other/Mixed	3	1.5
Education Level	196	99.5
Less than 12th grade	7	3.6
High school graduate or GED	26	13.2
Some college	74	37.6
College graduate	56	28.4
Some graduate school	12	6.1
Graduate degree	21	10.7
Sexual Orientation	189	95.9
heterosexual	164	83.2
gay	3	1.5
lesbian	13	6.6
bisexual	8	4.1
transgendered	1	0.5
Annual Household Income	194	98.5
Less than \$20,000	55	27.9
\$20,000 - \$49,999	57	28.9
\$50,000 - \$99,999	55	27.9
More than \$100,000	27	13.7

Since smoking status is of primary interest in this study, the data were analyzed for demographic characteristics of smokers and ex-smokers. Of the 197 study participants 114 (58%)

identified as current, regular cigarette smokers, smoking every day, every other day, or several times a month. Eighty-three participants (42%) identified as ex-smokers, individuals who had stopped smoking in the previous 5 years and remained smoke-free at the time of questionnaire completion. Thirty-nine of the ex-smokers (47%) had stopped smoking in the previous 12 months. A statistical study of the sample with reference to its size and vital statistics partitioned by smoking status (smokers and ex-smokers) is reflected in Table VIII. The reader should note that the sub-sample sizes (n) reflected in Table VIII may not total 197 because some respondents chose not to answer a question. For example, the number of ex-smokers partitioned by gender totals 81 (not 83) because 2 ex-smoker respondents did not indicate their gender.

Table VIII

## Demographic Characteristics of Smokers and Ex-smokers

Demographic Characteristics	Smokers		Ex-Smokers	
	N	% of smokers	N	% of ex smokers
Gender				
male	45	39.5	21	25.9
female	69	60.5	60	74.1
Age in years				
18 to 24	21	18.4	7	8.5
25 to 44	51	44.7	42	51.2
45 to 64	41	36	28	34.1
65 to 84	1	.9	5	6.1
Race/Ethnicity				
AA/Black	27	24.5	10	12.8
White	83	75.5	68	87.2
Education Level				
High School	24	21.1	9	11
Graduate and less College to College	76	66.7	54	65.9
Graduate Grad School and more	14	12.3	19	23.2
Sexual Orientation				
Heterosexual	94	87	70	86.4
LGBT	14	13	11	13.6
Annual Household Income				
Less than \$20,000	41	36.6	14	17.1
\$20,000 - \$49,999	30	26.8	27	32.9
\$50,000 - \$99,999	31	27.7	24	29.3
More than \$100,000	10	8.9	17	20.7

In examining smoking status and gender the data indicate that among the respondents who have quit smoking 74 % are female and only 26% are male. Respondents of black and African American ethnicity comprise only 13% of the respondents who have stopped smoking, while whites constitute 87% of those who have stopped smoking. In looking at education level and smoking status, it is clear that those respondents with high school education make up only 11% of the people who have quit smoking, while 89% of the people who have stopped smoking have at least some college education. In looking at annual household income among ex-smokers

the data indicate that only 17% of the people who have quit smoking have annual household incomes less than \$20,000, while 83% of the ex-smokers report annual household incomes in the higher brackets. Thirty-three percent of ex-smokers have annual household incomes ranging between \$20,000 and \$49,999, 29% have annual household incomes ranging between \$50,000 and \$99,999, and approximately 21% of the ex-smokers report an annual household income of \$100,000 or greater.

A statistical study of the sample with reference to several other characteristics (other smokers in the household, FTND score, strength of intention to stop smoking, and perceived dependence on nicotine) and partitioned by smoking status is reflected in Table IX. Among those who had stopped smoking 76% reported that there was no other smoker in their household, compared with 50% of those currently smoking who reported that there was no other smoker living in their household.

Scores on the 6-item Fagerstrom Test of Nicotine Dependence ranged between 1 and 10 with 71% of the respondents who had quit smoking scoring between 1 and 5, and only 29% scoring between 6 and 10 (for the 12 months before they made a serious attempt to stop smoking). Scores on the 6-item Fagerstrom Test of Nicotine Dependence for respondents who were currently smoking were not significantly different. Sixty-six percent of the current smokers scored between 1 and 5 on the FTND and 34% scored between 6 and 10. Overall scores on the FTND demonstrated that the majority of current smokers and those who had quit smoking scored relatively low, between 1 and 5 on this test designed to correlate to serum cotinine levels.

In examining respondents' strength of intention to stop smoking, 88% of the ex-smokers reported stronger levels of intention to quit smoking at the time of their most serious attempt to stop smoking compared to 72% of current smokers.

When looking at the respondents' perception of their dependence on nicotine during the last 12 months of smoking before their most serious attempt to quit, the data indicate that more

ex-smokers (75%) rated their dependence in the high range (a score of 6 to 10) compared to 61% of the current smokers.

It is interesting to note that the percentage of low scores on the FTND among smokers and ex-smokers (66% and 71% respectively) mirrors the percentage of high scores on the perception of dependence on nicotine (61% and 75%). This indicates a discrepancy between the measured dependence and the perceived dependence among both current smokers and ex-smokers in the sample. In other words, when participants were asked to rate their dependence on nicotine, 67% of all respondents believed they were moderately to highly addicted to nicotine, while their nicotine test score (FTND) indicated that only 30% all respondents were moderately to highly addicted to nicotine. Similarly, 33% of all respondents rated their perceived dependence on nicotine as low to moderate, while the FTND reflected that 70% of all respondents scored in the low to moderate addiction range.

Table IX

## Other Characteristics of Smoking Questionnaire Respondents

Characteristics	Smokers		Ex-Smokers		All Subjects	
	N	%	N	%	N	%
Other Smokers in Household					197	100
No	58	50.9	63	75.9	121	61.4
Yes	56	49.1	20	24.1	76	38.6
FTND Score					171	100
Low Score 1	12	16.9	9	9.0	21	12.3
2	9	12.7	20	20.0	29	17.0
3	10	14.1	12	12.0	22	12.9
4	9	12.7	15	15.0	24	14.0
5	7	9.9	15	15.0	22	12.9
6	7	9.9	15	15.0	22	12.9
7	9	12.7	7	7.0	16	9.4
8	4	5.6	5	5.0	9	5.3
9	3	4.2	2	2.0	5	2.9
High Score 10	1	1.4	0	.0	1	0.6
Intention to Stop Smoking					188	100
Low Intention: 1	1	.9	1	1.2	2	1.1
2	5	4.7	0	.0	5	2.7
3	6	5.7	1	1.2	7	3.7
4	3	2.8	3	3.7	6	3.2
5	15	14.2	5	6.1	20	10.6
6	5	4.7	4	4.9	9	4.8
7	19	17.9	1	1.2	20	10.6
8	17	16	19	23.2	36	19.1
9	16	15.1	15	18.3	31	16.5
High Intention: 10	19	17.9	33	40.2	52	27.7
Dependence on Nicotine					194	100
Low Dependence: 1	8	7.1	5	6.2	13	6.7
2	2	1.8	2	2.5	4	2.1
3	6	5.3	6	7.4	12	6.2
4	7	6.2	2	2.5	9	4.6
5	21	18.6	5	6.2	26	13.4
6	17	15	8	9.9	25	12.9
7	11	9.7	9	11.1	20	10.3
8	17	15	16	19.8	33	17
9	12	10.6	9	11.1	21	10.8
High Dependence 10	12	10.6	19	23.5	31	16



Some of the participants in this study reported using smoking cessation strategies to assist them in their “most serious attempt to stop smoking.” Forty-eight study participants (24% of all respondents) rated the helpfulness of smoking cessation programs in their most serious attempt to stop smoking. Nicotine replacement therapy was used by 85 study participants (43% of all respondents) to try to stop smoking. Other medications to try to stop smoking were reportedly used by only 49 participants in the study (25% of all respondents). Study participants rated the perceived helpfulness of these strategies in a serious attempt to stop smoking on a scale of 1 to 10 with 1 being the least helpful and 10 being the most helpful. Data were re-categorized to reflect 3 levels of perceived helpfulness, “not very helpful” (1 to 3), “moderately helpful” (4 to 7), and “very helpful” (7 to 10). Table X identifies the participant’s perceptions of the helpfulness of these smoking cessation strategies in their attempts to stop smoking.

As table X indicates, the data showed that 78% of ex-smokers reported that attending a smoking cessation program was moderately to very helpful in their most serious attempt to stop smoking, while 56% of current smokers found the cessation programs to be helpful. Eighty-five percent of ex-smokers found nicotine replacement therapies to be moderately to very helpful in quitting smoking compared to 69% of current smokers. Eighty-seven percent of ex-smokers who used other medications to assist them to quit smoking found this strategy to be moderately to very helpful compared with 75% of current smokers.

Table X

## Respondent's Perceptions of the Helpfulness of Smoking Cessation Strategies

Strategies	Smokers		Ex-Smokers		All Subjects	
	N	%	N	%	N	%
Cessation Program					48	100
1: Not Helpful	11	44	5	21.7	16	33.3
2: Moderately Helpful	10	40	10	43.5	20	41.7
3: Very Helpful	4	16	8	34.6	12	25
Nicotine Replacement Therapy					85	100
1: Not Helpful	16	31.4	5	14.7	21	24.7
2: Moderately Helpful	22	43.1	8	23.5	30	35.3
3: Very Helpful	13	25.5	21	61.8	34	40
Medications					49	100
1: Not Helpful	9	25	3	23.1	12	24.5
2: Moderately Helpful	18	50	4	30.8	22	44.9
3: Very Helpful	9	25	6	46.2	15	30.6

Of the 197 study respondents 153 (78%) reported smoking at sometime during the previous 12 months and only 44 (22%) reported not smoking in the previous 12 months. Among the 153 respondents who had smoked in the previous year, 110 (72%) reported making one or more “serious” attempts to stop smoking during the same timeframe, and only 43 (28%) reported making no serious attempts to stop smoking. Forty-five respondents (29%) made one serious attempt to stop smoking, 57 participants (37%) made 2 to 5 serious attempts to quit, 6 respondents (4%) made 6 to 10 serious attempts to stop smoking, and 2 participants (1%) reported making more than 10 serious attempts to quit smoking during the previous 12 months. Of the 153 respondents who smoked during the previous year, 114 (75%) smoked at the time they

completed the questionnaire, and 39 (25%) did not smoke, which means that these same 39 people had quit smoking sometime during the previous year.

Question 11 asked respondents “to estimate the number of times in the past year that your healthcare providers have advised you to stop smoking cigarettes.” Of the 197 respondents answering this question, 59 (30%) reported no advice from their providers to stop smoking. Sixty-three respondents (32%) reported being advised 1 time by their provider to stop smoking cigarettes, 51 (26%) were advised 2 to 4 times, and 24 (12%) were advised 5 or more times to stop smoking cigarettes in the previous 12 months. Question #11 did not contain an option for respondents to indicate that they did not have contact with a healthcare provider during the previous year, so it is not accurate to conclude that providers failed to advise smokers to stop smoking 30% of the time, although it might be possible.

#### *Factors Related to Smoking Cessation*

Statistical analyses of the demographic data and characteristics of smokers and ex-smokers reveal statistically significant relationships between smoking status and the variables gender, race, education level, annual household income, other smokers in the household, intention to quit, helpfulness of NRT, and perceived dependence on nicotine. No statistically significant associations were identified between smoking status and age, sexual orientation, or FTND score in the present study. Table XI presents the statistically significant associations between smoking status and the categorical variables gender, race, education level, annual household income, and other smokers in the household. Pearson’s chi-square test is used to determine whether there are significant associations between two categorical variables, and Phi and Cramer’s V indicate the strength of association between two categorical variables. Phi is appropriate when one has two categorical variables each with two categories and Cramer’s V is appropriate when one has two categorical variables one of which has more than two categories (Field, 2005).

Table XI

## Significant Associations Between Smoking Status and Categorical Variables Under Study

Variable	Pearson Chi-Square	df	Sig	Phi	Cramer's V
gender	3.882	1	.049	-.141	-
race	3.969	1	.046	-.145	-
education level	6.241	2	.044	-	.178
annual household income	11.760	3	.008	-	.246
other smokers in household	12.695	1	.000	.254	-

Table XII presents the statistically significant Pearson correlations between smoking status and the continuous variables under study. Two of the statistically significant associations are of a weak magnitude, falling between zero and - 0.3, while the other two associations are of moderate magnitude. Self theory of smoking is statistically associated with smoking status,  $r = -.350$ ,  $p < .001$ . Perceived helpfulness of nicotine replacement therapy is statistically correlated with smoking status,  $r = -.339$ ,  $p < .05$ .

Table XII

## Significant Correlations Between Smoking Status and Continuous Variables Under Study

Variable	Pearson Correlation with Smoking Status	p
perceived dependence on nicotine	-.149	< .05
intention to quit smoking	-.287	< .001
helpfulness of nicotine replacement therapy	-.339	< .05
self theory of smoking	-.350	< .001

### *Predicting Smoking Cessation Behavior*

Results of stepwise logistic regression analyses indicate that four variables are significantly predictive of smoking status. Table XIII outlines the findings.

Table XIII

Logistic Regression Model for Predicting Smoking Status

Predictor	$\beta$	SE	Odds Ratio	Wald Statistic
Self theory of smoking	-.667***	.189	.513	12.406
Other smokers in household	-1.214**	.366	.297	11.013
Household Income	-.230**	.083	.795	7.618
Intention to quit	-.179*	.080	.836	4.981
Constant	6.684***	1.192	799.428	31.428

\* $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ . n = 186

The Nagelkerke R square of the logistic regression model was able to account for 33.6 percent of the variance in smoking status for the participants in this study. Through this model 70.4 percent of the respondents were correctly classified. The percentage of correctly classified cases indicates the number of instances where the observed group membership (e.g. ex-smokers) matched the predicted group membership. For example, 55 participants who were predicted to be ex-smokers, were actually ex-smokers, and 76 participants that were predicted to be smokers, were in fact smokers, resulting in 131 of the total 186 to be correctly classified.

It is important to note that the assumptions for logistic regression analyses were met. There was an absence of perfect multicollinearity among the predictor variables. In other words, there were no statistically significant correlations greater than .70 among the predictor variables in the model. There was no specification of errors, as all relevant predictors were included in the model and all irrelevant predictors are excluded. And finally, the independent variables were

dichotomous or measured at the summative response scale. In stepwise logistic regression, also known in SPSS as “forward selection likelihood ratio,” independent variables are entered into the analysis in steps based on the significance of the score statistic. In other words, the independent variable that best predicts the outcome is entered into the model first, then the next, and the next, and the next, etc. Then variables are removed from the model based on “the probability of a likelihood-ratio statistic based on the maximum partial likelihood estimates” (SPSS Tutorial, 2005). In other words, those variables that do not significantly contribute to the outcome are then removed from the model in steps until the most parsimonious model is obtained.

*Predicting Intention to Stop Smoking*

Results of stepwise logistic regression analyses indicate that 2 variables are significantly predictive of intention to stop smoking. Table XIV outlines the findings.

Table XIV

Logistic Regression Model for Predicting Strength of Intention to Stop Smoking

Predictor	$\beta$	SE	Odds Ratio	Wald Statistic
Self theory of smoking	.289*	.124	1.335	5.438
Nicotine Replacement Therapy	.425*	.211	1.530	4.045
Constant	-3.158*	1.613	.043	3.835

\*p < .05. \*\* p < .01. \*\*\* p < .001. n = 70

The Nagelkerke R square of the logistic regression model was able to account for 45.7 percent of the variance in smoking status for the participants in this study. Through this model 91.4 percent of the respondents were correctly classified. In order to achieve the most parsimonious model, the variable “helpfulness of nicotine replacement therapy (NRT)” was included in this model as a predictor variable, even though the resultant sample size decreased to n = 70.

### *The Association Between Mindsets*

In exploring whether a relationship exists between mindset of smoking and mindset of intelligence, Pearson correlational analysis reveals that there is a statistically significant association between these variables in the sample under study,  $r = .151$ ,  $p < .05$ . A correlation between zero and 0.3 is generally considered by statisticians to be of a “weak” magnitude even though it is statistically significant (Anderson & Finn, 1996).

## CHAPTER V

### SUMMARY, DISCUSSION, and IMPLICATIONS

#### *Summary of Study*

This study investigated factors that contribute to adults' motivations to stop smoking cigarettes. It aimed to explore the relationships between self-theories of intelligence and self-theories of smoking and smoking cessation behavior and intention. This was accomplished by collecting 197 completed questionnaires about smoking cessation behavior from a convenience sample of 197 adult smokers and ex-smokers. Quantitative methods were used to answer the research questions that guided this investigation. Data were analyzed using descriptive statistics, correlational analyses and logistic regression. Quantitative data analysis allowed for an objective examination of the factors that contribute to adults' motivations to stop smoking and the relationships among self-theories and smoking cessation behaviors. The findings are explicated in this chapter, and organized according to the research questions being answered. Some of the results mirror the outcomes of previous research while other findings provide new or alternative perspectives. The present study has acknowledged limitations which affect the generalizability of the findings; and these limitations are discussed in this chapter. Implications of the present study for health professionals and recommendations for further research are also described.

#### *Discussion of Descriptive Findings*

A total of 197 participants completed the 32-item Smoking Questionnaire. Due to a two-week delay in receiving IRB approval, the researcher's original plan for data collection had to be



modified. Consequently, the participants were solicited face-to-face and by e-mail through a type of snowball sampling technique from among persons who attend an urban university campus in Northeast Ohio. Snowball sampling consisted of the researcher sending an e-mail containing the online questionnaire link and study information to all previous students, current faculty, and staff in her e-mail address book along with a request to send the on-line questionnaire link to anyone the recipient knew who was a current or ex-smoker. The researcher conducted face-to-face sampling at a main classroom building on an urban university campus, and among attendees at a blood pressure screening event, a Valentine's Day dance, an education conference, and a fundraising event for a nonprofit organization. This study used a convenience sample which should not be interpreted as representative of the communities where data were collected. Sixty-six percent of the respondents were female, 78% were white, and 18% were African American/black. Eighty-seven percent were heterosexual and 13% were LGBT. Overall the respondents were highly educated with 83% reporting that they had attended college or graduate school. The respondents represented a wide range of adult ages (18 to 84) and incomes (\$0 to over \$100,000). Fifty-eight percent of the respondents were current cigarette smokers and 42% reported having stopped smoking in the previous 5 years. Of those ex-smokers, 42% had quit smoking in the previous 12 months.

#### *Discussion of Smoking Cessation Predictions*

*Research Question 1: Which of the following variables best predict smoking cessation behavior: age gender, sexual orientation, level of education, household income, years of smoking, use of smoking cessation strategies, presence of smoking related symptoms or illness, previous quit attempts, nicotine dependence, healthcare provide advice, other smokers in the household, intention to stop smoking, mindset of smoking, and mindset of intelligence?*

This study sought to answer the first research question and identify which of the many variables under study are predictive of smoking cessation behavior. Results of the logistic regression model highlight four elements that are predictive of smoking cessation behavior. The

first is the strength of intention to stop smoking as measured by one questionnaire item on a scale of 1 to 10, with 1 being “not strong” and 10 being “very strong.” The results indicate that adults with strong intention to stop smoking are much more likely to be ex-smokers (to have stopped smoking) than adults with weak (not strong) intention to stop smoking. This finding is consistent with previous research. Intention to quit smoking, or motivation to stop smoking, has often been singled out in the literature as an important factor in smoking cessation efforts, and this research provides additional support for that notion. Motivation is one aspect of the Theory of Planned Behavior. “Motivation to comply” refers to the likelihood that an individual will do what each referent thinks they should do, and it precedes behavioral intention. In research testing the Theory of Planned Behavior, motivation to comply is measured on a scale of 1 to 7 (Montano & Kasprzyk, 2002). In other research, motivation to quit smoking is measured from 1 to 10 on the Intention to Quit Ladder Score scale. Smokers with the goal of quitting abruptly had higher levels of motivation and were more likely to follow through and quit than smokers with lower levels of motivation (Peters, Hughes, Calas, & Solomon, 2007).

The results of the current study also demonstrate that a respondent’s self theory of smoking is a significant predictor of ex-smoker status. Smokers with a fixed self theory of smoking were less likely to have stopped smoking than respondents with a growth self theory of smoking. In other words, smokers who believe they can change their smoking behavior have a greater likelihood of stopping smoking than those smokers who are less convinced of their ability to change. Since self-theories have not been used in research to predict smoking cessation or other health behavior outcomes this represents a unique finding that warrants further investigation.

The results show that the presence of other smokers in the household is associated with being a current smoker. Those respondents who reported another smoker in their household were significantly less likely to be smoke-free than those who reported that no smoker lives in their household. This finding is consistent with and supports outcomes from previous research.

The present study found that annual household income was a significant predictor of smoking status. Respondents with higher incomes were more likely to be ex-smokers, while respondents with lower incomes were more likely to be current cigarette smokers. Previous research studies have linked lower income levels with higher rates of cigarette smoking, and this finding is compatible with that notion (CDC, 2007b; National Center, 2007a). However, there is limited (no) research demonstrating greater instances of smoking cessation among individuals with higher annual incomes.

#### *Discussion of Factors Related to Smoking Cessation*

*Research question 2: What are the relationships between age, gender, sexual orientation, level of education, household income, years of smoking, use of smoking cessation strategies (medications, nicotine replacement therapy [NRT], participation in smoking cessation programs), presence of smoking related symptoms or illness, previous quit attempts, nicotine dependence, healthcare provider advice, other smokers in the household, intention to stop smoking, mindset of smoking, and mindset of intelligence?*

Research question 2 was intentionally written in a broad manner to allow for the discovery of as many statistically significant relationships as possible among the variables in this study. It is important to note that most of the literature reports demographic and other factors associated with smoking prevalence, but there is a paucity of research describing the demographics of people who have quit smoking (ex-smokers). The present study identified several statistically significant relationships between the variables under study and smoking cessation (ex-smoker status), and this section focuses on those significant correlations with smoking cessation (ex-smoker status) and the variables gender, race/ethnicity, education level, annual household income, other smokers living in the household, perceived dependence on nicotine, intention to quit smoking, helpfulness of nicotine replacement therapy, and self theory of smoking.

In the present study there is a statistically significant negative association between gender

and smoking status. In other words, males in this study were more likely to be smokers and females were more likely to be ex-smokers. This finding is consistent with smoking prevalence data already described in Chapter 2. Across the U.S. and the state of Ohio, the prevalence of smoking is higher among men (CDC, 2007b, CDC, 2007c). What is interesting about this finding is that being female is significantly associated with being an ex-smoker. Perhaps the participation of greater numbers of females in the present study skewed the analysis and prompted this result, perhaps females are more successful at quitting smoking than males, or perhaps there are confounding variables. This warrants further investigation. There is little research available that profiles female ex-smokers or investigates the relationship between female gender and smoking cessation success. It is also important to note that the definition of “ex-smoker” and “smoking cessation success” differs among studies. For example, one study may define ex-smoker through a single self-report data point (as in this research), while another study might measure serum cotinine levels, and another study might interview participants at 3 months and 6 months before determining that someone has successfully stopped smoking. Regardless of how “ex-smoker” status is determined, the various definitions make it a challenge to compare study findings.

Respondents who identified as African American/black were more likely to be current smokers. On the other hand being white was significantly associated with being an ex-smoker. The Centers for Disease Control (2007b) report a slightly higher incidence of cigarette smoking among African Americans than among whites. There is a paucity of research available on the racial makeup of ex-smokers. This also warrants further investigation.

In the present study higher levels of education were associated with being an ex-smoker and lower levels of education were associated with being a current smoker. This result supports previous findings that there is a higher prevalence of smoking among persons with less than a high school education (CDC, 2007b). There is little data available on the education level of people who succeed in their efforts to stop smoking. It is possible that the high education levels in the present sample skewed the analysis and prompted this result, or perhaps the more highly

educated are more successful at quitting smoking. Confounding variables must also be considered in answering this puzzle. Never the less, this also warrants further investigation as there is a paucity of research available on the education levels of ex-smokers

Annual household income was also significantly associated with smoking status in this study. Those respondents reporting annual household incomes less than \$20,000 tended to be smokers, while those participants reporting higher levels of income tended to be ex-smokers. Among those who had successfully stopped smoking, 83% reported having annual incomes greater than \$20,000. Although these findings generally support outcomes from previous research on the prevalence of smoking among people living below the federal poverty line, there is little published about the incomes of people who have stopped smoking (CDC, 2007b; National Center, 2007a). It is certainly possible that higher incomes facilitate the purchase and utilization of more resources to help people stop smoking, but there is no basis for drawing that conclusion from the present research data. Further investigation is warranted.

This study found a statistically significant association between smoking status and the presence of other smokers in the household. In other words, respondents who reported living with another smoker tended to be cigarette smokers themselves, while those who did not live with a smoker were more likely to be ex-smokers. This result is also consistent with previous research. Sociologists have noted that one's social environment can be supportive of or discouraging of health behaviors.

The significant correlation between perceived dependence on nicotine and smoking status is an interesting one. All participants, both smokers and ex-smokers, were asked to rate on a scale of 1 to 10 (with 10 being the highest) their level of "dependence on nicotine when they were smoking cigarettes on a regular basis." Surprisingly, ex-smokers tended to report significantly higher levels of nicotine dependence than current cigarette smokers, and so there was a significant negative correlation between nicotine dependence and smoking status in this sample. It is interesting that the people who were able to stop smoking believe that they were more

dependent on nicotine, while the people who continue to smoke believe they are less dependent on nicotine. Of further interest are the respondents' scores on the Fagerstrom Test for Nicotine Dependence (FTND) items. The reader is reminded that FTND scores range on a scale from 1 to 10 (with 10 being the highest) and they have been correlated with serum cotinine levels in previous research studies. In the present study 69% of all participants had FTND scores between 1 and 5, with 71% of ex-smokers and 66% of current smokers scoring between 1 and 5. So it is an interesting contradiction that 75% of the ex-smokers report higher perceived levels of dependence on nicotine, yet 71% of the ex-smokers scored in the lower half of the FTND scale. It is apparent in this study that individual perceptions of nicotine dependence (addiction) are quite different from scores on measures that are designed to accurately assess levels of addiction. This discrepancy warrants further investigation.

Respondents were asked to rate their perception of "the helpfulness of nicotine replacement therapy" (e.g. nicotine gum, patch, spray, inhaler, lozenge) in their efforts to stop smoking. Although only 85 participants reported using NRT in their efforts to stop smoking, there was a significant association between the perceived helpfulness of NRT and smoking status. In other words, participants who rated NRT as "moderately to very helpful" tended to be ex-smokers, while those who rated it as "not very helpful" tended to be current smokers. Previous research highlights the efficacy of NRT in smoking cessation efforts and this finding is consistent with that research (Williams, et al., 2006).

In the present study, self-theory of smoking was statistically significantly associated with smoking status. A participant's self-theory of smoking was calculated in the following manner. Respondents were asked to state their agreement or disagreement with the following three items on a 6 point scale with "1" representing "strongly agree" and "6" representing "strongly disagree": (a) "You are either a smoker or a non-smoker and you can't really do much to change it"; (b) "Smoking cigarettes is something about you that you can't change very much"; and (c) "To be honest you can't really change that you smoke cigarettes." Participant's ratings on each

of the 3 items were summed with resulting values ranging from 3 to 18. A score between 3 and 10 represented an entity self-theory of smoking, a belief that change in smoking behavior was not very likely. A score of 11 through 18 represented an incremental self-theory of smoking, a belief that it is very possible to change smoking behavior. Among the 83 ex-smokers, only 3 (4%) held entity self-theories of smoking and 80 (96%) held incremental self-theories of smoking. However among the 114 smokers, 22 (19%) held entity self-theories of smoking and 92 (81%) held incremental self-theories of smoking. To summarize, in the present study, self-theory of smoking was significantly associated with smoking status. That is to say, ex-smoker status was associated with a belief that smoking behavior can be changed. Therefore participants who had quit smoking were more likely to report a belief that smoking behavior can be changed.

It is important to note that based on this research study It is not possible to determine a causative relationship between self-theory of smoking and smoking cessation success. One could conclude that being successful at quitting smoking might strengthen an ex-smokers belief in one's ability to change. Or alternatively, one might conclude that a strong belief in one's ability to change will lead to a success in quitting smoking. Further research must be done to demonstrate the existence and direction of a causal relationship between self-theory of smoking and smoking cessation success. A longitudinal research study among persons trying to quit smoking or a interventional research study are two possible ways of demonstrating directionality and causation.

In the present research strength of intention to quit smoking was statistically significantly associated with smoking status. For example, those individuals reporting high levels of intention to quit smoking were more likely to be ex-smokers than those reporting lower levels of intention to quit smoking. This finding is not surprising as "intention to quit" is often referred to as "motivation to quit" and is cited in the literature as a factor positively influencing smoking cessation success. However, the reader is cautioned not to conclude direction and causality in this relationship as the present analysis cannot demonstrate this type of relationship. As was the case with self-theory of smoking, further research is warranted to demonstrate a causal relationship

between intention to quit and smoking cessation success.

#### *Discussion of Predictors of Intention to Stop Smoking*

*Research Question 3: Which of these variables (age, gender, sexual orientation, level of education, household income, years of smoking, use of smoking cessation strategies [medications, nicotine replacement therapy, participation in smoking cessation programs], presence of smoking related symptoms or illness, previous quit attempts, nicotine dependence, healthcare provider advice, other smokers in the household, mindset of smoking, and mindset of intelligence) best predict self-reported intention to stop smoking?*

This study sought to answer the third research question and identify which of the many variables under study are predictive of intention to stop smoking cigarettes. Results of the logistic regression model reveal two predictors of strength of intention to stop smoking: (a) self theory of smoking, and (b) helpfulness of nicotine replacement therapy. Based on this study, the odds ratio indicates that for every one unit increase in self theory of smoking the strength of intention to quit smoking increases 1.34 times. Additionally, for every one unit change in perceived helpfulness of nicotine replacement therapy the strength of intention to quit smoking increases 1.5 times. This finding warrants further investigation. Although causation and direction cannot be assumed based on this type of analyses, it does not negate the important interrelationships between self theory of smoking, NRT, and motivation to quit smoking. Future research studies should be designed to explore direction and causation among these variables.

#### *Discussion of Domain Specificity of Mindsets*

*Research Question 4: Is there a statistically significant relationship between mindset of intelligence and mindset of smoking?*

Correlational analysis was used to answer the fourth research question. For this analysis, mindset of intelligence was calculated in the same manner as mindset of smoking. Correlational analysis indicates that there is a statistically significant association between mindset of intelligence and mindset of smoking,  $r = .151, p < .05$ . Although this is a statistically significant



correlation, it is a weak one (Anderson & Finn, 1996). Correlations that are close to zero suggest independence, and this finding may indicate that these constructs (mindset of smoking and mindset of intelligence) are not related. They may be viewed as independent and domain specific. For example, one individual may have an entity self theory of intelligence and also hold an incremental self theory of smoking, while another individual may have an incremental self theory of intelligence and an incremental self theory of smoking. The domain specificity of self-theories is consistent with and supported by previous research (Dweck & Leggett, 1988).

### *Limitations*

#### *Reliability of the Smoking Questionnaire*

The Smoking Questionnaire used in this study was constructed of previously validated instruments and items written by the researcher. Reliability statistics for the previously validated instruments are within acceptable ranges, (.691 to .94). Items written by the researcher to measure self theory of smoking demonstrated an acceptable Cronbach's alpha of .92. However, other items on the questionnaire were intended to measure many different variables, and used several different scales. Therefore it was not possible to accurately assess the reliability of those other items. However the questionnaire was reviewed by 5 experts with experience in questionnaire design and pilot tested among a small group of current smokers, and revised to strengthen its validity. Future efforts might be directed toward developing and testing a more valid and statistically reliable instrument. For example, the development of an instrument that contains several items that consistently measure motivations to quit smoking. Such an instrument would be a useful asset in the conduct of future research.

#### *Convenience sample*

There could be a self-selection bias which affected the composition of the sample in this study. In conducting the research there were several indicators of self-selection bias. First of all, when talking with individual's who chose to complete the paper version of the smoking questionnaire in face-to-face encounters, especially those who had quit smoking in the previous

12 months, the researcher encountered individuals who expressed a need to declare that they had stopped smoking, a verbalization of pride about their accomplishment. They really wanted to participate in the smoking research study because it provided a means to declare their accomplishment. Another factor contributing to self-selection bias is that in the present social environment smokers often express that they feel like pariahs or outcasts. It is reasonable to conclude that individuals might chose not to participate in the study about smoking because they might be suspicious of the researcher's motives (that I might want to harass them) and upset by the perceived social condemnation of their smoking. Certainly it is possible that these types of self-selection biases could affect the composition of the sample. The overrepresentation of highly educated persons in the sample could be explained in 2 ways: (a) well-educated people probably know more about research studies and might be more inclined to participate in research or (b) asking and e-mailing people on a college campus to complete a survey would result in a higher number of well-educated respondents being contracted to participate. The convenience sample in this research limits generalizability of the results. To the extent that participants were not a representative sample, it has not been established that the skew in education level, gender, etc. produced biased analytic results.

### *Conclusion*

This study may be the first to provide evidence that self-theories play a role in smoking behavior change. The following sections provide a brief overview of the implications of this evidence and recommendations for future research, education, and practice. As with most exploratory studies the results of this research seem to uncover more questions than answers, and make it evident that there is much to be learned about the contribution of self-theories to health behavior change.

### *Implications and Recommendations*

This research study has important implications for health professionals, for educators that teach about theories of health behavior change, for researchers that investigate and define new

knowledge related to health behavior change, and potentially for practitioners who encourage or assist clients in altering their health behaviors. This study also sheds a bright light on many pathways for further research.

### *Implications for Health Professionals*

Considering the results of this study, health professionals may want to include information about the contribution of self-theories of smoking when teaching about the theories of health behavior change and when planning health behavior change interventions such as smoking cessation programs.

### *Theoretical Considerations*

This study demonstrates that self-theories do indeed make a difference in motivation to change smoking behavior and in smoking cessation outcomes. But it's clear that self-theories are not the only factor making a difference, self-theories are a piece of the model and a part of the equation. Self-theories provide an alternate perspective, and complement other theoretical models of health behavior change, but they do not replace these other theories. The potency of "the belief in change" requires further exploration and definition in the realm of health behavior theories and outcomes. So it is prudent to argue for further research on these important topics. For those who teach about theories of health behavior change, this author recommends an emphasis on the importance of an incremental mindset in achieving success.

Future research might explore the behaviors, emotions, and attributions of smokers attempting to quit. Do smokers who face challenge and failure in their attempts to stop smoking display the typical mastery-oriented or helpless behavior patterns that were observed in children who faced failure in earlier research by Diener and Dweck (1978)? One could interview smokers during their attempts to stop smoking and analyze interview transcripts for these typical patterns of thoughts, feelings and behavior. Another study might examine the types of goals smokers pursue. Do individuals trying to stop smoking adopt learning or performance goals? Future research must also explore and define directionality and causation among the components of the

self-theories model in a sample of smokers attempting to quit. These are just some of the possible research studies that might advance knowledge of the theoretical implications of self-theories and smoking cessation behavior, but there are also many practical considerations.

### *Planning Smoking Cessation Programs*

This study provides evidence that self-theories play a role in smoking behavior change. The magnitude of the effect of self-theories on smoking cessation outcomes is comparable to the effect of nicotine replacement therapy. However, it is evident that self-theories could be utilized by more people. Self-theories do not require a visit to the doctor and pharmacist. They do not require a prescription, and they are free of charge to anyone who chooses to believe that change is possible. For these reasons it is suggested that interventional strategies for smoking cessation programs should include a focus on self-theories of smoking in addition to promoting NRT as a strategy to stop smoking. Granted more research is needed to demonstrate the interventional potential of self-theories of smoking, but it is not difficult to conceptualize this potential. If researchers can induce a changeable mindset of intelligence by having participants read a paragraph, it would seem likely that reading or viewing a film about other smokers who have successfully quit smoking might induce an incremental self-theory of smoking. Interventions to repeatedly bolster an incremental mindset of smoking could include a buddy system, where a person trying to quit smoking is paired with a person that has been smoke-free for a year. Another support method could consist of phoning, e-mailing, or texting frequent reminders about an incremental self-theory of smoking to the person trying to quit smoking. Health educators need to tailor their communication to emphasize an incremental mindset. Health educators need to provide smart feedback to people who smoke by praising effort and inducing the belief in behavior change. Another intervention could teach family members and significant others how to provide supportive cues to the ex-smoker to support a growth mindset. In addition to emphasizing an incremental self-theory of smoking, smoking cessation program planners should continue to emphasize strategies for success such as strategies to deal with cravings, and

strategies to avoid behaviors and situations that are associated with smoking. If having another smoker in the household is a deterrent to success, the smoking cessation program planners might encourage all household members to quit smoking together. There is a pressing need for research to demonstrate the efficacy of such strategies to support an incremental mindset in people trying to stop smoking.

### *Recommendations for Future Research*

#### *Recommendation 1: Use Online Survey Techniques to Facilitate Research*

One success of this study was collecting 197 complete Smoking Questionnaires in just 24 days. This rapid data collection was possible through the use of a commercially available, inexpensive, online survey program. There are several equally attractive online survey options available. The online questionnaire had several advantages. First it was designed to be identical to the paper questionnaire in instructions and question content and format. Second the survey program gave several useful options that are not available in traditional paper based questionnaires. First, the individual questionnaire items could be set to require an answer or the respondent could not proceed to the next item. This is useful when it is essential to your research that specific items be answered. A second advantage is that the survey program can be set to only accept complete survey responses. Knowing one has a complete questionnaire saves substantial amounts of time during the data analysis phase. A third advantage to online questionnaires is that one can target specific groups and designate the maximum number of participants in each group in advance. For example, the researcher in the present study was able to pre-designate a maximum number of completed online questionnaires from smokers and ex-smokers to ensure some balance in the number of respondents. A fourth advantage is that once the online questionnaire with detailed instructions is launched, there is no need for the researcher to be present, there is no travel time involved, no need to reserve and man a table at some remote location, or to stand shivering outside in snowy January weather to obtain respondents. Online survey methods save precious time during the data collection phase. This researcher would

definitely recommend using online survey techniques for future research especially those not requiring a representative or random sample.

*Recommendation 2: Further Explore the Role Self-theories Play in Smoking Cessation*

In the present study the convenience sample had characteristics that were representative of the general population of smokers in Cleveland Ohio, but the sample had a skewed distribution of self-theories with a larger number of participants holding incremental self-theories of smoking than entity self-theories of smoking. Research by Dweck and colleagues (2000) showed that self-theories of intelligence were normally distributed. Future research could investigate and describe the distribution of self-theories of smoking in other representative samples of smokers and ex-smokers. And future research might address the question: What is the distribution of self-theories of smoking in other populations of smokers?

It is also clear that future research needs to investigate the interventional potential of self-theories in smoking cessation success. In other words, it would be useful to design an interventional research study in which cigarette smokers' self-theories are manipulated to induce or support an incremental self-theory of smoking and to measure subsequent outcomes. Several questions could be explored. Does a self-theory of smoking intervention make a difference for smokers in their smoking cessation process? Does it make a difference in outcomes? Does a self-theory of smoking intervention result in a greater percentage of smokers quitting smoking than other interventional strategies (such as NRT, smoking cessation programs, going cold turkey by oneself)? What types of interventions are most efficient and effective in manipulating smokers' self-theories? Are certain types of interventions more effective for different groups of smokers? For example, would one type of intervention be more appropriate to manipulate the self-theory of smoking among women who smoke and another among male smokers? Are certain interventions more appropriate for African Americans, or the elderly who smoke, or among persons diagnosed with smoking related illness?

An interventional study might explore the effects and outcomes of what Dweck referred

to as “effort praise” or “process praise”, defined as “praise for engagement, perseverance, strategies, improvement,” etc. which “fosters hardy motivation” (Dweck 2007, p. 36). The study might compare 2 similar groups of adults trying to quit smoking by attending an organized smoking cessation program. The smoking cessation program participants could be randomly assigned to control and experimental groups. Both groups would complete a questionnaire at the beginning of the program. The pre-questionnaire would include demographic questions and items intended to identify the participant’s self-theory of smoking. The control group would attend the smoking cessation program sessions and receive the normal content of the program (for example the American Lung Association’s Freedom from Smoking program.) The experimental group would also attend the program sessions, however, in addition the control group participants would be taught about the importance of believing in smoking behavior change by reading a series of vignettes (written by the researcher) about people who have been successful at quitting smoking. The experimental group would also be given effort praise. The praise might be delivered to the experimental group by verbal and/or written feedback throughout the program. The praise might compliment the program participants on their use of smoking cessation strategies, their effort in attending and participating in the sessions, their concentration in learning new techniques for dealing with cravings, the ideas for quitting success that they shared with other program participants, the way they focused on setting a quit date, the way they followed-through on implementing their plan to quit, and their effort in dealing with cravings and remaining smoke-free (Dweck, 1999). At the end of the program, and 3 months later, all program participants would complete the self theory of smoking items and a question to determine the participants’ smoking status. A study such as the one proposed here has the potential to demonstrate whether health educators can induce and support an incremental self-theory of smoking and whether those interventions significantly influence an adult’s ability to stop smoking and remain smoke-free.

*Recommendation 3: Continue to Explore Motivations in Smoking Cessation and Health Behavior Change*

In the present study motivation was conceptualized and roughly measured in only one questionnaire item as “strength of intention to stop smoking”. It was not possible to demonstrate acceptable reliability statistics for this one item even though this conceptualization was based on previous research using the intention to quit ladder score (Peters, Hughes, Calles, & Solomon, 2007). There is a need for research which develops an instrument that measures motivation/intention to quit smoking, and that demonstrates acceptable validity and reliability statistics. Furthermore, there is a need for further research that explores and explains the nature of the complex relationship between self-theories of smoking and motivation to stop smoking.

*Recommendation 4: Investigate the Role That Self-theories Play in Other Types of Health Behavior Change*

This study highlights the need for additional research to find answers to research questions in other areas of health behavior. These questions include: Can self-theories be delineated in other areas of health behavior change? For example, do people who want to lose weight have a self-theory of weight loss? Do people considering a change in exercise routine have a self-theory about their activity levels? Do people hold entity and incremental views of their diet and nutritional intake? If so, can these self-theories be manipulated to produce the desired change? How can that best be accomplished?

In a recent layman’s popular psychology book, Carol S. Dweck discussed her research on the role of self-theories of intelligence in motivation and learning achievement. In that book it was stated that the profound effects of self-theories can be witnessed in all aspects of human achievement. While this claim certainly seems plausible based on anecdotal evidence, it still constitutes an unsupported generalization as there is a paucity of empirical research to back it up. More research needs to be done to provide empirical support for the role of self-theories outside of the educational and psychology domains. This researcher believes that the role of self-theories



in health behavior change is an area of research that holds great promise for knowledge discovery and health promotion.

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## APPENDIX

## APPENDIX A

### Consent Form

Dear Participant:

I am a registered nurse, and a graduate student at Cleveland State University. I'm asking you to complete a questionnaire for adults who currently smoke or who have quit smoking cigarettes in the past 5 years. It should take about 10 minutes to complete. The purpose my research is to learn what factors help people stop smoking. The questionnaire asks questions about your beliefs about smoking and intelligence, smoking history, quitting history, and demographic information. It is my hope that information from this survey will contribute to a better understanding of why some individuals quit smoking and others do not.

Your responses to the questions are anonymous. Your name will not appear anywhere on the survey and complete privacy is guaranteed. All data will be reported in aggregate, so no one will know your answers. You may find some questions are of a sensitive nature, and you may chose to not answer any question. Your participation is completely voluntary and you may withdraw at any time. If you participate you will be entered into a drawing for a \$25.00 gas card. There is no consequence for not participating. The risk of participating is no greater than that of your normal daily activities.

If you'd like further information about this research please contact me, Vicki D. Johnson at 216-875-9872, e-mail: v.d.johnson01@csuohio.edu or contact the chair of my dissertation committee, Dr. Sheila Patterson at 216-687-3665, e-mail: s.m.patterson@csuohio.edu. If you have any questions about your rights as a research participant you may contact the Cleveland State University Institutional Review Board at 216-687-3630.

**Please indicate your agreement to participate by signing the consent statement on the next page.**

**I am 18 years or older and have read and understand this consent form and agree to participate by completing the Smoking Questionnaire.**

**I understand that if I have any questions about my rights as a research subject I can contact the CSU Institutional Review Board at (216) 687-3630.**

**Signature:** \_\_\_\_\_

**Name (Please Print):** \_\_\_\_\_ **Date:** \_\_\_\_\_

Would you like to receive information about this study once it is completed?

Yes

No

Do you want to be entered into a drawing for a \$25.00 gas card?

Yes

No

If you answered yes to one or both of the questions above, please print your contact information below:

E-mail: \_\_\_\_\_

Phone #: \_\_\_\_\_

Postal address: \_\_\_\_\_

There are two copies of this consent form. After signing, you may keep one copy for your records, if you'd like, and return the other one to the researcher.

Thank you in advance for your participation!



## APPENDIX B

### Smoking Questionnaire

Thank you for taking the time to complete this questionnaire. Please answer each multiple choice question by marking the box with an "X". Some questions have additional instructions. Please mark only one answer for each question. Remember your answers will be completely anonymous. If you need assistance, please ask the researcher.

1. Do you currently smoke cigarettes on a regular basis (every day, every other day, or several times a month)?
  - No
  - Yes
  
2. How long have you smoked cigarettes on a regular basis? Or if you are an ex-smoker, how long did you smoke cigarettes on a regular basis?
  - less than 1 year
  - 1 to 5 years
  - 6 to 10 years
  - 11 to 20 years
  - 21 to 30 years
  - 31 to 40 years
  - more than 40 years
  
3. Does anyone else living in your household currently smoke cigarettes? (not counting yourself)
  - No
  - Yes
  
4. How many times in the past year have you seriously tried to stop smoking? (Skip this question if you haven't smoked in the past year).
  - 0 (None)
  - 1 time
  - 2 to 5 times
  - 6 to 10 times
  - more than 10 times

Everyone please answer questions 5 through 11. If you do not currently smoke, please answer questions 5 through 11 as best you can for the year before you stopped smoking.

5. How soon after you wake up do you smoke your first cigarette?
- after 60 minutes (0)
  - 31 - 60 minutes (1)
  - 6 - 30 minutes (2)
  - within 5 minutes (3)
6. Do you find it difficult to refrain from smoking in places where it is forbidden?
- No (0)
  - Yes (1)
7. Which cigarette would you hate most to give up?
- the first in the morning (1)
  - any other (0)
8. How many cigarettes per day do you smoke?
- 10 or less (0)
  - 11 - 20 (1)
  - 21 - 30 (2)
  - 31 or more (3)
9. Do you smoke more frequently during the first hours after awakening than during the rest of the day?
- No (0)
  - Yes (1)
10. Do you smoke even if you are so ill that you are in bed most of the day?
- No (0)
  - Yes (1)

11. Estimate the number of times your healthcare providers have advised you to stop smoking cigarettes in the past year.
- 0 (none)
  - 1 time
  - 2 to 4 times
  - 5 or more times
12. Think back to the time you made a serious attempt to stop smoking cigarettes. Estimate how long you went without smoking cigarettes?
- not applicable; I did not try to stop smoking
  - less than 1 day
  - 1 day to 1 week
  - more than 1 week but less than 4 weeks
  - at least 1 month but less than 6 months
  - at least 6 months but less than 1 year
  - at least 1 year but less than 5 years
  - 5 years or more
13. Do you have symptoms or illnesses that you believe are caused by smoking and/or that your healthcare provider told you were caused by smoking?
- No (go to question #15)
  - Yes (go to question #14)
14. Using the following scale circle the number that best indicates the total amount of distress that the smoking-related conditions cause you.
- 1      2      3      4      5      6      7      8      9      10
- no distress maximum distress

Questions 15 through 20 have been designed to investigate ideas about smoking and intelligence. There are no right or wrong answers. We are interested in your ideas. Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements by writing the number that corresponds to your opinion in the space next to each statement.

1	2	3	4	5	6
strongly agree	agree	slightly agree	slightly disagree	disagree	strongly disagree

15. \_\_\_\_\_ You are either a smoker or a non-smoker, and you can't really do much to change it.
16. \_\_\_\_\_ Smoking cigarettes is something about you that you can't change very much.
17. \_\_\_\_\_ To be honest, you can't really change that you smoke cigarettes.
18. \_\_\_\_\_ You have a certain amount of intelligence, and you can't really do much to change it.
19. \_\_\_\_\_ Your intelligence is something about you that you can't change very much.
20. \_\_\_\_\_ You can learn new things, but you can't really change your basic intelligence.

Questions 21 through 25 are designed to investigate your ideas about your smoking history. There are no right or wrong answers. Simply read each statement and circle the number on the scale below each statement that most accurately describes your experience. Skip any question that does not apply to your experience.

21. Many health care professionals believe that dependence on nicotine makes it especially difficult to stop smoking cigarettes. Using the following scale circle the number that describes your dependence on nicotine when you were smoking cigarettes on a regular basis. Skip this question if it does not apply to you.

1	2	3	4	5	6	7	8	9	10
low dependence									high dependence

22. Think back to the time you made your most serious attempt to stop smoking cigarettes. At that time how strong was your intention to stop smoking? Circle the number that reflects the strength of your intention to quit smoking. Skip this question if you have never tried to quit smoking.

1	2	3	4	5	6	7	8	9	10
not strong									very strong



27. What is your age?
- 18 to 24 years
  - 25 to 44 years
  - 45 to 64 years
  - 65 to 84 years
  - 85 years and higher
28. What is your gender?
- Male
  - Female
29. What is your race/ethnicity?
- African American/Black
  - American Indian
  - Asian
  - Hispanic
  - White
  - Other (please specify): \_\_\_\_\_
30. What is your education level?
- less than 12 years
  - high school diploma or GED
  - some college
  - college graduate
  - some graduate school
  - graduate degree
31. What is your sexual orientation?
- heterosexual
  - gay
  - lesbian
  - bisexual
  - transgendered

32. What is your estimated annual household income?
- \$0 to \$9,999
  - \$10,000 to \$19,999
  - \$20,000 to \$34,999
  - \$35,000 to \$49,999
  - \$50,000 to \$74,999
  - \$75,000 to \$99,999
  - \$100,000 to \$149,999
  - \$150,000 to \$199,999
  - \$200,000 and higher

You have completed the questionnaire!

Thank you for your participation!

Please return the completed questionnaire to the researcher.

## APPENDIX C

### Smoking Questionnaire Reviewers

The following five experts were asked to evaluate the Smoking Questionnaire for face validity prior to the researcher's prospectus hearing and prior to seeking approval from the CSU Institutional Review Board.

(1) Vida Lock, PhD. is Director of the Cleveland State University School of Nursing. Dr. Lock is an expert in nursing education and continuing health education for professionals, and is experienced in on-line survey development.

(2) Mike Loovis, Ph.D. is a Professor in the Department of Health, Physical Education, Recreation and Dance. Dr. Loovis is an expert in adapted physical education and research. He also teaches leadership in the CSU Urban Education Doctoral Program.

(3) Judy Stahlman, Ph.D. is an Associate Professor of Special Education in the Department of Teacher Education, College of Education and Human Services. Dr. Stahlman is an expert in program evaluation and research, and has experience in survey/questionnaire development and evaluation.

(4) Marilyn Weitzel, Ph.D. is an Assistant Professor of Nursing. Dr. Weitzel is an expert in nursing education and research, and has experience developing, implementing, and evaluating on-line courses and surveys.

(5) Andrea Jennings-Sanders, Dr.P.H. is an Associate Professor in the School of Nursing. Dr. Jennings-Sanders is an expert in community health and disaster nursing, public health research, education, and epidemiology. She also has experience in on-line course development and on-line communication.



APPENDIX D

Letter to Smoking Questionnaire Reviewers

November 25, 2008

Dear Dr. \_\_\_\_\_,

I am asking you to review the Smoking Questionnaire (attached), a questionnaire for my dissertation research. Your expertise in research and education makes you especially qualified for this task. I expect to learn a lot from your feedback, and plan to modify the questionnaire based on your recommendations and the recommendations of the members of my dissertation committee.

If possible, please review the Smoking Questionnaire, answer the questions on page two, and return your answers to me via e-mail by December 11th. If you have any questions you may contact me by e-mail at [v.d.johnson01@csuohio.edu](mailto:v.d.johnson01@csuohio.edu) or by phone at 216-875-9872.

This questionnaire will be administered in paper and electronic versions to the general public. It is currently written at the 8th - 10th grade reading level. Thank you in advance for your assistance!

Sincerely,

Vicki D. Johnson  
Clinical Assistant Professor  
Urban Education Doctoral Student

## Smoking Questionnaire Review Questions

1. Are the instructions clear and understandable? How would you improve the instructions?
2. Which of the questions and response choices are vague, difficult to understand, ambiguous, or contain confusing terminology for the general public? Please explain and suggest alternative wording that would make the question(s) or response choices better.
3. Do you have any suggestions related to organization and spacing of the questionnaire to make it better? Please explain.
4. What other suggestions do you have to improve this questionnaire?