

ATTITUDES AND INTENTIONAL MARKERS FOR BEHAVIORAL  
CHANGE IN SMOKERS: EXAMINING THE  
EFFECTS OF INTENTION ON  
BEHAVIOR CHANGE

by

MICHAEL SHAUN CULWELL

Presented to the Faculty of the Graduate School of  
The University of Texas at Arlington in Partial Fulfillment  
of the Requirements  
for the Degree of

DOCTOR OF PHILOSOPHY

THE UNIVERSITY OF TEXAS AT ARLINGTON

August 2010

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## ACKNOWLEDGEMENTS

I would first like to thank my mentor, Dr. Basco, for her invaluable help and support throughout this process. Without her guidance and motivation, this project would never have seen the light of day. The members of my dissertation committee deserve recognition, as well; Dr. Angela Dougall, Dr. James Kopp, Dr. Raymond Jackson, and Dr. Marilee Schmelzer. Thank you for making this ordeal (and my ultimate defense) as painless a process as could be expected, given the circumstances.

I would further like to thank the undergraduates in the lab for their help (and valuable ideas) in recruiting subjects as well as their comments throughout innumerable drafts of this project. I would like to single out the help of Drew Cushing, who cold-called those subjects who were, shall we say, more reticent to completing both of the sections of this project. Without his help, this would have been over before it began. I am also not ignorant of the help that all of my friends offered in coming to the rescue when it started looking like this would never get finished. Thanks for your help, guys. I realize what it took.

And last, but certainly not least, I would like to thank my wife, Margarita, for her unwavering support and guidance with me as I ventured forward into uncharted territory, blindly (and stupidly) going where this could only lead. Her tenacity throughout this process did not go unnoticed and her patience with me throughout my innumerable fits as I lay whimpering in the corner, crying for my mommy, was certainly above and beyond the call of duty. Thank you, lover...this success is as much yours as it is mine.

June 8, 2010

ABSTRACT

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Michael Shaun Culwell, PhD

The University of Texas at Arlington, 2010

Supervising Professor: Monica Ramirez Basco

In 2009, the American Cancer Society (ACS) predicted that, of the 219,440 expected new cases of lung cancer, approximately 169,000 cancer-related deaths would be attributable to the use of some form of tobacco products. The ACS further suggests that all cancers caused by cigarette smoking are completely preventable. The source of prevention may be in an individual's behavior patterns. If researchers can better understand the thought processes behind harmful behavior patterns (such as smoking), then perhaps effective strategies for decreasing the influence of negative thought patterns (and subsequent behaviors) are within reach. This study found that possessing intent to cut back or quit smoking predicted actual reduction in the number of cigarettes smoked. Also, optimism, increased perceived social pressure to quit and having a more internal locus of control were found to have predicted intent to cut back and intent to quit smoking. Further, it was found that having a more internal locus of control alone predicted intent to cut back. These findings lend support to the application of the theory of planned behavior in the prediction of smoking behavior.

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## CHAPTER 1

### INTRODUCTION

The American Cancer Society (ACS) stated in 2006 that cancer was second only to heart disease as the leading cause of death in the United States, with 23.1% of all deaths that year (559,888 in total) being attributed to various cancers (ACS, 2009a). This year alone, more than 562,000 Americans are expected to die from cancer, equating to more than 1,500 per day and accounting for nearly 1 out of every 4 deaths nationwide (ACS, 2009b). The National Institutes of Health estimated that the overall costs associated with cancer in 2008 amounted to roughly \$228 billion, including direct medical costs/health expenditures, cost of lost productivity due to illness, and cost of lost productivity due to death (ACS, 2009b). Further estimates at that time predicted that in the year 2009, lung cancer would be the most fatal type of cancer for both men and women and would be responsible for an estimated 30% and 26% of projected cancer deaths, respectively (ACS, 2009a).

For many of the deaths resulting from lung cancer, the etiology can be attributable to one of the most highly preventable causes of death, tobacco use. The American Cancer Society predicted that in 2009, of the 219,440 expected new cases of lung cancer, approximately 169,000 cancer-related deaths would be attributable to the use of tobacco products (ACS, 2009b). As a result of the widespread consumption of cigarettes and other forms of tobacco products among adult men from 1945 to 1979, the death rates for males that are attributable to lung cancer increased steadily through 1990, then began to decline (ACS, 2009b). For women, who began smoking cigarettes later than men, the death rate attributable to lung cancer has begun to level off, after steadily increasing for many decades, an effect that mirrors that of men (ACS, 2009a).



The decline in deaths resulting from lung cancer has been associated with a decrease in adult smoking behavior in both men and women since approximately 1965 (ACS, 2009b). One year earlier, in 1964, the Surgeon General released his seminal report on Tobacco and Health, calling for a drastic decrease in cigarette consumption in the United States (ACS, 2009a). The disparity in cigarette smoking behavior across genders diminished from 1965 to 1985, most likely the dual result of a) smoking becoming more popular among women and b) higher rates of quitting among male smokers subsequent to the Surgeon General's warning (ACS, 2009a). After decreasing significantly between 1997 and 2004, the prevalence of smoking in the United States remained essentially unchanged between 2004 and 2006 (ACS, 2009b). However, in 2007, smoking behavior in adults began to decline significantly again (ACS, 2009a).

One important factor in reducing the prevalence of cigarette smoking behaviors (and smoking-related deaths) later in adulthood is decreasing cigarette-smoking behaviors among adolescents and young adults. Among high school students in the United States, smoking rates increased steadily from 1991 to 1997. It is believed that this dramatic increase in smoking behaviors was primarily due to aggressive marketing campaigns aimed at recruiting younger smokers (ACS, 2009a). Surprisingly, during the period of 1997 to 2003, cigarette smoking among American youth actually declined (ACS, 2009a). This decline in smoking behavior is thought to be the result of increased price of cigarettes as well as comprehensive social and political efforts to control the sale of tobacco products to minors (ACS, 2009a). However, in the face of increasingly vigorous marketing strategies by the tobacco companies<sup>1</sup>, the prevalence of smoking behaviors in adolescents and young adults remained relatively stable between 2003 and 2007 (ACS, 2009a). The recent plateau in the rate of decline may reflect a resurgence of increased spending on marketing and promotion by the tobacco companies and decreased

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<sup>1</sup> There is a well-known adage in the tobacco industry that goes: "An addicted customer is a customer for life, no matter how short that life may be" (Kleinman & Messina-Kleinman, 2009)

funding for comprehensive smoking intervention programs. This tug-of-war battle between the tobacco companies (who value profit) and the efforts of prevention groups such as the American Cancer Society (who value health) reflects the increased awareness and social pressures placed on Americans to quit smoking.

But there may be hope. The American Cancer Society suggests that all cancers caused by cigarette smoking are *completely preventable* (ACS, 2009b). The source of prevention, and the best place to target awareness, may be in an individual's behavior patterns. All one has to do is want to quit (or cut back) his or her consumption of cigarettes and other tobacco products. However, it is not easy to quit smoking. One study performed at Duke University found that "only five percent of unaided quit attempts result in successful abstinence...and most smokers who try to quit return to smoking again" (Duke University Medical Center, 2009). Furthermore, because the causes and reinforcing behavior patterns associated with smoking addiction are not currently well known, researchers need to establish what links, if any, exist between the harmful behavior of smoking and the reinforcing thought processes behind that behavior. If researchers can better understand the thought processes and motives behind harmful behavior patterns (such as smoking), then perhaps effective strategies for decreasing the influence of these negative thought patterns (and subsequent behaviors) are within reach.

#### *Aims of the Current Study*

This study attempted to determine the effects of intention on positive behavioral transformation, specifically cessation of smoking behaviors. The aims of the current study were: 1) to determine the extent to which *intent to quit* smoking at baseline manifests in actual reduction in the number of cigarettes smoked in previous 24 hours as reported four weeks later; 2) to determine the extent to which *intent to reduce* the number of cigarettes consumed at baseline manifests in actual reduction in the number of cigarettes smoked in previous 24 hours as reported four weeks later; 3) to determine the extent to which baseline levels of optimism,

social pressure to quit, and an internal locus of control predict *intent* to reduce the number of cigarettes smoked in previous 24 hours as reported four weeks later; and 4) to determine the extent to which baseline levels of optimism, social pressure to quit, and an internal locus of control predict *actual reduction* in the number of cigarettes smoked in previous 24 hours as reported four weeks later.

#### *The role of intention in controlling behavior*

Of the many advancements afforded to human beings throughout the history of evolution, perhaps the most fundamental is our ability to voluntarily control our own behavior. Central to this ability lies the concept of intention. Intention can be understood as a mental plan to behave in a certain way (Petri & Govern, 2004) or as a person's willingness to perform a certain behavior, and is oftentimes considered an important determinant of behavior (Ajzen, 2006). More specifically, intention is oftentimes determined both by one's attitude toward the behavior in question and his or her beliefs about the expectations of others (normative beliefs; Ajzen & Fishbein, 1970), as well as that individual's motivation to comply with those expectations (Ajzen & Fishbein, 1973). For example, Armitage (2009) found that implementation intentions (those that identify a situation as well as an appropriate behavioral response) were highly effective in reducing alcohol consumption.

The power of one's intention to change a behavior has also been shown to overcome even habituation, in that the residual impact of previous experience diminishes to naught in the presence of a strong and well-formed pattern of intention (Ajzen, 2002). Therefore, it may be possible that intention, in and of itself, can sufficiently predict future behavior. Indeed, current and historical research has found that behaviors can be predicted solely from the intention behind the behavior (Ajzen, 1996; Ajzen & Fishbein, 1973; Ajzen and Fishbein, 2008). In other words, simply wanting to change is a powerful and necessary precursor to actual behavioral change.

This rationale can be carried over to behaviors in the health arena as well. For example,

in a study of 698 active smokers, active intention significantly predicted future abstinence of smoking behavior (Moan & Rise, 2005). In that study, intention alone accounted for 12% of the variance in subsequent behavior, over and above that accounted for by the three factors of the theory of planned behavior (attitude, subjective norms, and perceived behavioral control; Moan & Rise, 2005). Furthermore, the theory of planned behavior (Ajzen, 2006) has been used in numerous studies to predict such health-related behaviors as walking (Scott, Eves, French, & Hoppe, 2007), exercise intention in obese adults (Boudreau & Godin, 2007), using sun protection (White et al., 2008), healthy dietary practices (dairy consumption; Kim, Reicks, & Sjoberg, 2003), mammogram screenings (Tolma, Reininger, Evans, & Ureda, 2006), condom use among male and female intravenous drug users (Corby, Schneider-Jamner, & Wolitski, 1996), and physical activity among people with chronic kidney disease (Eng & Martin-Ginis, 2007). The concept of intention is central to the theory of reasoned action (Ajzen & Fishbein, 1980) and the theory of planned behavior (Ajzen, 2006), both of which are discussed in greater detail below.

### *Models of Intention*

#### *The Theory of Reasoned Action*

The theory of reasoned action (Ajzen & Fishbein, 1980) proposes that intentions can shape observable behavior (Albarracin, Fishbein, Johnson, & Muellerleile, 2001), in that an individual's overt action is a direct result of his or her intention to perform the behavior (Taylor et al., 1998). In other words, if one intends to behave in a prescribed way (e.g., smoke a cigarette, eat a fattening meal), then he or she is likely to engage in that behavior. Furthermore, according to the theory, intentions are guided and impacted not only by one's *attitudes* toward the behavior, but also by any *subjective norms* present in the performance contingency (Albarracin et al., 2001). These two concepts (attitudes and subjective norms) are central to the theory of reasoned action and are discussed below.

### *Attitudes*

Attitudes have been described as many things, including acquired behavioral dispositions (such as with a preference test; Campbell, 1963) and as the degree to which one has either a positive or negative judgment of a behavior (Albarracin et al., 2001), as when parents discipline their children. A behavioral attitude, such as dietary choice, often develops on the basis of responding evaluatively toward an object or set of behaviors, in that one does not have an attitude toward something until one has evaluated that entity as either favorable or unfavorable (Eagly & Chaiken, 1993). For example, an individual decides daily which foods he or she will consume. If the person has committed to a particular diet plan (for health or weight reasons), then he or she is more likely to choose foods that are lower in fat and calories in an effort to maintain compliance with his or her chosen meal plan.

Consequently, social scientists have assumed that responses that express evaluation and therefore reveal people's attitudes can be (or should be) divided into three classes—cognition, affect, and behavior (Eagly & Chaiken, 1993). The first of these, the *cognitive* category, contains thoughts (conceptualized as beliefs) that people have about the attitude object, such as the belief that smoking can result in a number of health-related problems (Eagly & Chaiken, 1993). The second, the *affective* category, consists of feelings or emotions that people have in relation to the attitude object (depending on whether the object is evaluated favorably or unfavorably; Eagly & Chaiken, 1993), as in the view that smoking is unattractive and imparts a foul odor to one's breath and clothing. And finally, the *behavioral* category encompasses people's actions (or intentions to act) with respect to the attitude object (Eagly & Chaiken, 1993), such as whether or not the individual chooses to smoke, regardless of the potential risks to one's health and/or social standing.

Because they have positive expectations of the future, optimists are thought to be more goal-directed in their behavior and are, therefore, better suited to psychosocial adjustments and health-directed actions than are pessimists (Rauch, Schweizer, & Moosbrugger, 2008). There

is a great deal of evidence showing a positive relationship between possessing a high degree of dispositional optimism and a multitude of health-related benefits (Contrada et al., 2008; Fletcher et al., 2006; Hart, Vella, & Mohr, 2008; Ruthig & Chipperfield, 2007). These positive links illustrate the “power” that possessing an optimistic attributional style has on alleviating health-related concerns (such as the dangers of smoking). Consequently, individuals who possess a higher level of optimism should also have a stronger desire to remain healthy and, as a result, be more proactive in matters of personal health (Davidson & Prkachin, 1997).

Optimists have also been found to engage in a greater number of positive health practices (Milligan, 2004), such as eating healthy and not smoking. In other words, possessing an optimistic outlook may have some benefit in maintaining a high level of motivation to cease risky and unhealthy behaviors such as smoking. Therefore, this study assessed optimism as the “attitude” construct of the theory of reasoned action (theory of planned behavior) and subsequently limited its focus to dispositional optimism.

Dispositional optimism is one of the three broad categories or approaches into which the construct of optimism has been divided (Peterson, 2000), the other two being optimistic explanatory style and hope (Rauch, Schweizer, & Moosbrugger, 2008). Dispositional optimism is defined as the “generalized expectation of positive outcomes” (Rauch, Schweizer, & Moosbrugger, 2008, p. 49) and includes such constructs as life engagement and a focus on future events (Giltay, Zitman, and Kromhout, 2006). Both optimism and pessimism are stable outlooks temporally and contextually (Scheier & Carver, 1985). To the casual observer, optimists usually maintain their cheerful dispositions regardless of context or behavioral domain (the essence of dispositional optimism and the marker of interest to the current project); and, in a similar fashion, pessimists are oftentimes seen as being universally despondent (Scheier & Carver, 1985).

#### *Norms*

The subjective norm component of intention involves how the individual believes important others will view his or her behavior. Corollary to this is the individual's concern over whether or not important others believe the individual should perform the behavior in question (Albarracin et al., 2001). Norms are functional in their perspective; they develop to encourage or curtail behaviors that are connected to survival, on either an individual or a group level (Cialdini & Trost, 1998). Further, norms have come about in a manner that is very similar to the natural selection of species: they evolve through selective pressures on individuals to communicate with others about behavior patterns that are effective, relevant, and informative. Unsuccessful norms usually lead to inaccurate or incorrect behavior and, as with maladaptive genes, will neither replicate nor be passed on to subsequent generations (Cialdini & Trost, 1998).

This evolutionary "purification" can be carried over not only to inaccurate or incorrect behavior, but also to those behaviors that run counter to the individual's (or the society's) overall good health, such as smoking. If normative influences guide behavior by way of society's view of benefit and value (i.e., what behaviors are "good and acceptable," as opposed to which are "bad and prohibited"), then societal pressure to reduce or eliminate harmful behaviors should in fact curtail behavior on an individual level. This may illustrate how both smoking and not smoking are simultaneously maintained through reinforcement: one by the pressure from one's peers to initiate the behavior (e.g., it's "cool" to smoke) and the other through the many societal norms that are present today advocating cessation.

The effect of normative influence on health-related behaviors (particularly smoking) is well documented in the literature. For example, Rick, Zimmerman, and Connor (1989) examined many of the ways that significant others, such as friends and family members, affect changes (both positive and negative) in health-related behaviors. They found that, during the course of the change process, significant others provided a positive influence on health behaviors, with family members being especially influential. Furthermore, it was overall

helpfulness (e.g., social support) that was most beneficial in changing harmful behavior patterns, not just simply modeling the changed behaviors themselves (i.e., leading by example). Examining the effects of gender, Royce, Corbett, Sorensen, and Ockene (1997) found that the effects of social influence on smoking behavior significantly differed by gender. They found that women were more likely to feel pressured to quit in general and, more specifically, to report being pressured to quit by their children. Men, on the other hand, were more likely to report pressure from friends and coworkers (Royce et al., 1997).

With respect to peer pressure, Unger, Rohrbach, Howard-Pitney, Ritt-Olson, and Mouttapa (2001) examined 6,929 tenth graders in an effort to determine whether peer influence variables influenced adolescents' likelihood to start smoking. Their results indicate that social influence variables (i.e., peer pressure) are likely to make adolescents susceptible to taking up smoking (Unger, Rohrbach, Howard-Pitney, Ritt-Olson, & Mouttapa, 2001). Dielman, Campanelli, Shope, and Butchart (1987) found a similar effect with fifth and sixth graders; more specifically, that susceptibility to peer pressure was more highly correlated with substance use, misuse, and intention items than with either the health locus of control or self-esteem constructs. It is not surprising that peer pressure holds tremendous influence over the decisional schemas of adolescents and young adults, overshadowing even their own judgment of what is and what is not good for them.

Investigating the effects of home environment on smoking behavior, Gilpin, White, Farakas, and Pierce (1999) examined whether or not living in a "smoke-free" home (being forced to smoke outside) helped smokers to quit. They found that when participants who smoke heavily live within a restricted environment, coupled with close family members expressing a desire that the individual not smoke, these individuals either directly attempted to quit or reported the intention to quit smoking (Gilpin, White, Farakas, & Pierce, 1999). Furthermore, living in a smoke-free home lengthened the time from quitting to relapse (Gilpin, White, Farakas, & Pierce, 1999). Therefore, environmental restrictions seem to give smokers the added



incentive needed to push them into a quitting mindset and, if they have not previously considered it, open them to the idea of quitting.

As a general rule, attitudes have traditionally been weighted more heavily in calculating behavioral intentions than has social influence (norms; Eagly & Chaiken, 1993), possibly because most of the research being conducted has focused on measuring individual behaviors in relatively private settings and outside of the focal realm of most social and subjective norms. Some behaviors however, such as smoking, may actually be more susceptible to social/normative influence and therefore more strongly determined by the subjective societal norms that regulate them.

#### *The Theory of Planned Behavior*

The theory of planned behavior (Ajzen, 2006) takes the theory of reasoned action one step further with the addition of a third component: perceived behavioral control. Perceived behavioral control can be defined as an individual's confidence in his or her ability to perform a certain behavior (i.e., self-efficacy; Ajzen, 2006). The theory of planned behavior specifies that one's intention precedes behavior and is based on both the attitude toward the behavior and any subjective norms present (as in the theory of reasoned action), as well as the individual's perceived level of behavioral control (Ajzen, 2006). It is thought that those individuals with higher levels of perceived control (a more internal focus) will more easily form intentions toward behaving in a particular way than those individuals who view themselves as having little to no control. Therefore, perceived behavioral control, when combined with the intention to behave in a certain way, can sufficiently and accurately predict behavior (Ajzen, 2006), especially health-related behaviors (Wallston & Wallston, 1978).

The evidence is clear that having an internal locus of control allows one to more easily and effectively engage in behaviors that are more decidedly health-conscious, such as the maintenance of smoking cessation treatments (Shiple, 1981). Several studies have found that health locus of control is associated with health-related behaviors and practices (Campbell,

Busby, Robertson, & Horwath, 1995; Perrig-Chiello, Perrig, & Staehelin, 1999; Lau, 1982; Wallhagen, Strawbridge, Kaplan, & Cohen, 1994). For instance, Johnson and Chamberlain (1978) found that subjects in their experimental group who tended toward a more internal locus of control also made significant decreases in number of cigarettes smoked. Rosenbaum and Argon (1979) replicated this effect and found that participants who had an internal locus of control were more successful at attempts to stop smoking. Rosenbaum and Argon (1979) further found that when subjects did successfully quit, they were more likely to use abrupt cessation methods than were those who were not successful, a notably more decisive (and difficult) alternative. Further support for the power of internal locus of control came from Kaplan and Cowles (1978) who, like Johnson and Chamberlain (1978) and Rosenbaum and Argon (1979), found that those individuals who possessed internally-directed locus of control beliefs and who placed a high value on health were the ones most successful in altering their smoking behaviors (i.e., cutting down and/or quitting). Along these lines, Norman, Bennett, Smith, and Murphy (1998) found that, of all of their subject groups, the "pure internals" (those who had very little to no external locus of control) engaged in the most health-focused behavior, but later admitted that this effect was weak and that other factors outside of health locus of control must be considered when predicting health behavior.

This insight into a person's model of intention and behavioral control is especially important when discussing and analyzing those behaviors and activities that might be considered harmful to the individual, such as smoking. When behavioral decision schemas are analyzed, it oftentimes becomes difficult to establish the reasoning behind self-destructive behaviors. Whatever it may be that pushes an individual to try smoking, one thing researchers are fairly certain of is that it is not due to a lack of knowledge of the negative health effects of smoking. Ignorance is *not* the problem. For instance, Evans (1978) collected data from a 10-week study of 750 entering seventh graders which shows that most were aware of the dangers of smoking and the detrimental effects it has on health. The data did, however, point to three

sources of *social* pressure that was pushing these kids to take up smoking in the beginning: peers, parental models, and the media (Evans, 1978).

Furthermore, there is no evidence that smoking behavior is related to a lack of intelligence. In fact, Taylor et al. (2005) found that childhood IQ was in no way related to adult smoking consumption. Additionally, Rutten et al. (2008) analyzed geographic and demographic data from the National Cancer Institute's Health Information National Trends Survey and concluded that knowledge of the dangers of smoking varies by such factors as gender, socioeconomic status, and even geographic location. They concluded that females, non-Hispanic whites, and those with higher incomes and educational levels were all more likely to reject smoking myths (evidencing a higher level of knowledge of smoking's effects).

It is therefore important for researchers to identify what factors are present and activated (or markedly lacking) when individuals choose to engage and persist in behaviors (such as smoking) that may be counterproductive to their continued good health. Although it is difficult to conceive that a genuine lack of knowledge of the health consequences of smoking is what is allowing this behavior to remain the *number one leading cause of preventable death* (ACS, 2009b), further research is warranted so that we may more fully understand what factors are at work that allow smoking behavior to continue within mainstream society.

### *Hypotheses*

#### *Hypothesis One*

The first hypothesis predicts that level of *intent to quit smoking* at baseline will predict degree of change in number of cigarettes smoked as reported four weeks later. This hypothesis stems from the idea that intentions can shape (predict) observable behavior. The theoretical rationale for this hypothesis is grounded in the theory of planned behavior (Ajzen, 2006), in that if an individual possesses the intent (desire) to quit smoking, then the resultant behavior should closely follow that intention (i.e., the individual should cease smoking behavior if he or she possesses the intention to do so).

### *Hypothesis Two*

The second hypothesis predicts that level of *intent to reduce consumption of cigarettes consumed* at baseline will predict degree of change in number of cigarettes smoked as reported four weeks later. As with the first hypothesis, the theoretical rationale for this hypothesis lies firmly within the theory of planned behavior (Ajzen, 2006). The same theoretical rationale applies here as in the first hypothesis, the major difference being that hypothesis two is predicting intent to reduce consumption of cigarettes smoked as opposed to intent to quit smoking altogether.

### *Hypothesis Three*

Hypothesis three predicts that higher levels of optimism, increased social pressure to quit, and an internal locus of control as measured at baseline will predict *intent to reduce* the number of cigarettes smoked in the previous 24 hours. Aspects of the theory of planned behavior support this hypothesis in that attitudes (i.e., optimism), societal norms (i.e., increased social pressures to quit), and perceived behavioral control (i.e., internal locus of control) should all predict intent to perform a behavior (reduce overall number of cigarettes smoked in previous 24 hours). It is thought that those individuals with a higher level of optimism will also have a stronger desire to remain healthy and will be more proactive in matters of health. Also, those individuals who have increased social pressure to quit (either from family or close others) will feel compelled to conform to the requests of those around them. Further, those individuals with an internal locus of control will be more self-efficacious and therefore better able to exert proactive control over their behavior. For this hypothesis, I examined not only the collective (interactive) effect of all three variables, but also each variable's individual contribution to the total variance and put all seven factors into the initial regression model.

### *Hypothesis Four*

Hypothesis four predicts that intent to quit and cut back should mediate the effect that higher levels of optimism, increased social pressure to quit, and an internal locus of control as

measured at baseline will predict actual reduction in the number of cigarettes smoked in the previous 24 hours as reported one month later. Hypothesis four is similar to hypothesis three with the exception that hypothesis four predicts an actual reduction in number of cigarettes smoked as opposed to intent to reduce consumption, as predicted by hypothesis three. As with the third hypothesis, I examined not only the interactive effect of all three variables together (optimism, increased social pressure to quit, and internal locus of control), but also each variable's individual contribution to the overall variance.

## CHAPTER 2

### METHOD

#### *Participants*

The participants for this study were members of both the University of Texas at Arlington community, including (but not limited to) university students, faculty, and staff, as well as the general population at large. Those participants who were psychology students at UTA (and who were recruited via the psychology participant pool) received course credit for their participation in the study. For those participants who were not psychology students completing the study for required course credit, no compensation, beyond the advancement of science, was offered for their participation in the study. The Institutional Review Board at the University of Texas at Arlington approved this study and all participants gave their informed consent to participate.

#### *Sample Size and Statistical Power Analysis*

The G\*Power statistical computer program (Faul, Erdfelder, Lang, & Buchner, 2007) was used to compute the required sample size for a desired power of 0.95, effect size of 0.15 (medium), and with a total of 9 predictors (Revised Life Orientation Test, intent to quit rating scale, intent to cut back rating scale, the COMMIT Evaluation Survey, the Multidimensional Health Locus of Control scale, and all of the two- and three-way interactions); the calculated required sample size was 166 total participants.

#### *Recruitment Methods*

Based on the power analysis conducted, 260 participants were recruited via the psychology participant pool as well as fliers passed out around campus and signs posted at common smoking locations around campus, such as outside buildings. Participants were also recruited through personal interaction (approaching smokers when encountered) as well as via

online resources, such as Facebook. Of the 260 participants who completed the baseline measure, 177 completed the follow-up survey. Therefore, 260 participants provided data for testing the effects for hypothesis three and 177 participants provided data for testing the effects for hypotheses one, two, and four.

Recruitment targeted smokers only, as the focus of this study was to measure the effect of intention to quit and/or cut back cigarette consumption on future smoking behavior. In order to ensure that nonsmokers did not inadvertently participate, the first question asked of respondents when they logged on to do the survey was “Do you currently smoke?” If a respondent answered no, the survey was terminated; the nonsmoking respondents were thanked for their participation and logged out of the system without further involvement.

#### *Participant Demographic Information*

A total of 260 participants (93 Males and 167 Females) voluntarily participated in this project. Participant ages ranged from 18 to 65, with a mean age of 24.93 (SD = 8.506). There were 27 African American participants, 138 White participants, 33 Hispanic participants, 47 Asian/Pacific Islander participants, one Native American/Alaskan participant, and 14 participants who reported their ethnicity as “Other.” The overwhelming majority of participants reported they were Single/Never Married (206), 26 reported they were Married, 26 participants were Divorced, one was Separated, and one reported herself as Widowed.

With regards to number of children participants reported having, 223 participants reported that they had no children (85.8%), whereas the remaining 37 participants reported having one or more children. For the level of education completed, 60 participants (23.1%) reported having graduated from High School or received their GED, 137 participants (52.7%) reported completing “Some College,” 29 (11.2%) earned an Associate’s Degree, 24 (9.2%) had received Bachelor’s Degrees, eight (3.1%) had Master’s Degrees, and two (0.8%) participants reported having earned their Doctorate or Professional Degree.

Of the 260 participants sampled, all but 47 (18.1%) reported living with someone else (70 [26.9%] lived with one or both parents, 48 [18.5%] lived with his or her spouse, 78 [30%] lived with a roommate, and 17 [6.5%] reported "Other" as a living arrangement). As for employment, 177 (68.1%) reported they were currently employed and 83 (31.9%) reported having no employment. 225 (86.5%) were students (though not necessarily at UTA), five (1.9%) were UTA staff members, two (0.8%) were UTA faculty members, and 28 (10.8%) reported that they were Members of the Community (a designation I used to refer to those for whom the above categories did not apply).

*Demographic differences between those participants who completed the follow up and those who did not complete the follow up assessment*

Of the 177 participants who completed the follow-up assessment, 61 were male and 116 were female, compared to 32 males and 51 females (83 total participants) who did not complete the follow-up. 101 white participants, 19 African American participants, 24 Hispanic, 24 Asian/Pacific Islander, 1 Native American/Alaskan, and 8 participants reporting their ethnicity as "Other" completed the follow-up, versus 37 white participants, 8 African American participants, 9 Hispanic, 23 Asian/Pacific Islander, and 6 participants reporting their ethnicity as "Other" who failed to complete the follow up assessment. Those who completed the follow up assessment were older on average ( $M = 26.37$  years,  $SD = 9.646$ ) than those who did not complete the follow up ( $M = 21.86$  years,  $SD = 3.879$ ). Further, those who completed the follow up were also slightly more highly educated ( $M = 4.27$ ,  $SD = 1.062$ ) than those who did not complete the follow up ( $M = 4.02$ ,  $SD = 0.975$ ).

*Materials*

The materials for this study consisted of six individual measures, each designed (or adapted) to measure various aspects of smoking behavior and the motives that accompany it, and all were administered online through the Survey Monkey website. Three of the six measures were used to tap each of the three components of the theory of planned behavior:



*behavioral control* (health locus of control), *attitude* (optimism), and *social norms* (perceived social pressure). Both *intent to quit* and *intent to reduce consumption of cigarettes* (cut back) were measured by direct question. Furthermore, in an effort to discern that it is not a lack of knowledge that is responsible for continued smoking behaviors, a smoking knowledge test was given whereby participants identified common diseases that are and are not caused by smoking. Each of the measures that were used in the current project is described in greater detail below.

### *Measures*

*The Multidimensional Health Locus of Control Scale (MHLOC; Wallston, Wallston, & DeVellis, 1978)*

The multidimensional health locus of control scale was proposed by Wallston et al. (1978) as a means of assessing both the *internal* (personal control) and *external* (chance and powerful others) sources of control for health-related behaviors. The single internal subscale measures the importance of perceived personal control over health (how influential the own individual's behaviors were in his or her health-related outcomes). The dual external subscales assess what influence chance (luck and/or fate) and powerful others (family members and/or medical professionals) have on health-related behaviors.

The MHLOC contains 18 items, with six items from each of three subscales (personal control, chance, and powerful others). Responses were made on a 6-point Likert-scale format with responses ranging from 0 (*strongly disagree*) to 5 (*strongly agree*), making the range of possible scores from a minimum score of 0 to a maximum score of 108. The score for each subscale was the summed total of the 6 questions comprising it (Cicirelli, 1987). The subscale with the highest total response score was the dominant source of control (either Internal, External [Chance], or External [Powerful Others]; Cicirelli, 1987). Internal consistencies (coefficient alphas) for each of the subscales in the present sample were 0.68 for the Chance subscale, 0.71 for the Internal subscale, and 0.73 for the Powerful Others subscale. The

Cronbach Alpha for all items comprising the MHLOC Scale in the current sample was 0.68. See Appendix A to view the Multidimensional Health Locus of Control Scale as it was presented to participants.

*The COMMIT Evaluation Survey (Royce, Corbett, Sorensen, & Ockene, 1997)*

The COMMIT evaluation survey was designed by Royce et al. (1997) as part of the National Cancer Institute's Community Intervention Trial for Smoking Cessation (COMMIT) to test whether community-based intervention programs could increase the success rate of smoking cessation attempts, with particular focus on those individuals identified as heavy smokers. The COMMIT evaluation survey is a measure of two forms of perceived social pressure restricting smoking: direct pressure from those individuals close to the smoker (children, other family members, friends, coworkers, etc.) and indirect pressure from unknown others at public places (public smoking behavior). These two forms of social pressure encompass the most commonly reported forms of social pressure placed on both men and women to quit smoking (Royce et al., 1997). Therefore, this scale taps those components most closely related to the social norms construct of the theory of planned behavior. Coefficient alpha measures of internal consistency for the COMMIT evaluation survey in the current sample was 0.614, suggesting strong internal consistency.

The COMMIT evaluation survey assesses direct pressure by asking whether, in the preceding 12 months, the individual has felt pressure from other people to quit smoking. If they have, they are asked whether the direct pressure has come from: 1) their children, 2) other family members, 3) friends, 4) physician or other health care worker, or 5) coworkers. Participants will note their responses by circling the appropriate source(s) of pressure, if any. Level of direct pressure was calculated by counting the total number of sources of direct pressure the individual reported experiencing. Greater numbers indicate a higher level of perceived direct pressure to quit. See Appendix A to view the COMMIT Evaluation Survey as it was presented to participants.

*The Revised Life Orientation Test (LOT-R; Scheier, Carver, & Bridges, 1994)*

Although dispositional optimism as measured with the Life Orientation Test has been associated with a variety of health outcomes (Steptoe, Wright, Kunz-Ebrecht, & Iliffe, 2006), the original version of the Life Orientation Test was met with a great deal of skepticism over its lack of discriminant validity with measures of trait anxiety and neuroticism (Smith, Pope, Rhodewalt, & Poulton, 1989). The original version of the LOT was comprised of eight self-report items plus four filler items (12 items total) that assessed generalized expectancies of a positive over a negative outcome. Respondents indicated their agreement with the items on a 5-point Likert scale with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The reported Cronbach's alpha for the original version of the LOT was 0.82 (Scheier, Carver, & Bridges, 1994).

In light of the wealth of criticisms over the original form of the scale, the authors decided to revise the Life Orientation Scale to remove two variables that, in retrospect, more closely tapped constructs that lay closer to trait anxiety than to optimism (or lack thereof; Scheier, Carver, & Bridges, 1994). Therefore, a ten-item revised form of the Life Orientation Test (six items measuring optimism/pessimism and four filler items) was created to address these concerns and is the measure of optimism that was used in the proposed project. As in the original form of the LOT, respondents indicated their agreement with each of the ten items on a five-point Likert scale format with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicated a more optimistic outlook. The reported Cronbach's alpha for the revised version of the LOT in the current sample was 0.76. See Appendix A to view the Revised Life Orientation Test as it will be presented to participants.

*Measures of Intent to Quit and Intent to Cut Back* (items adapted for the current study from Ajzen, 2006)

In order to assess a participant's intention to quit and/or cut back his or her cigarette consumption, a self-report measure of intention is oftentimes thought to best capture an

individual's desire to perform a certain behavior (Ajzen, 2006). In his article, Ajzen (2006) gave examples of model questionnaire formats to tap each level of the theory of planned behavior (including intention). Because intention to quit and/or cut back cigarette consumption was the dependent variable for this study, it was thought that a more parsimonious and direct approach to assessing that construct is best. Therefore, for this project, one question for each behavior (quitting and cutting back), as outlined in Ajzen (2006), was used for obtaining each participant's level of intent to quit and intent to cut back cigarette consumption. See Appendix A to view each question as they were presented to participants.

#### *The Smoking Attitudes Survey (Klesges et al., 1988)*

In order to determine that it was not a genuine lack of knowledge of the harmful effects of smoking that was failing to restrain individuals from smoking, a scale testing the participant's knowledge of the inherent risks associated with smoking was administered. This way, it was possible to rule out what effect, if any, ignorance of the dangers of smoking has on one's continued performance of the behavior. The Smoking Attitudes Survey was developed by Klesges et al. (1988) to carefully evaluate smoking-related knowledge and how that knowledge translates into smoking status (i.e., whether knowledge of smoking and its consequences has any bearing on an individual's decision whether or not to smoke). The smoking attitudes survey lists 15 medical conditions and participants are asked to list which ones are possible consequences of smoking (e.g., emphysema, lung cancer, stroke, etc.) and which ones are unrelated to smoking (e.g., kidney stones, skin cancer, baldness, etc.). See Appendix A to view the Smoking Attitudes Survey as it was presented to participants.

#### *Procedure*

##### *Baseline Assessment*

The surveys comprising this study were administered online using the Survey Monkey website (the baseline survey of this project is viewable at the following website: <https://www.surveymonkey.com/s/smokingsurvey>, whereas the follow-up can be viewed here:

<https://www.surveymonkey.com/s/smokingsurveyfollowup>). Once participants had been recruited from the UTA campus (as well as the other recruitment methods outlined previously) and screened for smoking status, the website presented them with the informed consent page. If a participant declined consent for whatever reason, they were thanked, informed that their participation has concluded, and logged out of the system.

If a participant consented to completing the study (by clicking on a box stating his or her acknowledgement and agreement to participate in the study), he or she then completed the five questionnaires (MHLoC, COMMIT Evaluation Survey, Revised Life Orientation Test, measures of intent to quit and intent to cut back smoking, and the Smoking Attitudes Survey), as well as the direct questions asking how many cigarettes they have smoked in the preceding 24 hours and if this number is typical of them and if not, how many is typical. Participants also answered questions regarding their family history of smoking behavior such as whether or not their parents smoked, if their parents tried to quit, etc. These measures effectively comprised each participant's baseline attitudes, intent, and behaviors. Participants also provided basic demographic information such as their age, gender, race, marital status, and whether or not they are a student, faculty, or staff member.

#### *Follow-up Assessment*

Upon completion of the baseline measures, the participants were notified that this study is comprised of two parts: an initial baseline reading of smoking attitudes and behaviors and then a reassessment of smoking behavior frequency to be administered exactly four weeks later. The purpose of the follow up was to reassess smoking behavior (number of cigarettes smoked within the previous twenty-four hours and whether or not this number is still typical of them) in order to determine whether or not a positive intention to quit or cut back smoking at baseline has had any effect on the actual behavior of the participant as measured four weeks later (see Hypotheses 1 and 2).

### *Participant Identification*

Upon registering for the surveys, participants were required to provide their name and email address. The purpose of collecting this information was to allow the researchers to send out email reminders to the participants exactly three weeks from the date of completion of the baseline measures. This email notification gave the participants a one-week reminder that they must complete the second phase of the study in one week's time. It was originally intended that each participant would be given a unique subject number identifier by the Survey Monkey website and that this number would be used to correctly match up each participant's follow-up data to his or her baseline data. However, in practice, this method became increasingly cumbersome and impossible to handle effectively (participants regularly failed to include their participant number or used an incorrect one). Therefore, to maintain the highest degree of accuracy, the participant's name (and sometimes email address) was used to correctly identify cases for rejoining. However, once the baseline and follow-up data were correctly rejoined, all names and other identifying information (email address, physical address, etc.) were removed prior to analysis and the strictest confidentiality was maintained at all times.

## CHAPTER 3

### RESULTS

This section of the manuscript is divided into three sections. The first section, *Descriptive Statistics for Measures*, describes the results of the descriptive tests on each of the measures used in the study. The second part, titled *Tests of the Research Hypotheses*, describes the analysis rationale for each of the hypothesis tests and then states the results of those hypothesis tests. The third part describes the results of any post-hoc analyses that were conducted and is titled *Post-Hoc Analyses*.

*Descriptive Statistics for Measures (See Table 3.2)*

Each of the continuous measures used in this study (MHLoC, Optimism Scale [LOT-R], and the Intent to Quit and Intent to Cut Back rating scale) were analyzed independently, with the results of descriptive statistics reported here (Table 3.1 shows the correlations of these variables with intent to quit and intent to cut back).

Table 3.1 Correlation Matrix

	MHLOC-I	COMMIT	LOT-R	QUIT	CUT BACK
MHLOC-I	1	-0.005	0.155	0.072	0.186**
COMMIT	-0.005	1	0.075	-0.078	-0.035
LOT-R	0.155*	0.075	1	0.041	0.048
QUIT	0.072	-0.078	0.041	1	0.705**
CUT BACK	0.186	-0.035	0.048	0.705**	1

For the MHLoC, the mean score was 61.66 ( $SD = 9.222$ ), with a minimum score of 31 and a maximum score of 108, making the range of scores in the current sample 77. Reporting more detailed descriptive analyses for the MHLoC, each of the three subscales was analyzed individually. The mean score for the Chance subscale of the MHLoC was 16.82 ( $SD = 5.154$ , range = 30), for the Internal subscale, the mean score was 27.55 ( $SD = 4.44$ , range = 25), and for the Powerful Others subscale, the mean score was 17.51 ( $SD = 5.47$ , range = 30). Additional descriptive analyses of the MHLoC measure illustrate that 230 (88.5%) participants scored higher on the internal subscale of the MHLoC, indicating an internal locus of control for the majority of participants. The remaining 14 participants (5.4%) scored higher on either the Chance or the Powerful Others subscales and, therefore, had a more external focus.

Table 3.2 Descriptive Statistics for Measures

	Minimum	Maximum	Mean	SE	SD
MHLOC-I	11	36	27.55	0.278	4.441
COMMIT	0	7	1.97	0.106	1.715
LOT-R	20	50	35.31	0.355	5.629
QUIT	1	7	4.62	0.130	2.059
CUT BACK	1	7	5.36	0.125	1.946

In order to insure that those participants who completed the follow up measure did not differ with respect to their scores on the Internal Measure of the MHLoC, a one-way Analysis of Variance was run to test this difference. Results of this analysis confirmed that there was no significant differences between those participants who completed the follow up measure and those who did not,  $F(1, 253) = 1.847$ ,  $p = n.s.$



Regarding level of perceived pressure from others to quit smoking, 196 participants (75.4%) reported that they felt some form of pressure to quit smoking, leaving the remaining 63 participants (24.2%) reporting that they felt no pressure to quit. Tallying the various sources of social pressure participants reported experiencing, the mean number of sources of perceived social pressure to quit smoking was 1.97 ( $SD = 1.715$ ).

For the LOT-R (measure of dispositional optimism), the range of scores in the current sample was 30 (min. 20, max. 50), with a mean score of 35.31 ( $SD = 5.629$ ). Testing whether those who completed the follow-up survey differed from those who did not with respect to their optimism score on the LOT-R (as for the MHLoC described above), a one-way Analysis of Variance was conducted; no difference between the groups was found,  $F(1, 250) = 2.012$ ,  $p = n.s.$

For both the Intent to Quit and Intent to Cut Back measures, the range of scores in the current sample was six (recall that both scales were comprised of a seven-point Likert Scale, with a minimum score of one and a maximum score of seven). The mean score for the Intent to Quit measure was 4.62 ( $SD = 2.06$ ), whereas for the Intent to Cut Back measure, the mean score was 5.36 ( $SD = 1.95$ ). As with the previous two measures, a one-way ANOVA was run to test for a difference between those who completed the follow-up measure and those who did not with respect to their scores on both intent scales. The results of this test showed that there was no significant difference between those two groups on either Intent to Quit,  $F(1, 250) = 0.822$ ,  $p = n.s.$ , nor on Intent to Cut Back,  $F(1, 242) = 0.022$ ,  $p = n.s.$

#### *Tests of the Research Hypotheses*

##### *Data Analysis Strategies for Hypothesis Testing*

Hypothesis one predicted that level of *intent to quit smoking* at baseline would predict degree of change in the number of cigarettes that are smoked as reported four weeks later. To test this hypothesis, a general linear model using intent to quit smoking as a predictor variable and using both age and baseline number of cigarettes smoked as covariates was conducted.

This model effectively tested the participant's level of intent to quit, as assessed by the Intent to Quit measure (see Appendix), while controlling for the influence of the participant's age as well as the baseline number of cigarettes smoked. The reasoning behind controlling for the effects of a participant's age is two-fold. Just as the motivating pressures that may push one into taking up (and maintaining) smoking behavior while a person is young may be largely due to the effects of peer pressure (i.e., "it's cool to smoke"), the motivating pressures that may help one to want to quit (or cut back) may only come through the experiences obtained through age. For example, although one may try smoking initially as a young person, as one becomes older, he or she may experience health problems that might push the individual to want to quit (or at least cut back) on smoking. Therefore, age may have a bi-directional effect on the degree of change outcome variable and should, therefore, be controlled for. The degree of change in number of items smoked was calculated as the difference in number of cigarettes smoked from initial measurement to reassessment. For example, if a participant reported smoking 10 fewer cigarettes in the preceding twenty-four hours when completing the follow-up assessment than they reported at baseline, then that participant's degree of change score would be -10.

The second hypothesis predicted that level of *intent to reduce consumption of cigarettes consumed* at baseline would predict degree of change in number of cigarettes smoked as reported four weeks later. As with the first hypothesis, this hypothesis was tested using a general linear model analysis, the difference being that for hypothesis two, the predictor variables included *intent to reduce consumption* as assessed by the Intent to Reduce Consumption measure (see Appendix), along with age and baseline number of cigarettes smoked included in the model as covariates. As with the model used to test the first hypothesis, this model effectively tested the participant's level of intent to cut back, while controlling for the influence of the participant's age as well as the baseline number of cigarettes smoked.

Hypothesis three predicted that higher levels of optimism, increased social pressure to quit, and an internal locus of control as measured at baseline would predict *intent to reduce* the

number of cigarettes smoked in the previous twenty-four hours as reported four weeks later. To test this hypothesis, regression analyses were conducted using optimism (as measured by the Life Orientation Test), social pressure to quit (as measured by the COMMIT Evaluation Survey), and locus of control (as measured by the Multidimensional Health Locus of Control Scale) as predictors for intent to reduce number of items (cigarettes) smoked. For the sake of parsimony, age was not included as a covariate in this analysis; the results were significant even without controlling for the influence of age on the outcome measure. For this hypothesis, I examined not only the collective (interactive) effect of all three variables, but also each variable's individual contribution to the total variance.

Hypothesis four predicted that intent to quit and cut back should mediate the effect that higher levels of optimism, increased social pressure to quit, and an internal locus of control as measured at baseline would predict actual reduction in the number of cigarettes smoked in the previous 24 hours as reported one month later. Regression analyses were performed using an SPSS macro developed by Preacher and Hayes (2008) to examine the mediated effect of intent to quit and cut back on variables of optimism, social pressure to quit, and LOC as predictors for actual reduction in smoking. As with the third hypothesis, controlling for the effects of age did not affect the significance of the results and was, consequently, removed from the analysis for the sake of parsimony.

#### *Hypothesis Test Results*

*Does having the intent to quit smoking at baseline predict actual reduction in cigarette smoking one month later?* In line with expectation, tests of the first hypothesis revealed that, when controlling for the effects of both age and baseline number of cigarettes smoked, possessing the intent to quit smoking at baseline significantly predicted actual reduction in number of cigarettes smoked one month later,  $F(8, 157) = 7.344, p < 0.001, \eta^2 = 0.272$ . The factors present in the omnibus model included the predictor variable of centered intent to quit, as well as age and the original number of cigarettes smoked at baseline entered into the model

as covariates. Individually, both age,  $F(1, 157) = 4.459$ ,  $p < 0.05$ ,  $\eta^2 = 0.028$ , and the baseline number of cigarettes smoked,  $F(1, 157) = 47.367$ ,  $p < 0.001$ ,  $\eta^2 = 0.232$ , significantly predicted degree of change. Therefore, hypothesis one was supported.

*Does having the intent to cut back on the number of cigarettes smoked at baseline predict actual reduction in cigarette smoking one month later?* In line with expectation, tests of the second hypothesis revealed that, as with the first hypothesis, when controlling for the influence of both age and baseline number of cigarettes smoked, possessing the intent to cut back on the number of cigarettes consumed significantly predicted actual reduction in number of cigarettes smoked one month later,  $F(8, 152) = 7.937$ ,  $p < 0.001$ ,  $\eta^2 = 0.295$ . The factors present in the model included the predictor variable of centered intent to cut back, as well as age and the original number of cigarettes smoked at baseline entered into the model as covariates. Individually, both age,  $F(1, 152) = 4.517$ ,  $p < 0.05$ ,  $\eta^2 = 0.029$ , and the baseline number of cigarettes smoked,  $F(1, 152) = 52.335$ ,  $p < 0.001$ ,  $\eta^2 = 0.256$ , significantly predicted degree of change. Therefore, hypothesis two, like hypothesis one, was supported.

*Does possessing a higher degree of optimism, increased social pressure to quit, and an internal locus of control predict intent to cut back on the number of cigarettes smoked?* With all two- and three-way interactions present in the model, the effects of optimism, social pressure, and locus of control on intent to cut back was marginally significant at  $F(7, 216) = 1.826$ ,  $p < 0.10$ . However, examining the individual t-tests for each predictor coefficient, none of the individual predictors alone were significant predictors in their own right. The variable with the largest absolute value beta weight (signifying the greatest relevant “importance” of that predictor in the model) was the two-way interaction of optimism and direct social pressure to quit, although, as described above, that variable when presented alone was not a significant predictor of intent to reduce consumption. Although the omnibus model turned out to be marginally significant, its ability to explain the variance present in intent to cut back was

minimal, as the adjusted  $R^2$  of the omnibus model was only 0.025, explaining a very small portion of the variance.

However, if the above model was applied without the interaction terms present, the newly-constructed, interaction-free model significantly predicted intent to reduce consumption,  $F(3, 220) = 3.748, p < 0.02$ . Of these three individual main effect predictors, only locus of control significantly predicted intent to cut back  $t(223) = -3.306, p < 0.001$ . Neither perceived social pressure,  $t(223) = -0.773$ , nor optimism,  $t(223) = 0.02$  failed to individually reach significance. Locus of control also had the largest relative value beta weight (-0.222), almost four-times larger than the next highest individual predictor in the model (perceived social pressure; -0.051). Not only was this interaction-free model statistically significant, but the adjusted  $R^2$  was modestly improved at 0.036, indicating that removing the interaction terms produced not only a more parsimonious model, but a slightly better fitting one, as well. Although the third hypothesis was technically supported, the minimal  $R^2$  does not allow for a robust explanation of the variance present in the outcome variable.

*Does intent to quit and cut back mediate the effect of optimism, social pressure to quit, and locus of control predicting actual reduction in the number of cigarettes smoked?* To begin testing this hypothesis, a series of correlation analyses were run testing the relationship between each of the individual variables. Locus of control was correlated with perceived social pressure ( $r = -0.133, p < 0.05$ ), with optimism ( $r = -0.141, p < .05$ ), with intent to quit ( $r = -0.154, p < 0.05$ ), and with intent to cut back ( $r = -0.215, p < 0.05$ ). Locus of control, therefore, emerged as the only main effect predictor that was correlated with any of the other variables in the model. However, intent to quit and intent to cut back were highly correlated with each other ( $r = 0.705, p < 0.001$ ). Further, when controlling for the number of cigarettes smoked at baseline, none of the three main effect predictors (optimism, perceived social pressure, and locus of control) were correlated with the outcome measure, degree of change in number of cigarettes smoked. Intent to quit and cut back failed to correlate with degree of change in

number smoked when controlling for the number smoked at baseline. However, age emerged as a significant correlate of both intent to quit ( $r = -0.23, p < 0.001$ ) and intent to cut back ( $r = -0.202, p < 0.005$ ).

The mediation model used to test the effects for Hypothesis four included the following three predictors: optimism, perceived social pressure to quit, and locus of control; the two mediators included in the model were intent to quit and intent to reduce consumption; the outcome variable in the model was the degree of change in the number of cigarettes consumed from baseline to follow up, while controlling for the original number of cigarettes smoked. Using a macro developed by Preacher and Hayes (2008) for testing mediation models in SPSS, the mediation model in this hypothesis failed to attain significance with the present data. As before, locus of control emerged as the only significant individual predictor of intent to cut back smoking,  $t(156) = -2.1354, p < 0.05$ , but failed to predict intent to quit smoking,  $t(156) = -0.7627, p = \text{n.s.}$  Further, intent to quit significantly predicted the degree of change in the number of cigarettes consumed,  $t(156) = -2.2362, p < 0.05$ ; intent to cut back did not,  $t(156) = 1.1234, p = \text{n.s.}$  The number of cigarettes smoked at baseline (used as a covariate in this model to negate the influence of the original number of cigarettes smoked on the degree of change score) was not only significantly correlated with the degree of change score ( $r = -0.504, p < 0.001$ ), but also significantly predicted the degree of change score,  $t(156) = -8.169, p < 0.001$ . This shows that the more cigarettes one smokes at baseline, the less change in the number of cigarettes reported being smoked at follow-up. Had intent to cut back (instead of intent to quit) predicted degree of change, this mediation model would have held some significance by showing that intent to cut back in fact mediated the effect of locus on control on the degree of change in number of cigarettes smoked. However, because intent to cut back failed to significantly predict degree of change and neither optimism, nor perceived social pressure to quit predicted intent to quit or cut back, the overall model failed to reach significance (See Figure 3.1). Hypothesis 4, consequently, was not supported.

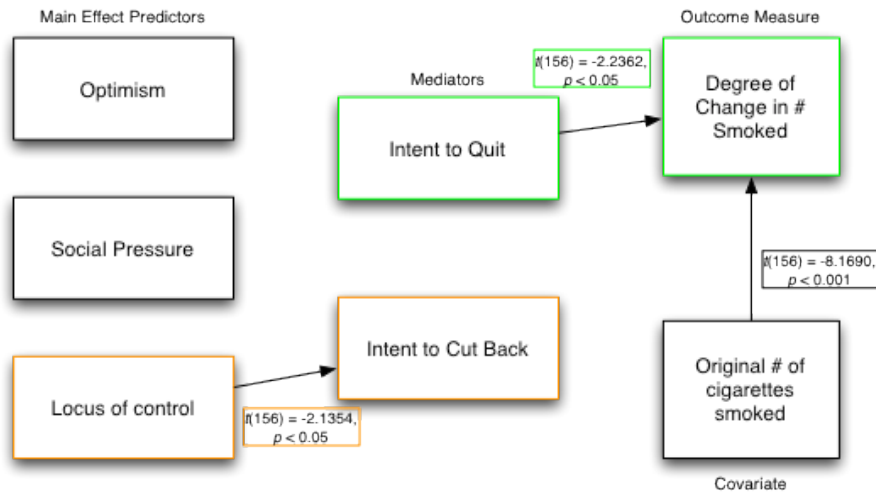


Figure 3.1 Mediation Model Used for Testing Hypothesis Four

### *Post-Hoc Analyses*

#### *Percent Change Scores*

The first two hypotheses of this study involve the role of intent in predicting behavior change, namely reduction or elimination of smoking behaviors. The first hypothesis involved intent to quit smoking, whereas the second involved intent to cut back smoking. However, the dependent variable in both of these hypotheses was the number of cigarettes smoked or, more specifically, the degree of change in the number of cigarettes smoked from time one (the baseline assessment) to time two (the follow-up).

Measuring change scores via direct number (i.e., how many raw units of change have occurred) is, by its very nature, somewhat lacking in its interpretability. This is due to the fact that the initial baseline number measure greatly influences the interpretability and subsequent meaningfulness of the overall degree of change. A change score, independent of the context in which it occurs, is meaningless. For a change score to be meaningful, it must be given a sense of context; a comparative measure that will give it some scale. For example, a consumption decrease of only three cigarettes in a twenty-four hour period is far less meaningful for the

individual who typically smokes fifty cigarettes in a day than for the person who only smokes five. In other words, knowing and understanding the *context* of the change (e.g., the relative percentage) is a fundamental, and altogether necessary, component to interpreting it.

Therefore, for this first set of post-hoc analyses, instead of simply using the numerical degree of change score in number of cigarettes consumed, I decided to examine the relative percentage of change in number of cigarettes smoked from baseline to follow-up. This method effectively standardized all of the change scores across subjects and subsequently enhanced the interpretability of the findings. However, although intent to quit and cut back significantly predicted the numerical degree of change scores (while subsequently controlling for baseline numbers), the results failed to reach significance when examining percentage of change scores. This may be due to the influence of the baseline number of cigarettes smoked and is something that needs to be controlled for when examining intent.

The centered intent to quit score failed to significantly predict the percentage change in number of cigarettes smoked from baseline to follow-up,  $F(1, 141) = 0.389, p = \text{n.s.}$  When controlling for the effects of age with intent to quit on the percentage of change scores, the results were not significant,  $F(7, 131) = 0.883, p = \text{n.s.}$  Additionally, the centered intent to cut back variable failed to significantly predict the percentage change in the number of cigarettes smoked from baseline to follow-up,  $F(1, 136) = 0.615, p = \text{n.s.}$  When controlling for the effects of age with intent to cut back, the results were no different,  $F(7, 126) = 0.384, p = \text{n.s.}$  Therefore, the current data do not support the idea that intent to quit and/or intent to cut back holds any predictive utility for actual behavior change for smoking over a one month period, even when controlling for the number of cigarettes smoked at baseline.

*Optimism, social pressure, and LOC predicting intent to quit*

This analysis is a reframing of the third hypothesis (which used these same variables to predict intent to cut back). It was originally thought that there would be more individuals who would endorse a desire to cut back than would endorse wanting to quit altogether, since



endorsing an intent to cut back is assumed when one endorses an intent to quit. Therefore, predicting intent to cut back (as opposed to intent to quit) seemed to be a more statistically sound approach, as there should be more participants endorsing intent to cut back, consequently giving more statistical power to a test of the third hypothesis model than to this one.

However, because the third hypothesis predicting intent to cut back was supported, perhaps these same variables would predict intent to quit, as well. As it turns out, with the two- and three-way interactions present in the model, this model failed to predict intent to quit,  $F(7, 225) = 1.222$ ,  $p = \text{n.s.}$ , just as it did with intent to cut back. However, mirroring the trend found in the results of the third hypothesis, removing the interaction terms allowed the model to reach marginal significance,  $F(3, 229) = 2.308$ ,  $p < 0.10$ . Although the adjusted  $R^2$  for this marginal effect was very small (0.017), this model does appear to have at least some predictive utility. Therefore, as with intent to cut back in the third hypothesis, the main effect predictors of optimism, perceived social pressure to quit, and locus of control can also predict intent to quit smoking altogether, but explaining very little of the variance present in that term.

### *Satisfaction*

There has been some recent evidence that an individual's level of satisfaction with his or her decision to quit smoking may have a profound impact on his or her ability to maintain cessation over time (Baldwin et al., 2006; Baldwin et al., 2009). Baldwin et al.'s findings show that, not surprisingly, the more satisfied an individual is with his or her progress in maintaining cessation, the more likely he or she is to stick with quitting (or cutting back). Based on the findings of Baldwin and his colleagues, it seemed interesting to test to see whether or not satisfaction with smoking (i.e., "I enjoy smoking") had any effect on a person's desire to quit or to cut back.

In line with previous findings, the data in the current study supported the contention that a person's enjoyment (satisfaction) with a particular behavior (i.e, smoking) predicted his or her

intention to quit,  $F(1, 250) = 32.698, p < 0.001$ , as well as his or her intention to cut back on the number of cigarettes smoked,  $F(1, 242) = 21.051, p < 0.001$ . However, the individual adjusted  $R^2$  values were relatively small (0.112 and 0.076, respectively). A paired samples t-test statistic showed that there was a statistically significant decrease in smoking satisfaction from baseline ( $M = 5.14, SD = 1.617$ ) to follow up ( $M = 4.68, SD = 1.667$ ),  $t(175) = 3.944, p < 0.001$ .

## CHAPTER 4

### DISCUSSION

#### *Discussion of the Individual Research Hypotheses*

The results for the first two hypotheses showed that, in the current sample, both intent to quit (in Hypothesis one) and intent to cut back smoking (in Hypothesis two) predicted the degree of change in the number of cigarettes smoked, but only when controlling for the influence of both age and the number of cigarettes consumed previously. The effect of an individual's age on his or her behavior can be profound. Because age plays such a big role in not only one's level of maturity, but also in the schemas one uses to make decisions. According to the Precaution Adoption Process Model (PAPM; Weinstein & Sandman, 1992), as one begins the processes of change, the influences of age are more readily pronounced in the earlier stages of change, where one is usually either unaware of the issue or is unengaged by the issue. This ties directly into the optimism bias, whereby an individual (usually young people) is aware of the inherent dangers of a particular activity, but does not believe that the harmful effects of that activity will happen to him or her. This fuels denial as a coping strategy and buffers the realization of the harm in what he or she is doing to themselves. As one progresses through the stages of change, he or she more readily takes responsibility for behavior and attempts corrective action.

Furthermore, the mere *perception* of risk can affect one's behavior. Instead of an "optimism bias," many younger people are aware (and understand) the risks inherent in smoking, but feel as if they have plenty of time to change and, therefore, plenty of time to quit. There is little to no rush to engage in any behavior change simply because they feel as though there is no hurry; the problems associated with smoking (lung cancer, emphysema, etc.) all happen to "older" people and there is little to no risk for them...until later. They are essentially

overly optimistic about their ability to quit (only when they have to) and further utilize this as a denial coping strategy to shield themselves from the stark realization that they are slowly killing themselves.

This reasoned action and ability to disengage from the harmful consequences of our actions leads directly to intent. The findings of this study lend support to the idea that merely possessing the intent to perform a certain behavior can dramatically influence the likelihood of performing behavior that follows it. This is not a surprising finding. We as human beings possess the evolutionarily inherited ability to control our own behavior. This is a fundamental difference between human beings and lower animals that merely rely on instinct and learning in order to perform a certain behavior. We, as human beings, can summarily make a decision to behave in a certain way and then enact that decision through our behavior.

But this begs the question: if human beings possess the ability to control their behavior simply by possessing the intent to perform that behavior, why do we continue to engage in behaviors that are harmful to us? Why maintain a course of action that we know will not improve our health, such as smoking? Because smoking is the leading cause of preventable death, it stands to reason that any person without masochistic tendencies who is able to control his or her behavior would cease to perform any behaviors that they know are unhealthy. But this is clearly not the case. It is evident that the reasoning behind one's continued compulsion to smoke is unique to the individual and perhaps altogether outside of the realm of intent alone; clearly, something more is working behind the scenes. What, exactly, is happening will continue to be discussed and analyzed by philosophers and psychologists for much time to come. Until the answer is discovered, this puzzling facet of human behavior will continue to be a mystery.

Results from the third hypothesis supported the notion that elements of the theory of planned behavior (higher levels of optimism, increased perceived social pressure to quit, and having an internal locus of control) can be used to predict smoking behavior. As one becomes

more internal in his or her locus of control, feels more pressure to quit smoking, and is more optimistic, the more readily he or she endorses a desire to reduce his or her cigarette smoking. However, although this model failed to capture much of the variance in intent, it does provide some evidence that the individual factors of the theory of planned behavior are predictive and require further exploration through future research. Perhaps another study can shed additional light on any of other factors that may be responsible.

Further evidence for the predictive power of locus of control on intent to cut back was found in the results for the fourth hypothesis. The results of the fourth hypothesis showed that locus of control significantly predicted intent to cut back, but not intent to quit, replicating (and lending strength to) the effect found in hypothesis three. Those individuals with a more internal focus expressed a stronger desire to cut back on the number of cigarettes they consumed. This effect is in line with current theory, given the literature on locus of control in health-related behaviors, particularly smoking (Johnson & Chamberlain, 1978; Kaplan, & Cowles, 1978; Rosenbaum & Argon, 1979).

One possible explanation for the small amount of variance explained by the variables chosen in the current study (optimism, locus of control, and perceived social pressure to quit) might be the *optimism bias*, briefly described above, whereby one believes that negative events (such as the health dangers associated with smoking) are more likely to happen to one's peers than to oneself (Caponecchia, 2010). Because the effect of optimism on health-related behaviors in the literature is strong (and directly-related), this phenomenon may explain why, although an individual may have scored high on a certain measure of optimism, the actual manifestation of that trait in the participant's behavior may not be as robust as initially believed.

Furthermore, the tendency for young people (who comprise the vast majority of subjects in psychological research) to minimize the inherent and long-term dangers of a particularly risky behavior in favor of the short-term gains in social status and pleasure are also well known (Brook et al., 2010; Huang, Jacobs, & Derevensky, 2010; Sullivan, Childs, &

O'Connell, 2010). McNamara and Willoughby (2010) even went so far as to state that risk-taking behavior could be regarded as *normative* behavior for adolescents. Because many of the subjects in the current study were college-age youth, perhaps this optimism bias was responsible for part of the lowered effect observed when attempting to predict intent (to either quit or reduce consumption) using a measure of dispositional optimism.

#### *Discussion of Post-hoc Effects*

##### *Percent Change Scores*

The results of the analyses using intent to quit and cut back as predictor variables for percent change scores (as opposed to direct number change scores) illustrate the magnitude of the effect that baseline consumption holds over the degree of change. Because the percentage scores were only examined as a means of constructing a more parsimonious model (thereby removing the need to control for one extra variable), the results of the first set of post-hoc analyses illustrate that attempting to circumvent the influence of the original number of cigarettes smoked (and its influence on later behavior) is not the same as computing percentage of change and attempting a similar analysis. The baseline number of a change score is, therefore, an unavoidable addition to the analyses that follow. Therefore, it can be concluded that controlling for the original number of cigarettes consumed is a necessary step to understanding future cigarette smoking behavior.

##### *Optimism, Social Pressure, and LOC predicting intent to quit*

The results of this analysis (along with those of hypothesis three) lend further support to the predictive power of the theory of planned behavior. These three variables stood as stable and, although weak, consistent predictors of both intent to cut back and intent to quit. Even the directionality of the effects mirrors theory: as one becomes more optimistic, experiences a greater level of perceived social pressure to quit, and becomes more internal in his or her locus of control, the more he or she express the desire to quit or cut back on the amount of cigarettes he or she consumes. This, along with the results from the third hypothesis, further illustrates

the power that one's intention has on a person's behavior, even one as addictive and overriding as smoking.

### *Satisfaction*

The amount of satisfaction one has with a current behavior no doubt influences the likelihood that he or she will continue to engage in that behavior. Smoking is certainly no exception. Because enjoyment significantly predicted both intent to quit and cut back, this lends even further support to the power of one's intentions in maintaining a certain behavior. If one enjoys a certain behavior, he or she should intend to continue in a course of action that will allow him or her the ability to maintain a course of action to perform the behavior and should, consequently, express little desire for change. Furthermore, this lack of desire to change does, for all intents and purposes, outweigh even one's own knowledge of the adverse health consequences of the behavior. It seems that, although the individual knows the profound health consequences associated with smoking, he or she still derives great pleasure from the activity and, subsequently, expresses little to no desire for change. Of course, the flip side to the argument is that, if one experiences little to no enjoyment from the activity, then he or she has little reason to continue in it, especially given the harmful nature of an activity such as smoking. This may be key. Perhaps a future study could examine this concept in depth, but it appears that (not surprisingly) diminishing or reducing the enjoyment one receives from smoking could have a profound impact on his or her desire to maintain it.

### *The Interaction and Influence of Optimism, Locus of Control, and Perceived Social Pressure*

Although the variables of optimism, locus of control, and perceived social pressure worked together in the current study to predict one's desire to cut back on smoking, how might these three variables interact to affect other behaviors? Do these constructs work together; facilitating each other's influence on other health-related behaviors or do they inhibit one another? Kostka and Jachimowicz (2010) found a direct relationship between optimism, internal locus of control, and increased self-efficacy (behavioral control) with quality of life

outcome measures in elderly subjects. Gana et al. (2010) found that optimism and locus of control were both covariates holding significant impact on participants' judgments of riskiness and risky behaviors. Pinquart and Frolich (2009) found that increased social support, optimism about the future, and self-esteem predicted improvement in subjective well being over time among cancer patients. Examining the effects of optimism/pessimism and locus of control on quality of life in patients with Parkinson's disease, Gruber-Baldini, Ye, Anderson, and Shulman (2009) found that lower levels of optimism (higher pessimism) is associated with reduced quality of life and those with less internal locus of control showed signs of increased disability. Needless to say, these variables all work together to promote positive health-related outcomes for individuals needing a wide range of physical and/or psychological adjustment.

#### *Limitations of the Theory of Planned Behavior*

The theory of planned behavior is very general in its form. The only guidelines and suggestions for its use (and the variables comprising it) is the model itself. Each of the factors comprising the model (attitudes, norms, and perceived behavioral control) are each open to interpretation as to which variables best illustrate and exemplify those parts of the model. Perhaps optimism is not the best marker of a person's attitude toward a specific variable. Perhaps a better attitude variable to predict smoking is something more akin to hopelessness, or resourcefulness, or industriousness, or neuroticism. Interpretation of which variables to include in a particular model is only limited by the imagination of the individual researcher.

The other variables comprising the model (subjective norms and level of perceived behavioral control) are somewhat dependent on the other variables present in the model, as well as the outcome variables for which the theory is being utilized. As long as the variables theoretically apply to the behavior under investigation, any application of the chosen variables could be made applicable because the theory, by its very nature, is somewhat vague. Therefore, many of the constructs of certain behaviors that bear little resemblance to the



fundamental constructs of the theory of planned behavior can essentially be re-worked to conform to the theory, simply due to the lack of specificity present in the model to begin with.

Furthermore, because the model attempts to generalize to all behaviors, the possible interpretations and manifestations of this model are truly infinite. While this increases the applicability and utility/usefulness of the theory, it also consequently diminishes its specificity and resulting practicality. Therefore, if the theory of planned behavior is to be used, it must be used somewhat literally, as has been done in the current study. However, the relative ambiguity of attitude variables can only lend itself to interpretation. As a result, the attitude construct of optimism seemed like a reasonable match to smoking behavior and that is the attitude construct that was used. However, results from the current study indicate that perhaps another variable might better tap the attitude construct and lend more weight to a predictive model of smoking behavior. Future research can help determine if this is the case.

#### *Limitations of the Current Study*

Because the majority of the participants reported that they were college students (86.5% of the sample), this homogeneous sample may not generalize to the population at large as well as a more heterogeneous one might. Therefore, ideally, researchers should sample from a representative population if they wish to generalize their results to the entire population. To more fully understand (and represent) the general population as a whole, many of whom have never even stepped foot on a college campus, a more heterogeneous sample is needed, especially when examining such a wide-spread behavior as smoking cigarettes. Future research should take this into consideration and strive to obtain a more representative sample of the population.

If a study relies solely on self-report data (as this one did), there is an inherent bias associated with relying on self-report data for both the predictor and the outcome measure. There has been some recent evidence suggesting that much of the variance in the outcome variable can be attributable to the measurement type (such as self-report data) as opposed to

the actual construct being measured. Along these same lines, when relying solely on self-report data for information, there is always the possibility of social desirability creeping into the data with no way to counteract it. A future study should attempt to minimize this influence.

Another possible limitation of the current study is that there was no direct intervention offered during the intermission between the baseline and follow-up assessments. Several studies have found that having some form of direct intervention may help individuals quit or refrain from smoking altogether (Ausems, Mesters, van Breukelen, and De Vries, 2009; Freund et al., 2009; Groeneveld et al., 2009). Perhaps if some form of intervention had been offered during the current study, the strength of some of the effects observed may have increased as a result.

#### *Possible Hindrances to Quitting*

Because knowledge of the harmful effects of smoking was not a factor in what caused the participants of the current study to continue to smoke (in the current sample, only 4 of a total of 260 participants answered more questions incorrectly on the Smoking Knowledge Survey than correctly), it is evident that something else is controlling people's compulsion to smoke. It has recently been shown that cigarette withdrawal can lead to depressed mood states (Zaniewska, McCreary, Wydra, & Filip, 2010), among other things. Perhaps many individuals try to quit (or cut back) and, as a result of the depressed mood that oftentimes accompanies cessation, return to cigarettes as a means to feel better. Assessment of mood as a secondary predictor (or covariate) in future models might shed light on this possibility.

Another study found that smoking and craving tobacco products are strongly associated with using and abusing both heroin and cocaine and that both tobacco and cocaine are equally addictive and "feed" off of each other, initiating cravings for one when using the other (Epstein et al., 2010). Difranza (2010) compared the powerful cravings experienced by cigarette smokers to those of other illicit drugs, in that the urge to partake manifest after a period of abstinence from the product and will continue to increase in intensity until abated. The longer

the smoker goes without a cigarette, the more powerful the cravings to smoke become, so much so that tobacco addiction may indeed warrant clinical diagnosis right alongside other forms of drug addiction. The results described above may help illustrate why many individuals might describe their efforts at quitting smoking as truly hopeless and that they are unable to control themselves against the powerful and addictive force of smoking cigarettes. Perhaps this feeling of hopelessness is what keeps people from quitting. Future research can address these issues.

In light of these issues and to address the ever-increasing risks associated with smoking (along with a possible limitation of this study), intervention strategies should utilize a biopsychosocial framework in their methodology, assessing and addressing the biological, the psychological, and the social influences present in addictive behaviors, especially smoking. Biological factors to address would most certainly be the overwhelmingly addictive nature of tobacco products, nicotine's effect on the mind and the body, as well as the other myriad of harmful products in tobacco and the effect those products have on the body, most notably lung tissue. The psychological effects of smoking would perhaps be the most difficult to address and control, but also the most important. These psychological factors might include the reinforcing nature of smoking, the repetitive and anxiety-reducing nature of smoking behavior, the intent behind that behavior, the effects of age on smoking behavior (and harmful behaviors in general), etc. These psychological factors would essentially be the gate-keepers to the other factors present in the intervention; if you can get the individual out of his or her own way, psychologically, then the other factors will perhaps take care of themselves. And finally, the social factors present in smoking, such as advertising, peer pressure, and other social influences are very powerful motivating factors in behavior. Although the social acceptance of smoking behavior has all but vanished (smoking is no longer an acceptable social behavior, with many municipalities all but banning it in public), the social pressures placed on individuals to take up smoking are still many. There is even some argument that both the modeling of

smoking in cartoon characters, such as Joe Camel, and the behavioral memory of “smoking” candy cigarettes has a profound impact on children’s likelihood to smoke in later life.

### *Concluding Thoughts*

Cigarette smoking is a *powerfully* addictive behavior, overriding even one’s own level of behavioral control. The addictive draw of smoking cigarettes is enough to override even a smoker’s best efforts at quitting. Further, smoking has been viewed as a disease; an addiction that may warrant a clinical diagnosis (Difranza, 2010), not unlike that for other drugs that are deemed unsafe by the federal government and illegalized in many countries, including the United States. Because the behavioral tendencies toward addiction with cigarettes mirrors that of other illicit drugs, it begs the question as to why something so harmful (the number one leading cause of preventable death; ACS, 2009b) has remained outside of the reach of the legal system in many of the most highly industrialized nations in the world.

But the legal implications notwithstanding, it is well known that once a person becomes addicted to smoking cigarettes, it is very difficult, if not impossible, for him or her to quit. The best course of action (and perhaps the best place to target proactive awareness programs) is one that preemptively targets potential smokers early on, ideally before the individual starts smoking in the first place. Targeting this awareness early, before one even takes up the habit, may help block the inescapable and overwhelming allure that cigarette smoking holds for those who have already succumbed to its influence.

APPENDIX A  
MULTIDIMENSIONAL HEALTH LOCUS OF CONTROL SCALE

Below are a number of statements concerning your personal attitudes toward health. Please read each statement and consider the extent to which you agree or disagree with it. Then respond to the statement as accurately as possible by using the following scale to indicate how much you agree with it.

- 0 – strongly disagree
- 1 – disagree somewhat
- 2 – slightly disagree
- 3 – slightly agree
- 4 – agree somewhat
- 5 – strongly agree

My good health is largely a matter of good fortune. \_\_\_\_\_

No matter what I do, I'm likely to get sick. \_\_\_\_\_

Luck plays a big part in determining how soon I will recover from an illness. \_\_\_\_\_

Most things that affect my health happen to me by accident. \_\_\_\_\_

No matter what I do, if I am going to get sick, I am going to get sick. \_\_\_\_\_

If it's meant to be, I will stay healthy. \_\_\_\_\_

If I can take care of myself, I can avoid illness. \_\_\_\_\_

I am in control of my health. \_\_\_\_\_

The main thing which affects my health is what I myself do. \_\_\_\_\_

If I take the right actions, I can stay healthy. \_\_\_\_\_

If I get sick, it is my own behavior which determines how soon I get well again. \_\_\_\_\_

When I get sick, I am to blame. \_\_\_\_\_

Having regular contacts with my physician is the best way for me to avoid illness. \_\_\_\_\_

Whenever I don't feel well, I should consult a medically-trained professional. \_\_\_\_\_

Health professionals control my health. \_\_\_\_\_

When I recover from an illness, it's usually because other people have been taking good care of

me. \_\_\_\_\_

Regarding my health, I can only do what my doctor tells me to do. \_\_\_\_\_

My family has a lot to do with my becoming sick or staying healthy. \_\_\_\_\_

APPENDIX B  
COMMIT EVALUATION SURVEY



During the past twelve months, have you felt pressure from other people to quit smoking?

Yes \_\_\_\_\_ No \_\_\_\_\_

If so, from whom?

Your children \_\_\_\_\_

Other family members \_\_\_\_\_

Your friends \_\_\_\_\_

Your physician or other healthcare personnel \_\_\_\_\_

Your coworkers \_\_\_\_\_

Other acquaintances \_\_\_\_\_

When you are inside of a public place where smoking is allowed, what are you most likely to do?

Light up a cigarette if you wish \_\_\_\_\_

Look around to see if others are smoking and then light up \_\_\_\_\_

Ask if others would mind \_\_\_\_\_

Just not smoke \_\_\_\_\_

APPENDIX C  
REVISED LIFE ORIENTATION TEST

Please indicate the extent of your agreement with the following items by using the following scale:

0 – strongly disagree

1 – disagree

2 – neutral

3 – agree

4 – strongly agree

In uncertain times, I usually expect the best. \_\_\_\_\_

It's easy for me to relax. \_\_\_\_\_

If something can go wrong for me, it will. \_\_\_\_\_

I'm always optimistic about my future. \_\_\_\_\_

I enjoy my friends a lot. \_\_\_\_\_

It's important for me to keep busy. \_\_\_\_\_

I hardly ever expect things to go my way. \_\_\_\_\_

I don't get upset too easily. \_\_\_\_\_

I rarely count on good things happening to me. \_\_\_\_\_

Overall, I expect more good things to happen to me than bad. \_\_\_\_\_

APPENDIX D  
MEASURES OF INTENT TO QUIT, CUT BACK, AND SMOKING BEHAVIOR

I plan to quit smoking in the forthcoming month.

strongly disagree : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : strongly agree

I plan to cut back on the number of cigarettes I smoke in the forthcoming month.

strongly disagree : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : strongly agree

I plan to limit my smoking to \_\_\_\_\_ cigarettes per day.

How many cigarettes have you had in the previous 24 hours? \_\_\_\_\_

Is this typical for you? \_\_\_\_\_

If not, what is typical? \_\_\_\_\_

I enjoy smoking.

strongly disagree : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : strongly agree

Does anyone in your immediate family (parents, siblings, children, etc.) smoke? \_\_\_\_\_

Have they tried to quit in the past? \_\_\_\_\_

Were they successful? \_\_\_\_\_

If so, was it easy for them to quit? \_\_\_\_\_

APPENDIX E  
SMOKING ATTITUDES SURVEY

Which of the following diseases and/or conditions do you believe are related to smoking?

Heart attack \_\_\_\_\_

Stroke \_\_\_\_\_

Heart murmur \_\_\_\_\_

Kidney Stones \_\_\_\_\_

Emphysema \_\_\_\_\_

Arthritis \_\_\_\_\_

Bronchitis \_\_\_\_\_

Lung Cancer \_\_\_\_\_

Skin Cancer \_\_\_\_\_

Mouth Cancer \_\_\_\_\_

Ulcer \_\_\_\_\_

Premature Births \_\_\_\_\_

Baldness \_\_\_\_\_

Skin wrinkles \_\_\_\_\_

Flu \_\_\_\_\_

What is the likelihood that a smoker would have any of these outcomes?

None \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ Certain

What is the likelihood that **you** will have any of these smoking-related health outcomes?

None \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ Certain

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## BIOGRAPHICAL INFORMATION

Michael Shaun Culwell is a native of Fort Worth, Texas and completed a Bachelor of Science Degree in Psychology and Criminal Justice in 1998 from Texas Christian University. He completed both his Master of Science Degree and Doctor of Philosophy Degree from the University of Texas at Arlington. Dr. Culwell is a licensed pilot and a PADI SCUBA instructor. Upon graduation, Dr. Culwell has plans of pursuing a career in teaching, writing, and motivational and inspirational speaking.