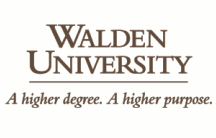

2015

Best Predictors of a Person's Long-Term Success with Quitting Tobacco

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Walden University
2015

Abstract

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by

Nhu-Tam Villar

MA, Seattle University, 2002

BA, University of Washington, 1998

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Health Psychology

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Abstract

Smoking relapse rates among tobacco users remain high after quit attempts with or without interventions. Though researchers have examined stress-related factors contributing to high relapse rate, little empirical research has concentrated on variables predicting long-term quit maintenance. The purpose of this study was to determine the predictability of stress management tools, including exercise motivation, eating behaviors, social support, and self-compassion, as well as the significant combined variance of these variables, in a person's long-term maintenance with tobacco use abstinence. Bandura's social cognitive theory was used to highlight the factors contributing to health behavior such as tobacco use. This study involved a survey research method gathering quantitative data from former and current tobacco users (n = 90) recruited from a Social Psychology Network online sampling service. Multiple regression analysis was the statistical method used to determine the significance of the predictor variables from the collected data with an alpha level set at .05. According to study findings, self-compassion was the only variable that accounted for the variance in the length of the longest quit attempt. This study contributes to positive social change as it offers findings that may be valuable to the health care providers more effective treatment strategies in treating tobacco users, leading to lowered health care costs. Increased likelihood of long-term tobacco cessation may result from identification and application of quit smoking tools through treatment interventions.

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Dedication

This study is dedicated to my husband Mark and son Maximus, who have been supportive of my years of study. They have been patient and understanding of the time I have spent completing my dissertation. They are my inspiration.

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I would like to thank my chair, Dr. Diana Jeffery, who provided me with helpful feedback and guided me through the dissertation process. She was encouraging and patient with my progress, which motivated me to press on during some arduous times of the process. I am grateful for her guidance, support, and expertise.

My committee member, Dr. Patricia Loun, also provided expert guidance at the critical stages of my study. She helped me see what could have been overlooked but important to consider. I thank her for the time she took to provide constructive feedback and incite mastery.

I would like to remember another committee member, Dr. Mary Alm, who prepared me for the initial stages of my dissertation proposal. She provided me with not only the needed feedback but also perseverance as she continued to guide me until her last few weeks prior to losing her battle with cancer.

While not members of my committee, my former supervisors Dr. Elizabeth Fildes and Marta Wilson provided me with one of the greatest opportunities to work with the population of tobacco users and inspired me to pursue higher education. I am also thankful for my colleague Wendy Dingee, who gave me the idea to research and include self-compassion as one of the variables in my study.

Finally, my family has been the foundation for personal and professional growth throughout my academic career. I am grateful for my parents who have always believed in me.

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Chapter 1: Introduction to the Study

Introduction

Public health promotion, disease control prevention, and treatment interventions primarily have considered the negative effects of tobacco smoke and smoking involving health and illnesses such as cancers, cardiovascular disease, stroke, chronic obstructive pulmonary disease, and pregnancy complications as some of the tobacco-related health conditions and illnesses (Aydogan et al., 2013; Brusselle, Joos, & Bracke, 2011; Hamer, Molloy, & Stamatakis, 2008; Montez & Zajacova, 2013; Stampfli & Anderson, 2009; Swan & Lessov-Schlaggar, 2007). The Centers for Disease Control and Prevention (CDC; 2008) reported one thirds of cancer deaths and over three fourths of deaths from lung and heart diseases are tobacco-related. Tobacco-related illnesses cost health care as much as 96 billion dollars annually (CDC, 2012; Durazzo, Meyerhoff, & Nixon, 2010). Both health care professionals and the public have also been aware of the benefits of tobacco use cessation, such as decreased risks of cardiovascular diseases or pulmonary disorders (Mehta, Nazzal, & Sadikot, 2008; Piao et al., 2009; Stampfli & Anderson, 2009). Nevertheless, many continue to use tobacco and relapse on tobacco use indicating the need for more information about treatment interventions (Stampfli & Anderson, 2009).

Stress has been the common tobacco use and relapse trigger. Researchers have identified tobacco use initiation and tobacco use relapse as one of the behavioral responses to stress (Childs & De Wit, 2010; McKee et al., 2010; Roohafza, 2007). Scholars have indicated that effective stress management for health maintenance often

involves exercise motivation, healthy eating habits, social support, and self –compassion (Atkins et al., 2010; Gonzales et al., 2007; Harwood, Salsberry, Ferketich, & Wewer, 2007; McFadden et al., 2011; Roohafza et al., 2007; Schneider, Spring, & Pagoto, 2007). Several researchers have found significant effects of these stress management strategies on smoking reduction as well as short-term abstinence; nonetheless, it is not known whether these strategies would predict the length of the longest quit attempt as a measure of long-term tobacco use cessation.

In this study, I focused on examining predictors of long-term success with quitting tobacco use. This study potentially could benefit treatment providers as well as providing helpful information about quitting tobacco use to current and former tobacco users. Health care and treatment providers may recommend strategies that increase the likelihood of success with quitting tobacco to patients; patients gain more coping tools that may increase their confidence in making a quit commitment. On a larger scale of possible social changes, increased chance of success or longer quit maintenance may help lower health risks, thus health costs (Adams, 2009; Arnson, Shoenfeld, & Amital, 2010; CDC, 2012; Durazzo et al., 2010; Edwards, 2009).

The following sections in this chapter include a statement of the research problem, the purpose of the study, and the research questions as well as hypotheses. There will also be a discussion of the theoretical framework for the study. The explanation of the nature of the study includes involved design and method, definitions of the variables, assumptions, scope of the research, limitations, and the significance of the study.

Statement of the Problem

Scholars have reported high smoking relapse rates among tobacco users, as high as 90% after quit attempts with or without treatment or interventions (Allen, Bade, Hatsukami, & Center, 2008; Gwaltney, Metrik, Kahler, & Shiffman, 2009; Herd, Borland, & Hyland, 2009). Many tobacco researchers have examined issues associated with tobacco use relapse and contributing factors to continued use; nonetheless, few if any researchers have researched long-term tobacco use abstinence, as well as related strategies used to maintain long-term quit success (Fuglestad, Rothman, & Jeffery, 2008). Key variables of long-term quit maintenance, longer than 12 months, remain unknown. Information or data presenting predictive factors may benefit treatment interventions for health behaviors, such as tobacco use. Stress has often been one of the main reasons for tobacco use initiation and continuation as well as relapse (Atkins et al., 2010; Gonzales et al., 2007; Harwood et al., 2007; McFadden et al., 2011; Roohafza et al., 2007; Schneider et al., 2007). It is unknown whether stress management techniques addressed in substance abuse or dependence treatment would predict the length of the longest quit attempt; stress management often involves cognitive-behavioral factors such as social support, exercise, and eating behaviors. Additionally, many researchers have examined the aforementioned cognitive behavioral factors, but few have explored the role of self-compassion in tobacco use abstinence (Kelly et al., 2010).

Purpose of the Study

The purpose of this quantitative study was to examine the predictability of cognitive behavioral variables including exercise motivation, eating behaviors, social

support, and self-compassion, as indicators of stress management techniques on long-term tobacco use abstinence. Exercise motivation, eating behaviors, social support, and self-compassion were the independent variables; the length of the longest quit attempt was the dependent variable in this study. Long-term tobacco use abstinence equates 12 months or longer without the use of a tobacco product (American Psychiatric Association, 2013; DiClemente, Prochaska, Fairhurst, Velicer, Velasquez, & Rossi, 1991; Schumann et al., 2005). Another objective of the study was to assess whether the results support the use of Bandura's social cognitive theory in examining behavioral health change such as quitting tobacco and remaining tobacco free.

Research Questions and Hypotheses

The following research questions and corresponding hypotheses guided the current study:

Research Question 1

1. Will exercise motivation be associated with the length of the longest quit attempt?

$H1_o$: Exercise motivation will not be associated with the length of the longest quit attempt.

$H1_a$: Exercise motivation will be associated with the length of the longest quit attempt.

Research Question 2

2. Will eating behaviors be associated with the length of the longest quit attempt?

$H2_o$: Eating behaviors will not be associated with the length of the longest quit attempt.

$H2_a$: Eating behaviors will be associated with long-term tobacco use abstinence.

Research Question 3

3. Will social support be associated with the length of the longest quit attempt?

$H3_o$: Social support will not be associated with the length of the longest quit attempt.

$H3_a$: Social support will be associated with the length of the longest quit attempt.

Research Question 4

4. Will self-compassion be associated with the length of the longest quit attempt?

$H4_o$: Self-compassion will not be associated with the length of the longest quit attempt.

$H4_a$: Self-compassion will be associated with the length of the longest quit attempt.

Research Question 5

5. Does the combination of exercise motivation, eating behaviors, social support, and self-compassion explain significant variation in the length of the longest quit attempt?

$H5_o$: *A* significant proportion of the variance of exercise motivation, eating behaviors, social support, and self-compassion will not account for the length of the longest quit attempt.

$H5_a$: A significant proportion of the variance of exercise motivation, eating behaviors, social support, and self-compassion will account for the length of the longest quit attempt.

Nature of the Study

The nature of this study included a survey research method, which involved gathering quantitative data from former and current tobacco users with various lengths of tobacco use abstinence and numbers of quit attempts. In this study, the online survey included self-administered questionnaires and was cross-sectional. Likert-type scales were used for the questionnaires to measure exercise motivation, eating behaviors, social support, and self-compassion. The questionnaire for exercise, intrinsic motivation, was derived from the Exercise Regulation Questionnaire (BREQ-2; Markland & Tobin, 2004). The revised version of the Three-Factor Eating questionnaire, the emotional eating subscale, was used to measure eating behaviors (De Lauzon et al., 2004). The Functional Social Support questionnaire (FSSQ) was used to measure perceived support or need for support on eight areas of support strengths (Broadhead et al., 1998). The questionnaire for self-compassion was derived from the short form of the Self-Compassion scale (Raes, Pommier, Neff, & Van Gucht, 2011). Participants rated their responses on 5-point scales except for the Three-Factor Eating questionnaire with a 4-point scale. One of the tobacco

use questions in the demographic questionnaire measured the length of the longest quit attempt, the dependent variable (See Appendix B).

The sample population included all genders and ethnicities from all levels of education, income, and heath care coverage. The exclusion criteria consisted of those under the age of 18, those with clinical mental health diagnoses, and those who had chronic physical health complications for ethical reasons. The current study excluded individuals using pharmacotherapy for tobacco use cessation, those receiving behavioral intervention or therapy for quitting tobacco use, and those with current alcohol or drug use problems to control for confounding variables. Additionally, members in active duty military and in the Reserve or National Guard were also excluded; military personnel are required to pass fitness tests and exercise regularly despite having twice the rate of smoking than found among males in the civilian population (Larson, Booth-Kewley, & Ryan, 2007; Signh, Bennett, & Deuster, 1999). Additionally, deployed military personnel do not have choices about diet, and thus questions about making dietary changes may not apply (Signh et al., 1999). A nonprobability sample was chosen from participants from the Social Psychology Network based on their availability. The survey was cross-sectional. A multiple regression analysis was run using the Statistical Package for Social Sciences (SPSS) program to determine the significance of the predictor variables from the collected data with alpha level set at .05. The independent variables were exercise motivation, eating behaviors, social support, and self-compassion. The dependent variable was the length of longest tobacco use abstinence. To obtain a

statistical power of .08, a correlation coefficient of .03 and effect size of .15, 84 participants were needed.

Theoretical Basis for the Study

In an attempt to examine the factors contributing to a health behavior such as tobacco use, as well as variables that may predict long-term success with quitting tobacco, I employed Bandura's (2005) social cognitive theory, as it indicates "self-management" as one of the needed aspects that would lead a person to attain and maintain health and wellness (p. 245). Based on the social cognitive theory, individuals with a high level of self-efficacy are expected to present a higher likelihood of involvement in health behavior initiation and maintenance. The major elements of social cognitive theory consist of self-efficacy, self-regulation, and emotional coping responses (Bandura, 2005). These elements are applicable to tobacco use behaviors as they relate to health behaviors. The present study relates to self-efficacy as it relates to beliefs or judgment in an individual's knowledge about past successes and abilities to maintain tobacco free. Self-regulation relates to a person's motivation level and acquired skills to remain tobacco free. Emotional coping responses answer to self-perception of stress and stress coping relating to tobacco abstinence maintenance.

Although the social cognitive theory was the primary theoretical basis for the study, functionalist theory was also applied to examine social forces, systems, structures, and expectations that may influence an individual's behavioral changes. Functionalist theorists would suggest that the unfit nature of tobacco smoke and smoking having a negative impact on the fitness of the society as the primary cause for the social change

(Bettcher & Lee, 2002). Additionally, the transtheoretical model would explain possible motivating factors associated with health behavior changes such as quitting smoking (DiClemente et al., 1991). The theoretical foundations of the current study are explored further in Chapter 2.

Definitions of Terms

To clarify terms used throughout the study, the following definitions are included:

Terms

Quit attempt: This term refers to the duration of the absence of tobacco use or smoking for a minimum of 24 hours or longer (CDC, 2011; Hughes & Callas, 2010).

Tobacco use: This term refers to the use of tobacco via smoking or smokeless form of any type of tobacco such as cigarettes, cigars, chew, and dip (CDC, 2012). Nicotine use in the form of nicotine replacement therapy (NRT) is not considered tobacco use; however, former tobacco users using NRT will not be included in the study.

Variables

Eating behaviors: This term refers to reported eating behavior frequency involving cognitive restraint, uncontrolled eating, and emotional eating. Cognitive restraint refers to a person's intentional effort made to resist food triggers or cues and food intake. Uncontrolled eating implies the likelihood of loss of control as a result of food cravings. Emotional eating insinuates a person's inability to resist emotional triggers (DeLauzon et al., 2004).

Exercise motivation: This term refers to factors or reasons for engaging in exercise, which can include external or social influences, self-conscience, perceived benefits of exercise, and intrinsic values of exercise (Duncan et al., 2010; Markland & Tobin, 2004). Exercise refers to physical activities involving moderate walking, cycling, jogging, or cardiovascular type of exercise that generates increased heart rate or produces a sweat used for health and wellness (Daniel, Cropley, & Fife-Schaw, 2007; Schneider et al., 2007).

Length of the longest quit attempt: This term refers to the number of days of abstinence from all types of tobacco use and nicotine in a quit attempt that lasts the longest.

Self-compassion: The relationship a person has with his or herself in regards to self-kindness and with others in regards to common humanity in addition to mindful awareness of his or her holistic existence. Self-compassion scores include self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identified aspects of self-compassion (Neff, 2003; Raes, Pommier, Neff, & Van Gucht, 2011).

Social support: This term relates to the perceived level of support and received resources from others; scores of the perceived availability, quality, and frequency or quantity of support will be calculated (Andrykowski & Cordova, 1998; Bovier, Chamot, & Perneger, 2004).

Assumptions

Participants might have provided honest and accurate self-report of their tobacco use abstinence. It was also assumed that all participants answered all questions in the

survey to the best of their knowledge; all participants needed to be 18 years of age and older as well as U.S. legal residents without any current clinical health issues. Participants understood the informed consent to participate as well as their rights of research participation and withdrawal. An additional assumption was that the standardized measures were constructed and written in an intelligible manner.

Mechanical assumptions of this study included the following:

1. Social cognitive theory is applicable to understanding of tobacco use behaviors as it is to health behaviors.
2. Multiple regression analysis provides a comprehensive and relevant measurement of the variables' predictability.
3. The sample size of 84 participants is sufficient based on the sample size calculator for multiple regression analysis of four predictive variables (Soper, 2013).
4. A quit attempt is defined as absence of tobacco use or smoking for a minimum of 24 hours or longer (American Psychiatric Association, 2013; DiClemente et al., 1991; Hughes et al., 2003; Japuntich, Piper, Leventhal, Bolt, & Baker, 2011).

Scope and Delimitations

The scope of the current study targeted primarily the population of former and current tobacco user with any length or number of quit attempts aged 18 and older. Participants consisted of those who had Internet access as the study involved online participation in a survey. The study included only those individuals who were not

currently using nicotine replacement therapy for the duration of their tobacco use abstinence to avoid confounding effects of pharmacotherapy. I also excluded individuals who were in counseling or a behavioral treatment program for tobacco cessation to avoid confounds. The findings may not be generalizable to tobacco users with diagnosed clinical mental disorders or chronic health diagnoses per exclusion criteria used in the study. I also excluded non-U.S. residents; thus, the findings may not extend to tobacco users in other parts of the world.

Limitations

The limitations in this study primarily involved the nature and the methodology of research. Nonprobability sampling method would pose limits to generalizability of study findings (Creswell, 2009). Participants' self-reports of the length of abstinence may not be reliable, which may limit interpretations of predictability of the variables. Additionally, the data collected from the study primarily involved self-reports, thus may present a reliability threat. Another limitation, which often accompanies quantitative research studies, is the lack of understanding of the reasons and meanings associated with participants' health habits and practices (Creswell, 2009). The current study does not provide explanations of how or why participants are ready or committed to use social support, exercise, adopt healthy eating behaviors, or practice self-compassion. Nevertheless, findings from this study could be valuable to several health-related disciplines, including other drug addictions and chronic health issues, as they may suggest strategies for health attainment and maintenance or recovery.

Significance of the Study

Tobacco researchers have identified nearly 5,000 toxic chemicals in tobacco smoke in addition to nicotine, an addictive psychoactive ingredient and an agonist that serve as a stimulant indicating nicotine is a drug and tobacco use an addiction (Durazzo et al., 2010; Holmes et al., 2011; Paul et al., 2008). Scholars have suggested both positive and negative effects of nicotine on the brain and cognition; nonetheless, the addictive nature of tobacco use has been associated with more health issues than claimed benefits (Edwards, 2009; Swan & Lessov-Schlaggar, 2007). Many compounds in tobacco smoke, first-hand and second-hand tobacco smoke, such as vinyl chloride, hydrogen cyanide, and arsenic are toxic to the brain and are associated with increased risks of brain cancer; ammonia, carbon monoxide, lead, and butane are some of the many chemicals in tobacco smoke that can also have negative effects on a person's overall health (Swan & Lessov-Schlaggar, 2007). Increased length of tobacco cessation and quit maintenance may benefit various social arenas including health and economical benefits by decreasing health risks, increasing productivity, and lowering costs (Adams, 2009; Arnson et al., 2010; Durazzo et al., 2010; Edwards, 2009).

Economical Benefits

One of the prominent and immediate benefits of quitting tobacco involves monetary benefits. An individual smoking a pack a day, priced at an average of $5.51 per pack, can save as much as over $ 2,000 after 1 year of abstinence (American Lung Association, 2013). Not only the individuals will benefit financially from quitting tobacco use, the health care industry also saves money. Public health arena has

announced that tobacco-related deaths and diseases have cost health care as much as billions of dollars annually (CDC, 2012; Durazzo et al., 2010). The occupational arena also can benefit from employees quitting tobacco. Companies would benefit from increased productivities and lowered employee health care costs as employees quit tobacco use or remain tobacco free (Baard & Baard, 2009; Nuebeck, 2006). The CDC (2002) estimated approximately over $1,700 in lost productivity and over $1,600 in excess medical expenses per year for each tobacco user. Moreover, longer abstinence from tobacco use can benefit both individuals and society economically.

Health Benefits

Researchers have identified health risks associated with tobacco use; yet, more specific health benefits associated with quitting tobacco also need to be discussed and publicized (Arnson et al., 2010; Stampfli & Anderson, 2009). Within the realm of public health, researchers have indicated the immunological effects of tobacco smoking and environmental tobacco smoke (ETS), which include increased risks of upper respiratory tract infections prevalent among patients with multiple sclerosis (Handel et al., 2011; Sundstrom & Nystrom, 2008; Sundstrom, Nystrom, & Hallmans, 2008). Mehta, Nazzal, and Sadikot (2008) explained that tar and nicotine might have immunosuppressive effects on the host's innate immune response, which may increase infection susceptibility. Chronic obstructive pulmonary disease, or lung diseases, and autoimmune diseases including rheumatoid arthritis and multiple sclerosis are also immune-related health conditions associated with tobacco use and tobacco smoke (Arnson et al., 2010).

Tobacco use, though, may not have a direct effect on cancer but is associated with increased risks of cancers via the immunological pathways (Mehta et al., 2008). Researchers have found an association between tobacco smoke and declined cytotoxic T cell activity (Kalra et al. as cited in Stampfli & Anderson, 2009; Pertovaara et al., 2006). Carcinogens found in tobacco smoke can negatively affect the immune system's functions and delay inflammatory responses. Furthermore, recurrent inflammations or chronic infections can induce cancer risks (Stampfli & Anderson, 2009).

Consequently, many scholars have found significant positive immunological effects associated with tobacco cessation. Tobacco use abstinence can reverse the negative effects of tobacco use on the immune functions as well as reduce susceptibility to the development or exacerbation of chronic illnesses (Apelberg, Onicescu, Avila-Tang, & Samet, 2010; Fusby et al., 2010; Mehta et al., 2008; Stampfli & Anderson, 2009). Researchers have found significant increase in the number of dendritic cells promoting effective immune responses among individuals who have abstained from tobacco use. Aside from dendritic cells, T-cell responsiveness is also another immunological component affected by tobacco use, which tobacco use abstinence may help decelerate the progression of immune-related disorders (Roos-Engstrand et al., 2010).

Moreover, like alcohol and drug addiction, tobacco or nicotine dependence is also a social issue as it presents negative consequences to both the individuals and the public at large (Yates, 1984). The CDC (2012) has declared tobacco use as the leading preventable cause of death and diseases that costs the nation billions in health care annually. This study will contribute to positive social change as it will offer findings that

may be valuable to the health care field in regards to more effective treatment strategies and lowered health care costs. Increased likelihood of long-term tobacco cessation may result from identification and application of quit smoking tools through treatment interventions (Niaura & Abrams, 2002). Individuals equipped with effective tools not only feel more confident making quit attempts and motivated by improved long-term quality of life, society benefits from healthier citizens as well (Piper et al., 2012). Longer quit maintenance may help lower health risks, thus health costs (Niaura & Abrams, 2002; Yates, 1984).

Summary

Tobacco research has provided abundant information to professionals and the public; nonetheless, specific areas of behavioral health interventions related to tobacco use need further examination. Tobacco use relapse rate has remained high despite public information and research findings providing more knowledge about the need to quit tobacco use to health care professionals and individuals. Studies, as well as the population of tobacco users, have identified stress as the common trigger of tobacco use initiation and relapse. Presently, it is unknown whether stress management strategies used among patients with chronic health diagnoses such as cancer and patients with drug and alcohol addiction would be beneficial or effective in maintaining tobacco use abstinence.

In this study, I focused on exercise motivation, eating behaviors, social support, and self-compassion as the independent variables for long-term tobacco use abstinence or the length of the longest quit attempt. Researchers have suggested that these cognitive behavioral tools are effective in improving chronic health treatment and addiction

recovery. Few researchers have examined the effects of these variables among the population of tobacco users; scholars have primarily investigated short-term as opposed to long-term tobacco use abstinence. In the current study, the length of the longest quit attempt refers to the number of days of tobacco use abstinence and without any type of nicotine replacement. Moreover, the current study bears significance to social change as it may present findings that may provide specific results relevant to various disciplines and increase success in health maintenance among individuals.

The following chapters will provide more in-depth discussions of the study. Chapter 2 will include an extensive literature review of previous addiction, tobacco, and health-related studies. Chapter 2 also covers an in-depth discussion of the theoretical foundations for the current study. Chapter 3 will involve a detailed description of the methodology that supports the research questions. Chapter 4 will include information about data collection and statistical analysis. Chapter 5 will include a summary of all elements discussed in previous chapters and a discussion of suggestions for future research.

Chapter 2: Literature Review

Introduction

Tobacco researchers have identified several key factors associated with tobacco relapse as well as quit maintenance, stress coping strategies that may predict or support long-term quit maintenance are unknown. In this study, I examined the associations of stress management involving cognitive behavioral coping strategies and the length of the longest quit attempt. Scholars have identified stress as the common denominator for smoking relapse, which requires further research into the effectiveness and predictability of cognitive behavioral coping strategies used for long-term quit maintenance (Atkins et al., 2010; Gonzales et al., 2007; Harwood et al., 2007; McFadden et al., 2011; Roohafza et al., 2007; Schneider et al., 2007). In this study, I focused on the associations of stress coping strategies in relation to long-term tobacco use cessation. Discussions of the literature review include identification and descriptions of social cognitive theory, functionalism, and the transtheoretical model. In another part of the literature review, I present, analyze, and synthesize research studies related to exercise motivation, eating behaviors, social support, and self-compassion as stress management variables of long-term smoking cessation examined in the current study.

Literature Search Strategy

The literature review for the current study involved several library databases including PsycINFO, PsycARTICLES, Mental Measurements Yearbook, Health and Psychosocial Instruments, PsycEXTRA in the Behavioral Studies and Psychology category. EBSCO HOST, and GOOGLE Scholar as the primary search engines used in

the current research. Key search terms used included *smoking cessation*, *social cognitive theory*, *functionalism*, *transtheoretical model*, and *health behavior and variables*. Research articles used in the current research also arose from combinations of search terms such as *stress management and tobacco cessation*, *exercise and smoking cessation*, *social support and smoking cessation*, *compassion and smoking behavior*, *spirituality and addiction recovery*, and *nutrition and health behavior*. Selected literatures are peer-reviewed articles and empirical studies predominately dated after 2005. Articles dated prior to 2005 set the foundation for current research as they provide the historical or theoretical foundations for tobacco research. The positive as well as challenging aspects of the literature search for this research was the plethora of supported evidence in smoking cessation and associated factors such as stress and addiction; aforementioned key words helped narrow the research focus.

Theoretical Foundation

To study contributing factors to health behaviors such as tobacco use, I used Bandura's (2005) social cognitive theory as it indicates self-management as one of the needed aspects that would lead a person to attaining and maintaining health and wellness. I also referred to functionalist theory to examine social forces, systems, structures, and expectations that may influence an individual's behavioral changes; functionalist theorists would suggest the unfit nature of tobacco smoke and smoking having a negative impact on the fitness of the society as the primary cause for the social change (Bettcher & Lee, 2002). Additionally, the transtheoretical model was used to explain possible

motivating factors associated with health behavior changes such as quitting smoking (DiClemente et al., 1991).

Bandura (2005) postulated social cognitive theory in the 1970s, concentrating on biopsychosocial determinants of health as it addressed the interrelationship among personal, social, and behavioral factors. Acknowledging these factors, social cognitive theory provides an understanding and practical solutions to social and personal health concerns (Pajares, 2002). Several scholars have assessed the applications of social cognitive theory to examine health behavior motivation and attitudes (Baban & Craciun, 2007). Social cognitive theory tenets have assumed fundamental roles in health psychology, entailing social and clinical applications that involve cognitive and social dimensions influencing individuals, groups, and communities (Baban & Craciun, 2007). Social cognitive theorists deem that perceived ability and control in achieving goals can motivate people to make decisions and take actions. Having a sense of control can increase an individual's level of self-confidence and willingness to overcome obstacles (Baban & Craciun, 2007). Social cognitive theory thus bears relevance to understanding health challenges as it highlights the importance of improving mental and social wellbeing that affects positive changes and maintenance of health behaviors.

Social cognitive theory is one of the most common theories employed in tobacco research as well as smoking cessation. Ditre et al. (2010) used social cognitive theory constructs involving outcome expectancies, coping behaviors, and self-efficacy to examine the interrelationship between pains and smoking motivation. Expectancies, adequate coping strategies, and high level of self-efficacy could have a significant effect

on smoking behaviors (Ditre et al., 2010). Similar to the study by Ditre et al. (2010), I also applied social cognitive constructs to assess smoking behaviors. Unlike the Ditre et al. study, the current study involves stress management strategies as opposed to pain coping strategies. I examined the social cognitive theory constructs in maintenance of health behavior involving the maintenance of long-term smoking cessation.

Moreover, social cognitive theorists assume awareness of health behaviors and habits as well as a sense of control and perceived abilities, which can increase confidence in encountering challenges and motivating behavioral changes. Increased awareness or knowledge could inculcate beliefs and serve as motivating factors for action and behavior change maintenance. Social cognitive theorists also imply that changes occur when individuals believe in having control over the results of their actions (Baban & Craciun, 2007). In this essence, social cognitive theorists not only focus on the conscious awareness but also on perception or experience. Perception is a byproduct of accumulated life experience (Baban & Craciun, 2007; Ditre et al., 2010). Social cognitive theory, therefore, covers various aspects of human functioning and potentials that correlate with health attainment, which I attempted to examine in the correlation between smoking cessation and cognitive behavioral dimensions.

From an evolutionary standpoint, functionalism may have explained smoking as a byproduct of outdated social norms or smoking cessation as compliance with social values that maintains the mechanisms of social systems (McClelland, 2000). Functionalism insinuates that maintaining orders requires conformity within the social systems, which concerns sanctions and evolution or growth; social changes occur as a

natural process of social functions and forces. Based on functionalist theory, social forces can influence an individual's behavior, thus changes social systems, structures, and expectations, which sequentially changes individuals (McClelland, 2000). Tobacco smoke or smoking is a social issue as it affects not only individuals but also various social systems, costing the health care system billions of dollars (CDC, 2012). Changes in social sanctions via the functions of specific social systems must occur to maintain a healthy society; healthy society brings up healthy individuals (McClelland, 2000; O'Neil, 1986). Functionalists would also explain the need for survival as well as optimal quality of life requires changes that promote smoking cessation interventions. Additionally, functionalist theorists would suggest the unfit nature of tobacco smoke and smoking having a negative impact on the fitness of the society as the primary cause for the social change.

Many tobacco researchers have not addressed functionalism to explicate smoking cessation as a catalyst for social change. Nonetheless, tobacco smoking is an individual behavior with social connections and consequences. The current study could be the first to refer to functionalism as one of the theoretical foundations for examining cognitive behavioral factors contributing to lifelong health changes. Changing social norms and behaviors can transpire from available social support and education involving effective smoking cessation coping tools (Heim et al., 2009). Social perception and attitude toward exercise, nutrition, support, and spiritual health practices could trigger changes in social norms that govern or influence smoking behaviors.

Studying behavioral changes involving initiation and maintenance of new behaviors such as addiction recovery or smoking cessation requires a systematic examination of the processes leading to desired changes (DiClemente et al., 1991; Schumann et al., 2005). The transtheoretical model (TTM) is an inclusive model for behavior change as it incorporates constructs such as self-efficacy and level of confidence embedded in Bandura's social cognitive theory as instrumental variables for change (Schumann et al., 2005). The TTM provides a look at the extent to which changes occur as well as disallowing dichotomous approach to classifying health behaviors (DiClemente et al., 1991). Tobacco smokers and former smokers undergo the stages of change that signify their attitudes or level of readiness toward smoking cessation; individuals in the precontemplation (PC), contemplation (C), and preparation (P) work toward action (A) and maintenance (M) stages of the quit process (DiClemente et al., 1991). The PC is defined as the lack of intention to change; individuals in the PC stage would not consider quitting in 6 months while those in the contemplation stage would (Balmford, Borland, & Burney, 2010; DiClemente et al., 1991; Schumann et al., 2005). The C refers to the presence of an intention to change; those in the C stage though would not consider quitting in 30 days while those in the P would. Individuals in the P stage may also have made at least one quit attempt in the last 12 months lasting at least 24 hours (Balmford et al., 2010). Having less than 6 months of smoking abstinence equates reaching the A stage and 6 or more months achieving the M stage (Balmford et al., 2010; DiClemente et al., 1991; Schumann et al., 2005).

Primary TTM constructs have revolved around pros and cons of smoking as well as self-efficacy or perceived ability and commitment to quit smoking (Schumann et al., 2005; Segan, Borland, & Greenwood, 2002). Segan et al. (2002) examined the predictive nature of TTM constructs among tobacco users (n = 193) about their quit attempt and short-term abstinence. This study suggested inconsistency between TTM constructs and quit attempts leading to short-term abstinence (Segan et al., 2002). In a longitudinal study, however, Schumann et al. (2005) found significant associations between TTM constructs and progression from pre-abstinence and abstinence among current and former smokers (n = 786). Nevertheless, TTM has remained the most influential model for framing smoking cessation interventions; the current research thus utilizes TTM along with social cognitive theory and functionalism to investigate potential cognitive behavioral tools contributing to long-term maintenance (Segan et al., 2002). With respect to the TTM constructs, participants in this study consisted of individuals in all stages of the TTM. Furthermore, I attempted to explore and elucidate involved factors sustaining smoking abstinence that remains undetermined by TTM.

Altogether, social cognitive theory, transtheoretical model, and functionalism explained and served as the theoretical foundations for the current study involving smoking cessation as a health behavior that requires an examination of motivation and associated determinants (see Figure 1). I employed social cognitive theory constructs such as coping strategies and self-regulation of health habits. Definitions of long-term smoking cessation and assessment of commitment level as well as selection of participants derived from the concepts of transtheoretical model and stages of change.

Functionalism explains the social aspects of health changes that may have an impact on social change as a whole.

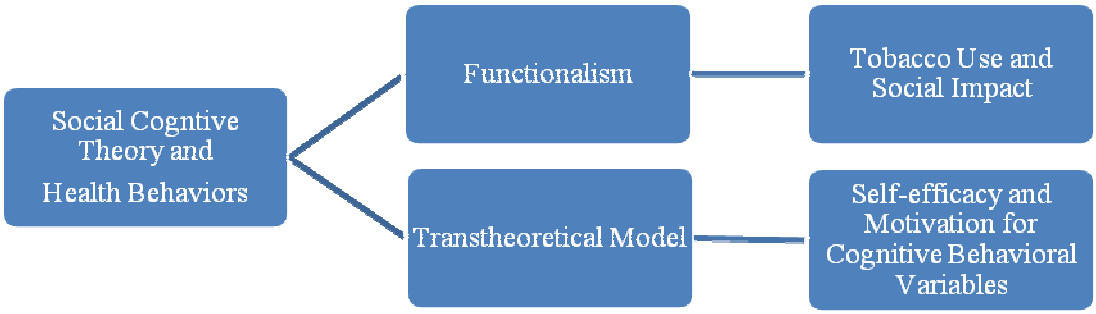

Figure 1 Theoretical Basis: Social cognitive theory, transtheoretical model, and functionalism will explain and serve as the theoretical foundations for the current study involving smoking cessation as a health behavior that requires an examination of motivation and associated determinants.

Literature Review

Stress Management and Tobacco Cessation

Clinical observations and research studies have denoted psychological stress a common denominator for tobacco use and relapse (Childs & De Wit, 2010; McKee et al., 2010; Roohafza, 2007). Kenford et al. (2002) examined both the physiological and affective models of nicotine addiction and found negative affect as the primary predictor of tobacco use relapse after six months of quitting. Evidently, stress or chronic stress itself can result in harmful health consequences. Using tobacco under stressful circumstances can exacerbate negative effects that psychological stress may already have on a person's wellbeing and add a myriad of physical problems including cardiovascular diseases, cancer, and chronic obstructive pulmonary disease (Adams, 2009; Harwood, et

al., 2007; McKee et al., 2010; Roohafza et al., 2007). Examining tobacco use and its interrelationship with psychological stress would elucidate and highlight the role of stress management in tobacco dependence treatment and prevention. Understanding the interrelationship between stress and tobacco use and the harmful effects because of the amalgamation can benefit both treatment professionals and the public (McKee et al. 2010; Yong & Borland, 2008).

Many tobacco users often claim stress as the main reason for smoking initiation, maintenance, and relapse suggesting stress as a barrier to success with quitting smoking (McKee et al. 2010; Yong & Borland, 2008). Mckee et al. (2010) found a connection between the cortisol level and tobacco craving. With increased stress, the hypothalamic-pituitary-adrenal (HPA) axis reacts and triggers an increase in cortisol. Tobacco craving increases with decreased ability to resist smoking urges (McKee et al., 2010). Additionally, some researchers have suggested stress involving negative emotions may increase smoking urges because of the reinforcing effect and psychoactive properties of nicotine. Many tobacco users though perceive and report smoking a stress reduction vice; yet many have observed the short-lived nature of such stress reduction. Yong and Borland (2008) suggested that changing a challenging health behavior such as quitting tobacco would require changing one's perception about stress and stress management.

Many are aware of negative health effects associated with tobacco use; nonetheless, stress remains the primary rationale for smoking continuation or relapse. Tobacco users are more likely to smoke under stress whether they acknowledge the perceived effect of stress reduction (Childs & De wit, 2010). In contrast to the common

perception of smoking as a stress reliever, studies have suggested that tobacco smoking can indeed augment the level of stress as nicotine can affect the activation of the HPA axis and physiological stress responses (Childs & De Wit, 2010; Chen, Fu, & Sharp, 2008; Lufty, Brown, Nerio, Aimiuwu, Tran, Anghel, & Friedman, 2006). Smoking may provide temporary stress relief as it can restore the stress level; however, as nicotine activates stress responses, long-term tobacco use ultimately triggers the release of more stress hormones (Chen et al., 2008; Lutfy et al., 2006; Rohleder & Kirschbaum, 2006). Thus, smoking can result in a higher level of stress resulting in the cycle of smoking continuation and relapse as nicotine and stress interact and counteract. The interdependent relationship between stress and tobacco use arise from biopsychosocial bases (Fernander, Shavers, & Hammons, 2007; Harwood, Salsberry, Ferketich, & Wewers, 2007). Stress may trigger certain responses or health behaviors, which in turn may create more stress. Stress and addiction epitomize an interdependent relationship in regard to drug-seeking behavior and relapse. The coping mechanisms involving physiological and psychosocial aspects appear to play a major role in drug reward system of tobacco use in response to stress (Chen et al., 2008; Lutfy et al., 2006; Rohleder & Kirschbaum, 2006).

Evolutionary, Historical, and Current Perspectives

Selye (1973) was one of the first to conceptualize stress and stressors; interestingly or perhaps ironically, Petticrew and Lee (2011) examined tobacco industry documents and discovered that the tobacco industry funded the majority of Selye's stress research. Nonetheless, Selye provided an important foundation for modern research on

stress as well as stress-related behaviors such as smoking. Psychological stress, as Selye suggested, refers to an occurrence of an event affecting the mental process including perception of threats, planning, and decision-making processes (Selye, 1973).

Stress elicits responses or coping, which may not result in favorable outcomes (Folkman & Lazarus, 1988). Ineffective coping responses often involve blaming, avoiding, escaping or withdrawing, and aggression with harmful or unhealthy consequences. The outcome of ineffective coping may beget depression, anxiety, low self-esteem, low self-confidence, which sequentially activate more stress once again. From an evolutionary standpoint, stress provides survival benefits consisting of threat avoidance or goal achievement. Likewise, tobacco in the sixteenth century provided medicinal benefits for its use for toothache, vision impairment, and hunger (Sharlet, 2001). Modern discoveries, however, provides substantial scientific evidence suggesting and linking chronic stress or ineffectively managed stress and tobacco use to cardiovascular diseases, cancers, and immune disorders. Tobacco use accompanying stress can exacerbate negative health outcomes. Chronic stress and tobacco use present detrimental health effects and affect healthcare costs. Health concerns thus are social concerns; examining and addressing health effects of stress and tobacco use may promote positive health behavior changes such as tobacco cessation (Adams, 2009).

Stress, Tobacco Use, and Biopsychosocial Influences

Biopsychosocial sources may have an influence on stress or stress coping and tobacco use. Different people may response differently to the same stressor. Many develop different levels of dependency on the same substance. Genetic or biological

factors play a role in individuals' susceptibility to stress, illnesses, and addiction. Individuals' psychological wellness may also have an influence on their stress coping tendencies and health behaviors. Social factors including cultural perspectives and socioeconomic status may limit resources or hinder coping ability. Examining the etiology of stress and tobacco use as a coping mechanism from a biopsychosocial viewpoint would expand perspectives on health behaviors.

Biological Influences

The same stressor or event may elicit different reactions and perceptions from different people. Some may be more susceptible to stress than others based on physiological or genetic predispositions (Slavik & Croake, 2006). Similarly, addiction studies have also linked genetic influences to an individual's vulnerability to substance dependency (Munafo & Johnstone, 2008). Hberstick et al. (2007) conducted a longitudinal twin study and suggested genetic factor plays a significant role in nicotine dependence among over 75% of the participants. The likelihood of developing an addiction increases when addiction has affected the biological family. Nonetheless, studies have examined and suggested a genetic and environment interaction as significant in stress management and development of addiction (Hberstick, et al., 2007; Munafo & Johnstone, 2008). Hence, an integrated approach would provide a more complete explanation for the complex nature of health behaviors such as stress coping and tobacco use.

Psychological Influences

Multitudes of scholars have investigated the interconnection between stress and smoking. Chronic or unremitting stress may often result in negative affect or unstable emotions leading to psychiatric illnesses and maladaptive behaviors including drug-seeking behaviors (Harwood et al., 2007). Nicotine, a psychoactive ingredient in tobacco, can alter affect or moods and provide psychological rewards (Harwood et al., 2007; Perkins, Karelitz, Giedgowd, Conklin, & Sayette, 2010). Many thus perceive smoking a rewarding response, as it appears to temporarily alleviate stress and manage stress-related factors or psychological factors. Perceived social support or control and affective states are some of the common psychological factors that may facilitate unhealthy responses or ineffective stress coping such as tobacco use or smoking (Harwood et al., 2007; McKee, 2010; Ockene et al., 2000).

Researchers have suggested significant correlations between social support and stress. Positive social support tends to associate with a lower level of perceived stress than does negative or lack of social support, which affects health and influences health behavior. Negative or lack of social support may play a role in smoking behaviors. Harwood et al. (2007) suggested that positive support is associated with stronger determination to quit smoking. Perceived control also has a significant role in health behavior. Those operating from an internal locus of control are more likely to take responsibility for making behavioral changes while those with external locus of control, and perceived lack of control over life, are more likely to give in to unhealthy behaviors such as tobacco use (Harwood et al., 2007). Lack of social support and perceived lack of

control often correlate with negative emotions, anxiety, or depression; individuals with emotional disorders often resort to tobacco use as a form of self-medication (Harwood et al., 2007).

Perceptions may influence behaviors involving some cognitive and emotive processing (Doran et al., 2011; Sheeran, Gollwitzer, & Bargh, 2012). Meaning making as well as decision-making process would filter through cognitive appraisal involving assessment and interpretation of an event or experience. Cognitive theorists have postulated that thoughts can influence emotions, and thus actions. Coping strategies as they relate to cognition and behavior appear to require techniques that change the thought process, patterns, or perceptions (Folkman & Lazarus, 1988). Perception of stress and stress appraisal among tobacco users may affect their decision to initiate, continue, or return to smoking (Folkman & Lazarus, 1988; Hajek, Taylor, & McRobbie, 2010).

Tobacco users or smokers may assess the level of perceived stress via primary appraisal and decide whether they can manage the challenge, or gain from smoking (Badr & Moody, 2005; Hajek et al., 2010). Integrating cognitive theories with social cognitive theory, tobacco users would feel more or less confident or capable of managing stress without cigarettes or tobacco depending on their cognitive appraisal of stress or stressor; effective emotion regulation via exercise, support, nutrition, and self-nurturance can result in stress reduction (Fucito, Juliano, & Toll, 2010). Moreover, cognitive factors can interfere with health decision-making processes indicating the need for cognitive behavioral interventions that reduce barriers and increase the chances of health maintenance such as smoking abstinence (Reilly & Mansell, 2010).

Socioeconomic Status, Stress, and Tobacco Use

Socioeconomic status (SES), comprised of the level of education, employment, living conditions, and quality of life, is one of the social factors that may influence health behaviors and wellness (Harwood et al., 2007). Education level can significantly influence career, earning opportunities, and associated factors affecting life satisfaction. Income and access to healthcare services may have an effect on the level of psychological stress and subsequent coping mechanisms. Studies have found a negative correlation between SES and the level of psychological stress; individuals from low SES groups are more likely to experience higher levels of stress (Glasscock, Andersen, Labriola, Rasmussen, & Hanse, 2013; Harwood et al., 2007; Krueger and Chang, 2008). SES may also indirectly affect decision-making and health behaviors in response to stress. Research has suggested the existence of health inequalities among low SES groups preventing them from obtaining needed information and treatment services resulting in lack of effective stress coping mechanisms. Additionally, many studies have identified tobacco use or smoking as the common behavioral response to various stressors (DeVoe & Pfeffer, 2011; Harwood et al., 2007; Kim et al., 2009).

Regardless of possible indirect or direct effects of SES, smoking prevalence appears highest among individuals with low SES. Low SES itself may not warrant the highest level of stress; however, stress associated with low SES may activate several coping responses including tobacco use as stress coping mechanism (Harwood et al., 2007). SES may have an influencing role in generating stress as sporadic work hours, high workload with low pay, and lack of quality healthcare can result in coping responses

that include smoking behaviors (DeVoe & Pfeffer, 2011; Harwood et al., 2007; Kim et al., 2009). Moreover, stress and tobacco use issue from biological, psychological and social factors warranting an integrated approach to examine and address stress-related responses such as smoking behavior, a drug-seeking behavior. Tobacco use evidently is not an effective stress coping mechanism that many people may perceive as a first-line defense in managing stress or difficult emotions.

Health Risks Associated with Stress and Tobacco Use

Stress researchers suggest significant effects of psychological stress on the immune system through the neuroimmune-endocrine pathways. The brain registers stress signals and transmits them via stress neuropeptides that regulate immune cells, which consequently affects the immune process; chronic stress can have a negative effect on the immune system and the development of chronic diseases (Olff, 1999; Tausk, Elenkov, & Moynihan, 2008). Stress can progressively weaken immunity and result in increased susceptibility to infections and cold.

Similarly, tobacco researchers have also linked tobacco use or smoking to several health complications. Health care professionals and the public have become aware of cancers, cardiovascular diseases, chronic obstructive pulmonary disease, and pregnancy complications as some of tobacco-related health issues. The CDC has identified tobacco use as the number one leading cause of preventable death and illnesses for it has cost millions of deaths worldwide and billions of dollars in healthcare (Adams, 2009; Fernander et al., 2007; Harwood, et al., 2007; McKee et al., 2010).

Stress itself can have an effect on the development of various health problems. Stress-related and tobacco-related illnesses have played a major role in increased morbidity and mortality worldwide (Adams, 2009; Fernander et al., 2007; Harwood, et al., 2007; McKee et al., 2010; Roohafza et al., 2007). Psychological stress may function as both a precursor and corollary of risky behaviors and unhealthy lifestyles leading to increased morbidity and mortality; studies have suggested significant correlations between perceived psychological stress and unhealthy behaviors. Tobacco, a legal and easily accessible substance, may present stress reduction properties that are appealing to those who attempt to manage stress. Tobacco use in response to stress undeniably would generate or exacerbate a multitude of stress-related health issues (Roohafza et al., 2007; Rohleder, & Kirschbaum, 2006). Hence, studies would need to continue to explore healthy or effective stress coping techniques that also would support tobacco or smoking cessation efforts.

The Mechanism of Tobacco Use in Coping with Stress

Researchers have indicated the role of biopsychosocial factors in perceived psychological stress and coping behaviors including addictive behaviors such as tobacco use or smoking. Cleck and Blendy (2008) suggested that individuals with addiction tend to react differently to stress, as a result of the neurological and physiological effects of drugs, as compared to those without addiction. Addiction research has examined the relationship between stress response mechanism, the HPA axis, and drug use behaviors and suggested that the mesolimbic dopamine reward pathway become more responsive in the event of stress (Cleck & Blendy, 2008; Schwabe, Dickinson, & Wolf, 2011; Sinha,

2008). Numerous addiction studies have identified stress as the significant risk factor for drug use initiation, development of drug addiction, and drug relapse as the rewarding effect of drug use under stress acts as a feedback loop (Schwabe et al., 2011; Sinha, 2008). Schwabe, Dickinson, and Wolf (2011) suggested that unremitting stress often act as the prime precursor for increased risk of drug abuse and addiction. Challenging life experiences or events such as lack of support or trauma often contribute to increasing perceived psychological stress prompting pleasure seeking or pain avoidance tendencies that include the use of mind-altering substances such as tobacco smoking (Audrain-McGovern, Rodriguez, & Kassel, 2009; Scales, Monaha, Rhodes, Roskos-Ewoldsen, & Johnson-Turbes, 2009). Some researchers interpret tobacco use as self-medication because of its relationship to drug use under the influence of psychological stress. Tobacco use, a coping attempt in response to stress, thus may involve biopsychosocial influences (Sinha, 2008).

Researchers have suggested tobacco use or smoking may produce both stress reduction and stress induction effects (Jackson, Knight, & Rafferty, 2010; Parrott, & Murphy, 2012; Rao, Hammmen, London, & Poland, 2009; Rohleder & Kirschbaum, 2006). These researchers have examined nicotine, the primary psychoactive ingredient in tobacco, and its neurological mechanism and found nicotine to have an effect on stress response via the HPA axis (Chen et al., 2008; Childs & DeWit, 2009; Lutfy et al., 2006; Rohleder & Kirschbaum, 2006). Evidence has shown that nicotine has the neurological mechanism and role in the reward system of the brain similar to that of cocaine (Sinha, 2008). Animal studies also have identified the ability of nicotine to activate the stress

response (Lutfy et al., 2006). Stress, thus commonly precedes or ensues smoking initiation, increased tobacco consumption, and smoking relapse (Lutfy et al., 2006; McKee et al., 2010; Sinha, 2008).

The reinforcing properties of nicotine, particularly in the event of stress, involve the activation of the mesolimbic dopaminergic pathway, which has a role in the reward learning process; stress exposures can trigger a response from the hypothalamic-pituitary-adrenal (HPA) axis. Nicotine alone can also activate the HPA axis and trigger the secretion of corticotropin-releasing hormone in the hypothalamus, adrenocorticotropic hormone from the pituitary, and cortisol from the adrenal glands (Rohleder & Kirschbaum, 2006). Long-term use of nicotine or chronic smoking can lead to changes or desensitization of the HPA axis activity and blunting of the HPA axis responsiveness to acute psychological stress (Chen et al., 2008; Rohleder & Kirschbaum, 2006). Nicotine use may present certain rewarding effects and stress reduction potentials; however, it can also stimulate the HPA axis that elicits the release of stress hormones norepinenephrine in the amygdale, and become a stressor itself (Chen et al., 2008). Again, stress can activate drug-seeking tendencies such as tobacco use; concomitantly, tobacco use can generate more stress.

Aside from the physiological aspect of nicotine in stress response, the neural process of stress can trigger involuntary responses and habituation of drug use. Scholars have ascertained stress as one of the significant risk factors of drug addiction and addiction relapse as the cognitive processes of the effects of stress may have a role in addictive behaviors. Stress may affect the progression of addiction and susceptibility to

relapse by altering the neural pathways that control the goal-directed system and the habit system (Schwabe et al., 2011). Derived from this psycho-neuro-endocrinological perspective, stress and stress hormones can prompt the neural circuit to change from goal-directed to habit action. Schwabe et al. (2011) maintained that acute stressors prompt habitual responses to drug-related cues that can trigger relapse of addictive behaviors including alcohol or tobacco use. Chronic stress thus may also trigger individuals, with or without intention of use, to relapse on drug, alcohol, or tobacco use attributable to the process or mechanism of a drug habit; stress can accelerate the shift from voluntary drug use to habitual drug use and involuntary drug addiction (Schwabe et al., 2011). The cognitive processes associated with stress thus have an effect on addictive behavior indicating significant considerations for cognitive-behavioral methods in the treatment of addiction and the prevention of relapse.

Tobacco use or smoking would perpetuate additional stress based on the physiological mechanism of nicotine and its effect on the HPA axis. Consistent with the findings suggesting the physiological effect of nicotine on stress, Stein et al. (2008) found higher levels of stress among smokers compared to non-smokers. Tobacco use overall appears to present itself as a stress-inducing factor in many aspects of life. The costs of tobacco smoking and associated adverse health consequences affect not only the users but also society. Nonetheless, many tobacco users perceive smoking as a stress reliever with or without an understanding of how tobacco use can consequently add more stress. An exploration of psychological or psychiatric perspectives may provide another explanation for the interrelationship between stress and tobacco use.

Researchers have linked unremitting stress or chronic stress to the development of depression suggesting repeated activation of cortisol released under chronic stress could exhaust the HPA leading to cognitive impairment (Peters, Cleare, Papadopoulos, & Fu, 2011). Consequently, ineffective coping mechanisms may arise from improper functioning of the HPA axis (Jackson, Knight, & Rafferty, 2010; Peters et al., 2011). Overflowing cortisol plays a role in the increased risk of depression, which is strongly correlated with stress and inadequate coping (Auerbach, Abela, Xiongzhao, & Shuqiao, 2010). Animal studies found the stressed-out brain and the depressed brain both have high levels of cortisol and insufficient serotonin receptors. Depressive symptoms can trigger tobacco use; as high as close to 60% of individuals with major depression report tobacco use (Diaz, James, Botts, Maw, Susce, & de Leon, 2009; Thorndike, Wernicke, Pearlman, & Haaga, 2006). Fucito and Juliano (2009) found a positive correlation between negative mood states and tobacco consumption. Studies have examined nicotine properties and suggested that antidepressant effects of nicotine may have contributed to the increase or continuation of self-medication with tobacco use or smoking (Diaz, James, Botts, Maw, Susce, & de Leon, 2009; Harwood, Salsberry, Ferketich, & Wewers, 2007).

Tobacco smoking rate is also prevalent among individuals with anxiety disorders, particularly Post-Traumatic Stress disorder (Thorndike et al., 2006). Symptoms arise from traumatic or life-threatening experiences often include recurring and intrusive thoughts, reliving of the traumatic experience, thought avoidance, extreme emotions associated with the trauma, isolation, insomnia, mood instability, and hyper vigilance;

these symptoms can prompt stress coping mechanisms, which often involve avoidance coping (DSM-5; American Psychiatric Association, 2013). Greenberg et al. (2011) suggested that individuals with PTSD tend to smoke more as they attempt to avoid painful emotions associated with traumatic experiences. Moreover, both stress and stress coping with tobacco use implicate biopsychosocial factors that influence health behaviors and maintenance of health behaviors. The neurological and cognitive process of stress and nicotine provide some of the rationales for initiation and continuation of tobacco use as stress coping mechanism. Psychological aspects of health behaviors also contribute to the initiation and maintenance of stress-related behaviors such as smoking (Greenberg et al., 2011; Harwood et al., 2007; Lutfy et al., 2006; McKee et al., 2010; Sinha, 2008). Stress coping and tobacco use are indeed complex health behaviors that would necessitate considerations of methods that may increase the probability of health behavioral maintenance including effective stress management and long-term tobacco cessation.

Cognitive-Behavioral Tools

Negative or ineffective responses to psychological stress such as tobacco use or smoking can exacerbate current stress levels experienced. Stress-related tobacco use or smoking can have an effect on the development, progression, and recovery of physical illnesses (Whiteford, 2003; Yamane et al., 2010). Coronary heart disease, lung diseases, cancers, and immune disorders are some of the major tobacco-related health issues that signify the need for behavioral changes and involve implementation of effective stress management techniques (Chen et al., 2008; Rohleder & Kirschbaum, 2006; Roohafza et al., 2007). Researchers consistently have found significant relationship between

perceived stress and smoking or tobacco use (Perkins et al., 2010; Roohafza et al., 2007); hence, implementing, training, and exercising effective stress coping strategies may have an influential role in smoking or tobacco use reduction as well as supporting quit success (Roohafza et al., 2007). Overcoming stress-related health behaviors, as challenging as quitting smoking or tobacco use, would necessitate an integrated or holistic approach involving cognitive-behavioral aspects to stress management. Cognitive-behavioral tools entailing healthy eating behaviors, exercise, utilizing social support, and engaging in self-compassion would be applicable to making a behavioral change such as tobacco cessation.

Eating Behaviors

Stress can have an interrelationship with health behaviors including food intake and tobacco use. Researchers have examined the relationship between dietary intake and psychological stress and indicated that stress can influence eating habits as well as eating behaviors simultaneously can affect perceived stress. Food elicits certain physiological responses that can provide emotional or mental comfort as it releases dopamine or activates the mesolimbic reward system similar to the neurological mechanism of drug use (Stice et al., 2008). Longitudinal research has examined the effects of stress on eating behaviors and associated physical activity level that interfere with weight management efforts (Kim, Bursac, DiLillo, White, & West, 2009).

Eating behaviors can include restrained eating, uncontrolled eating, and emotional eating (De Lauzon et al., 2004). Restrained eating refers to an individual's conscious effort to restrict food intake to achieve a desired outcome whether to manage or lose

weight (De Lauzon et al., 2004; Laessle, Tuschl, Kotthaus, & Pirke, 1989). Uncontrolled eating entails a loss of control or tendency to increase food intake despite the lack of physiological signals of hunger (De Lauzon et al., 2004). Emotional eating implies the tendency to respond to negative feelings with eating or the inability to resist eating in a stressful state of mind (Courbasson, Rizea, & Weiskopf, 2008; De Lauzon et al., 2004). Research has indicated a significant relationship between eating behaviors and other health-related behaviors (Courbasson et al., 2008; Leeman, O'Malley, White, & McKee, 2010; Shmueli and Prochaska, 2009).

Researchers have identified counter effects of nutritional restraint on smoking cessation efforts. Shmueli and Prochaska (2009) examined dieting and smoking behaviors in the context of self-control theory to determine the likelihood of smoking under resistance to sweets and vegetables among smokers (n = 101) in San Francisco. Participants in this study were randomly presented with sweets or vegetables and instructed to resist eating them. Participants had no restrictions on what they could do during their 10-minute break after the presentation of food. Carbon monoxide (CO) level, which was the primary dependent variable, collected prior to the start of the experiment and after the break determined the participants' smoking status. From statistical analyses involving correlations, ANOVAs, chi-square, and logistic regression, the results showed that participants resisting sweets presented higher CO level during the break than those who resisted vegetables. The findings thus indicated a significant correlation between dietary restraint and increased likelihood of smoking suggesting food resistant may counteract smoking cessation efforts (Shmueli & Prochaska, 2009).

Similar to above findings, Leeman et al. (2010) also suggested that food deprivation would hinder smoking cessation ability. Unlike aforementioned study, Leeman et al. (2010) examined not only food deprivation but also nicotine deprivation among smokers in their between-subjects design study. Participants (n = 30) in this study, recruited through advertisements and comprised of primarily Caucasians and African Americans, randomly assigned to either the food and nicotine deprivation or nicotine deprivation only group. Nicotine deprivation lasted for 18 hours while food deprivation lasted 12 hours. ANOVAs results revealed that participants deprived of both food and nicotine were quicker to resort to cigarette use after the experiment than those without food deprivation (Leeman et al, 2010).

There is a paucity of research on uncontrolled eating, particularly studies on uncontrolled eating among individuals who have abstained from smoking. Generally, uncontrolled eating in the form of increased caloric intake or food consumption post smoking cessation is widely observed and anticipated. Weight gain often accompanies increased food intake and triggers smoking relapse (Kim, et al., 2009; Levine, Cheng, Kalarchian, Perkins, & Marcus, 2012). Managing uncontrolled eating thus may increase the chance of success with quit maintenance. Stotland and Larocque (2005) did not examine the effects of management of uncontrolled eating on smoking cessation but on weight loss among participants (n = 344) with obesity. Participants in this study received counseling treatment, medical evaluation, a diet plan, and cognitive behavioral interventions involving goal setting, cognitive restructuring, positive reinforcement and many other behavioral modification strategies. The results from this study suggested that

the best predictor for weight loss is a significant reduction or decreased tendency for uncontrolled eating (Stotland & Larocque, 2005). This finding may provide a foundation for studying the predictability of uncontrolled eating and tobacco use cessation.

Researchers have not extensively examined emotional eating in the realm of behavioral health and addiction (Courbasson, Rizea, & Weiskopf, 2008). Some studies have observed the presence of emotional eating, as a response to stressful events or changes, among the population of individuals with substance use disorders. Courbasson et al. (2008) examined the relationship between emotional eating and substance use behaviors among participants (n = 193) who presented comorbid eating disorders (ED) and substance use disorders (SUD). Participants in this study completed questionnaires assessing addiction severity, ability to resist drug use, perceived level of stress, eating disorders, and emotional eating tendency; participants were also interviewed to confirm their diagnoses of ED and SUD. Courbasson et al. (2008) suggested that high emotional eating though was strongly associated with increased confidence to refrain from drug use, increased tendency for emotional eating also increased severity of psychological aspects of wellbeing.

Based on the above studies, restrained eating, uncontrolled eating, and emotional eating may interfere with one's ability to resist smoking and augment relapse tendency. Conclusively, these findings imply the need to address eating behaviors post cessation to prevent cyclical effects of weight gain and tobacco use or smoking relapse. To date, little is known about the relationship between eating behaviors and maintenance of tobacco use

abstinence. In the current study, I examined whether emotional eating can predict the likelihood of quitting maintenance.

Exercise Motivation

Physical exercise ranging from leisure walks to yoga practice, running, or hiking evidently present several benefits. Healthcare professionals often consider exercise as one of the tools used for stress reduction; studies have indicated that exercise can boost energy and decrease depressive symptoms. Donaghy (2007) analyzed many longitudinal studies examining the effect of physical activities on depression and found that exercise has a significant role in both prevention and treatment intervention for depression. Several studies have identified the correlations between stress and coronary heart disease (CHD); some have suggested that ineffective stress management involving unhealthy coping behaviors such as smoking and lack of exercise can contribute to increased risks of developing CHD (Gough, 2011; Wise, 2010). Exercise or physical activity plays a role in reduction of the risk and susceptibility for stress-related and tobacco-related illnesses such as CHD. Dishman et al. (2006) suggested that the role of exercise in moderating neural responses to stressors and regulating sympathetic responses to stress might help reduce the risk of heart diseases. Daubenmier et al. (2007) found that increased physical activity level or exercise can improve cholesterol level and reduce psychological stress among non-smoking coronary heart disease (CHD) patients. Exercise evidently presents physical health benefits that may improve psychosocial health (Daubenmier et al., 2007; Rouse et al., 2011).

Numerous studies have consistently indicated not only exercise has an important role in medical or physical but also psychological aspects of health (Daubenmier et al., 2007; Rouse et al., 2011). Studies have examined the benefits of exercise and physical wellness through the effects of exercise on the immune function; these studies found exercise not only reduces bad cholesterol and increases muscle strength but also enhances self-esteem (Yeh, Chuang, Lin, Hsiao, & Hsiao, 2011). Donaghy (2007) suggested that exercise provides stress reduction benefits and corresponds with positive body image. Associated social and spiritual aspects of exercise involving dancing or group walking perhaps help people stay connected and generate positive emotions (Priest, 2007). Studies have observed the effects of exercise, such as yoga, on the level of cortisol and found that exercise triggers responses from the parasympathetic nervous system decreasing stress hormone level, which results in relaxation (Bock et al., 2010; Ross & Thomas, 2010). Generally, exercise may serve as an essential behavioral tool in coping with stress; yet, the level of exercise motivation may present as a challenge to the maintenance of other health behaviors such as quitting tobacco use.

Tobacco users may often present with health concerns such as cancer, cardiovascular diseases, and lung diseases as primary quit reasons; yet, many continue to smoke as concerns about weight gain may outweigh health concerns and produce anxiety triggering an increase of perceived stress that result in perceived needs for tobacco use or smoking. Additionally, the quit process may involve experiencing withdrawal symptoms, which include physiological changes that may affect motivation level and relapse tendencies among tobacco users; depression or negative emotions and weight gain often

accompany smoking cessation (Daniel, Cropley, & Fife-Schaw, 2007; Faulkner, Arbour-Nicitopoulos, & Hsin, 2010; Schneider, Spring, & Pagoto, 2007). Studies have suggested that exercise can alleviate stress, reduce negative moods, have a positive effect on weight management among smokers, and notably increase the chance of success with tobacco cessation (Daniel et al., 2007; Faulkner et al., 2010; Schneider et al., 2007; Van Rensburg, Taylor, Hodgson, & Benattayallah, 2009). Attaining exercise motivation can be an effective cognitive behavioral strategy targeting tobacco use or smoking relating to stress and weight gain concerns.

Van Rensburg et al. (2009) examined the effect of exercise on cigarette cravings in an fMRI study examining brain activation and responses. Based on animal models suggesting four neurological circuits involving the reward, motivational, learning and memory, and control circuit, associated with nicotine addiction and exercise, Van Rensburg et al. (2009) postulated that exercise might also have an effect on regional brain activation observed in fMRI in humans. Participants (n =10) in this study involved adult smokers ranging from 18 to 50 years old smoking regularly a minimum of 10 cigarettes per day for at least two years without a plan or intention to quit smoking. Prior to the experiment sessions, participants abstained from smoking for 15 hours with breath CO level recorded before the start of the passive session or exercise session. Participants in this randomized crossover design study completed one passive session with sitting without movements or activities, and one exercise session involving moderate-intensity stationary cycling for 10 minutes, each session followed by a 15-minute MRI scanning. During each scanning session, participants viewed 60 images, 30 smoking-related and 30

neutral images, presented randomly at three seconds each. Participants subjectively reported their smoking craving on a seven-point scale at baseline, mid-, and post-session for both passive and exercise conditions. The ANOVA analysis presented a shift in the activation of reward, motivation, learning and memory, and control circuits in the post-exercise scanning in comparison to post-control or passive scanning; increased regional activation of the mesocorticolimbic dopamine system was observed in the post-control scanning suggesting increased nicotine or smoking desire. The strength of this study was attributable to its examination and presentation of the neurobiological mechanism involved in smoking or nicotine cravings. Additionally, the potential implication of exercise in the treatment of nicotine addiction found in this study may herald further research in the treatment of other addictions; the sample size though was not significant for generalization. Nevertheless, little is known about exercise motivation in long-term smoking cessation.

Similar to the fMRI study completed by Van Rensburg et al. (2009), Faulkner et al. (2010) also conducted a within-subject crossover study to examine the effects of exercise, in the form of brisk walking, on smoking cravings and urges. The rationale for this study stemmed from the perspectives of preventive strategies of smoking withdrawal symptoms and cravings to prevent relapse. Participants (n = 19) in this study were adult cigarette smokers, smoking an average of 15 cigarettes per day. Each attended two testing sessions, one with the passive sitting condition and one with the brisk walking condition, within the same week. Prior to the testing session, each participant had to abstain from smoking for a minimum of three hours with breath CO levels recorded before the start of

each session. Each session involved either a 10-minute passive sitting on a chair or 10-minute brisk walk on a treadmill with monitored heart rates; participants rated their smoking craving halfway through the session, at the end of the session, and 10 and 20 minutes post session. The study required participants to smoke a cigarette using the Clinical Research Support System (CReSS) pocket, a computer-based device measuring puff count, volume, and duration, after the 20-minute post-condition. The ANCOVA analysis revealed a significant increase in delaying the first puff, shorter durations of puffs, and decreased puff volume after the walking session among participants in comparison to the passive session; participants also took one puff fewer in the walking session than in the passive session. The strengths of this study involve the objective measures of smoking behaviors via the use of the CReSS devise measuring the puff quality and quantity. Nonetheless, small sample size in this study may inherently affect generalizability. In general, the findings may have important clinical implications in the treatment of nicotine dependence; yet, the likelihood of exercise motivation having an effect on long-term abstinence from smoking remains unknown based on these findings as the study solely focused on changes in smoking behaviors and temporary abstinence from smoking.

Despite evidence supporting the need to incorporate exercise in heath management, little is known about exercise motivation that may explicate factors or barriers to exercise and health maintenance such as maintenance of tobacco use cessation. Exercise motivation refers to factors that influence an individual's readiness, willingness, and commitment to initiate and maintain exercise routines (Rouse et al., 2011; Scioli et

al., 2009). Extrinsic and intrinsic aspects of self-determination and self-efficacy are some of the primary components of exercise motivation (Duncan et al., 2010; Marcus, Selby, Niaura, & Rossi, 1992; Teixeira, Carraca, Markland, Silva, & Ryan, 2012). On the continuum of self-determination or motivation for exercise, extrinsic factors such as social or familial pressures and guilty conscience are the less self-determined aspect of motivation (Moustaka, Vlachopoulos, Vazou, Kaperoni, & Markland, 2010; Rouse et al., 2011; Teixeira et al., 2012). Intrinsic motivation denotes a more self-determined attitude toward exercise yielding more favorable health behavior outcomes; intrinsic self-determination involves genuine enjoyment of exercise activities and the satisfying after effects of exercise. Studies have found intrinsic motivation to be a significant influence on the initiation of exercise and maintenance of exercise participation; studies have suggested a significant association between intrinsic motivation and positive health behavior outcomes (Duncan et al., 2010; Moustaka et al., 2010; Rouse et al., 2011; Scioli et al., 2009; Teixeira et al., 2012).

Scioli et al. (2009) particularly studied the relationship between exercise motivation and smoking behaviors. This is the only research that examined exercise motivation among college student participants (n = 614) who were smokers and nonsmokers. This study involved an internet survey asking students about their smoking behaviors and motivational factors for exercise. Along with questions about their smoking or quit status and exercise behaviors, participants also answered questions that measured intrinsic and extrinsic factors of self-determination for exercise. The results in this study revealed that intrinsic motivation for exercise was significantly higher among

those who were physically active nonsmokers than among those who were physically active smokers (Scioli et al., 2009). Like many studies, this study was not without limitations in regards to its population and research method. Nonetheless, the findings bear some health implications indicating that exercise motivation and the type of motivation may play a role in health attainment and maintenance.

A plethora of studies has examined the benefits of exercise as well as its influence on other health-related behaviors; many have indicated the significant relationship between exercise and tobacco use reduction or short-term cessation. Given the benefits of exercise, many studies have examined the motivational factors of exercise to understand and implement strategies for exercise initiation and maintenance. Thus far, one study has examined exercise motivation and its implication for smoking cessation (Scioli et al., 2009). It is unknown whether exercise motivation would be associated with long-term tobacco cessation, which will be examined in the current study.

Social Support

Researchers have studied the relationship between psychosocial support and perceived level of stress and found significant positive correlations between support and quality of life; Harwood et al. (2007) found negative correlations between social support and perceived stress. Based on these findings, psychosocial support in the forms of social service and meaningful relationships improve emotional and mental health hence overall wellness. Atkins et al. (2010) suggested that social support presents positive effects on psychological well-being and helps improve physical health and longevity. Tobacco use or smoking indeed can generate additional stress on different aspects of life. Overcoming

a challenging behavioral change such as tobacco cessation can also be a stressful ordeal in itself because of associated biopsychosocial changes (Atkins et al., 2010). Thus, acquiring psychosocial support from a loved one, healthcare professionals, or professional counselors may alleviate the stress level and dissuade one from engaging in unhealthy behaviors such as tobacco use or smoking (Lawhorn et al., 2009; May et al., 2007; Stewart, Thomas, & Copeland, 2010).

Social support defined as positive feedback from various social sources eliciting desirable behavioral changes can improve the chances of smoking abstinence (Stewart et al., 2010). Studies have linked social support to stopping smoking efforts and indicated its significant role in predicting cessation success (Lawhorn et al., 2009; May et al., 2007; Stewart et al., 2010). Stewart et al. (2010) examined the characteristics of support persons, college students (n = 244), and their perceived provided support to smokers to determine associated positive or negative type of support. The carbon monoxide monitor determined participants' smoking status, 170 were never smokers while the remainder consisted of current and former smokers. The Support Provided Measure assessed positive and negative level of perceived support provided to smokers. The findings suggested that negative support provided to smokers are more likely to come from current and former smokers than from never smokers; participants romantically involved with the smokers (n = 23) also reported giving more positive type of support (Stewart et al., 2010). The insignificant sample size of participants in romantic relationships with their smokers and other types of support persons in this study may limit its

generalizability. Nonetheless, this study provided a valuable instrument for the current study to design social support measures.

Timing of social support provided or given may also influence smoking cessation effort and success. Lawhorn et al. (2009) conducted a longitudinal study to examine the predictability of social support timing and maintenance of smoking cessation. Participants (n = 739) in this study were smokers randomly assigned to the pharmacological intervention or psychosocial intervention group and followed up 12, 24, 36, and 52 weeks after treatment initiation. Similar to the aforementioned study, positive support was more likely to increase smoking abstinence, particularly long-term smoking abstinence. In regard to timing of support, Lawhorn et al. (2009) found that positive support provided early in the cessation process would predict success at week 12 of treatment; consistent with their other hypothesis, negative support provided during early stages of quitting did predict smoking continuation or prolonged smoking status throughout the quit process. Additionally, the findings did not suggest positive support would predict long-term smoking abstinence beyond the 12 weeks; however, the findings indicated that reduced negative support throughout the quit process would predict long-term success with quitting smoking (Lawhorn et al., 2009). Like many studies, this study bears limitations in regards to explaining causal relationships between social support and smoking cessation. Nevertheless, this study provided important clinical implications in terms of highlighting the treatment interventions and coping strategies for individuals who are ready to quit or who have quit smoking.

Similar to the findings in the aforementioned study, May et al. (2007) also found a significant association between social support and smoking cessation that does not exceed 26 weeks. Like the study conducted by Stewart et al. (2010), May et al. (2007) did consider the characteristics of social support such as smoking status of support persons though focused on the participants' perception of received support versus participants' perception of support provided to smokers. Participants (n = 928) in this study attended six weeks group-based intervention involving oral dextrose for smoking cessation in London followed with group support during the first month of cessation. Consistent with the findings found in the study by Lawhorn et al. (2009), the results from this study suggested that social support could predict short-term but not long-term success with quitting smoking. Current research builds on the findings of positive support, explore, and assess predictability of social support perceived among former smokers or smoking abstinence beyond the 12 weeks, the evidence not supported in above studies (Lawhorn et al., 2009; May et al., 2007).

Self-Compassion

The development of healthy or meaningful relationships may arise from compassion. Tobacco use may not only affect an individual's physical health but also his or her perception of self-care. The current study focuses on self-compassion, which is defined as the practice of liberating oneself from self-criticism, accepting shortcomings as part of human experiences, and acknowledging psychological pain without judging (Neff, 2003). Research on the relationship between self-compassion and wellness is on the rise; clinicians have recognized self-compassion as one of the crucial treatment

elements among individuals with psychological needs (Barnard & Curry, 2011). Given the support found among the literature on the influence of self-compassion on health and wellness, stress-related behaviors such as addiction may benefit from the practice of self-compassion as it relates to achieving peace that may dissuade harmful and addictive behaviors (Barnard & Curry, 2011; Leigh, Bowen, & Marlatt, 2005; Terry & Leary, 2011;Vidrine et al., 2009). Inarguably, tobacco use poses addiction potentials and complicates health issues; thus a comprehensive treatment approach involving self-compassion would be of relevance (Leigh et al., 2005; Vidrine et al., 2009).

Self-compassion rises from an understanding of self-love without judging inabilities and weaknesses in making positive health choices, such as quitting smoking (Terry & Leary, 2011; Kelly, Zuroff, & Foa, 2010). A few studies thus have examined the relationship between self-compassion and mental or behavioral health issues such as substance use issues. Vettse, Dyer, Li, and Wekerle (2011) examined the association between self-compassion and emotion regulation among participants (n = 81) in a substance treatment program. Over eighty percent of the participants, consenting youth between the age of 16 and 24, in this study were poly-substance users with cannabis as the common drug of choice. Self-compassion was among measures of emotion regulation, childhood trauma, psychological symptom severity, and substance use behaviors. The results from this study suggested that higher levels of self-compassion correlate with lower levels of emotional difficulties and addictive severity; gender difference was not a factor in self-compassion (Vettese et al., 2011). These findings may

indicate the significance of self-compassion practice in clinical intervention for health-related behaviors.

Nonetheless, more studies have yet to consider self-compassion as a vital tool employed with tobacco use cessation and quit maintenance. Kelly et al. (2010) examined the relationship between self-compassion and smoking behaviors. The key purpose of this study was to determine whether self-compassion would affect smoking self-regulation. Participants (n = 119) in this study were assigned to either the self-compassion intervention or the self-monitoring intervention group over a three-week period. The self-compassion intervention group received guided imagery of self-compassion, audio guide to visualization of self-compassion, and writing exercise of self-compassion. The results from this study revealed that participants in self-compassion training group decreased the daily number of cigarettes smoked faster than those in the baseline self-monitoring group did. Based on this study, self-compassion training appeared indicative of smoking reduction; notably, Kelly et al. (2010) suggested a higher significance among those with a low level of readiness to change and high self-critical tendency.

The previously mentioned studies examining self-compassion seem to have presented relevant influence of self-compassion on health behaviors including tobacco use in particular as they provide significant clinical implications to both healthcare or addiction treatment professionals and the public. These studies may pave the way for integrating a holistic approach in treating nicotine dependence. Nevertheless, these studies entail limitations.

The study conducted by Kelly et al. (2010) is the only study examining the effects of self-compassion on short-term smoking cessation; none to date has yet to investigate self-compassion and long-term quit maintenance or tobacco cessation. Kelly et al. (2010) examined the correlation between self-compassion training and smoking reduction but not smoking cessation. The findings from these studies thus do not seem to present high suggestibility values or predictability of long-term smoking cessation. However, the treatment of nicotine addiction has seemed to overlook self-compassion possibly because of its longstanding social acceptance until recent discoveries of health risks (Gonzales et al., 2007). Hence, self-compassion for long-term smoking cessation is one of the variables investigated in the current study.

Summary

Psychological stress and tobacco use thus far appear to share psychological influences. Perceptions may influence the level of stress experienced and generate psychological responses thus triggering or initiating smoking behavior. The literature reviewed has indicated an interrelationship between psychological stress and tobacco use as well as providing evidence suggesting stress management via cognitive behavioral means can improve the likelihood of smoking cessation. Research has implicated stress management benefits of exercise as well as positive correlations with smoking reduction or cessation. Some studies though with reservation suggested diet restrictions might counteract with smoking cessation goals while others suggested nutrition management as a contributing factor to smoking cessation success. Social support has received considerable attention in stress and tobacco cessation research; studies have found

positive correlations between social support and short-tem smoking reduction or cessation. Aside from cognitive behavioral approach to stress management as it relates to smoking cessation efforts, spiritual practices have also gained attention from both the medical and addiction fields.

Moreover, exercise motivation, eating behaviors, social support, and self-compassion are known contributing factors to health attainment as they serve important roles in stress management. The relationship between these cognitive behavioral variables and the length of the longest quit attempt remains unknown. Studies have primarily examined the relationship between cognitive behavioral strategies and smoking reduction or changes in smoking behaviors. Additionally, tobacco studies though have indicated any smoking during the first two weeks of smoking cessation as predictor of relapse or long-term quit maintenance; however, contributing factors or lack of tools leading to any smoking during the first two weeks and affecting long-term maintenance remain unknown. In this study, I assessed predictability of cognitive behavioral tools as variables for long-term quit maintenance. Multiple regression analysis was considered to assess the significance of variance among cognitive behavioral tools and long-term smoking abstinence that previous studies have not identified. Previous studies have primarily recruited current tobacco users to examine their smoking behaviors including smoking reduction and short- and long-term smoking cessation; the effects of experimental interventions as well as relationships among research variables have remained unknown among the veteran former tobacco smokers. The current study,

however, included participants who were at various lengths of tobacco use abstinence or lengths of the longest quit attempt.

Chapter 3 covers the research methods employed in the study. Research design and rationale, the target population and sampling procedures, data collection methods, and the instruments used will also be discussed in this chapter. There will be discussions as well as rationales of the operational definitions of cognitive variables. The type of data analysis will be addressed in this chapter. Additionally, there will be discussions of ethical concerns and procedures, and threats to external and internal validity.

Chapter 3: Research Method

Introduction

The primary purpose of the study was to explore the associations between stress management tools and tobacco use abstinence among former and current tobacco users. In this study, I examined the predictability of cognitive and behavioral coping tools as they relate to stress management with the length of the longest quit attempt. Cognitive behavioral tools include physical exercise motivation, healthy eating behaviors, social support, and the practice of self-compassion. The following sections cover the methodological aspects of the study involving the research design and rationale, the target population and sampling procedures, data collection methods, and the instruments used. The operational definitions of cognitive variables support the rationale for the chosen research methodology and the type of data analysis considered. Discussions of threats to external and internal validity will follow aspects of the research design and methods. Ethical concerns and procedures discussed in this chapter will provide assurance with paperwork provided to reflect proper protection of confidential data, ethical treatment of human participants, and institutional review board approvals.

Research Design and Rationale

In this study, I examined cognitive-behavioral variables as they relate to stress management that may support long-term tobacco use abstinence. Cognitive-behavioral variables were the independent variables with the length of the longest quit attempt as the dependent variable. Cognitive-behavioral constructs included physical exercise motivation, eating behaviors, social support, and the practice of self-compassion. Unlike

previous tobacco or cigarette smoking research, the current study involved both former and current tobacco users as well as the inclusion of all types of tobacco use such as smokeless tobacco. In examining predictability of multiple variables, a research survey would be a more efficient way to collect quantitative data. Additionally, the chosen research design was less time-consuming and cost-effective as it was cross-sectional; this survey was online, which is timesaving and more cost-effective than a mailed survey.

Researchers have noted the challenges of obtaining high response-rates with Internet-based studies as opposed to telephone or mail surveys (Laguilles, Williams, & Saunders, 2011; Messer & Dillman, 2011; Millar & Dillman, 2011; Sinclair, O'Toole, Malawaraarachchi, & Leder, 2012). Scholars have suggested that online response rates can improve with research incentives such as lottery incentives provided with the study (Laguilles et al., 2011; Messer & Dillman, 2011; Millar & Dillman, 2011). Laguilles et al. (2011) conducted four Internet-based experiments to examine the effectiveness of lottery incentives among U.S. college students and found significantly high response rates among the incentive groups across all four experiments as compared to the control groups. I, however, did not use lottery incentives as Walden Institutional Review Board disapproves such approach. Nonetheless, online research may reach a wider range of participants and generate higher response rates resulting from anonymity (Kraut et al., 2004). Time constraint was one of the challenges in recruiting a minimum of 84 online participants who met the set criteria and completed all questionnaires.

Population

Former and current tobacco users with any length of abstinence and number of quit attempts, including cigarette or cigar smokers and smokeless tobacco users, were the target population. Tobacco cessation researchers have considered long-term cessation as absence of tobacco use or smoking 12 months after a quit attempt (Hughes et al., 2003; Japuntich et al., 2011). Many define a quit attempt as 24-hour duration of absence of tobacco use or smoking (CDC, 2011; Hughes & Callas, 2010). The CDC (2011) defined current smokers as individuals who had smoked a minimum of 100 cigarettes in their life and smoked every day or on some days. The CDC defined former smokers as individuals who had smoked a minimum of 100 cigarettes in their life but had stopped for 6 or more months prior to the survey. The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) specified that 3 months of tobacco use abstinence equate with "early remission," while 12 months of abstinence equate with "sustained remission" (American Psychiatric Association, 2013). In the current study, former tobacco users were defined as individuals who had used tobacco in the past but have stopped using, or achieved a prolonged quit attempt, in the past 12 months or longer prior to participating in the study. There was a question in the demographic questionnaire that asks about the length of tobacco use abstinence.

Current and former tobacco users were recruited from Social Psychology Network (SPN), an online research recruitment service, which reaches a wide range of participants worldwide via Twitter and an RSS feed. SPN is not limited to professionals or students. According to the SPN website, they reported having a subscriber base to the RSS feed of

over 51,000 people; over 46,000 followers on Twitter can assess the link to online research studies. SPN currently has reached over 36000 people on Facebook (Plous, 2013).

This study did not include former and current tobacco users using electronic cigarettes or any form of pharmacotherapy for smoking or tobacco cessation such as nicotine replacement therapy patches, gum, nicotrol inhaler, nasal spray, or lozenges to control for confounding factors. Individuals who received nonpharmacological interventions, such as counseling or professional treatment for tobacco use cessation, were also excluded from the study. Participants with aforementioned parameters could be of any ethnicity, level of income, and education. The exclusion criteria would encompass individuals under the age of 18 and those who are in active duty military, military Reserve, or National Guard. Individuals with clinical mental health diagnoses and non-U.S. residents were also excluded in the study with legal and ethical concerns as rationales for the exclusions. A table of frequencies and percentages for participant characteristics, such as marital status, age of first tobacco use, gender, and length of abstinence, is included in Chapter 4.

Sampling and Sampling Procedures

The sample selected from SPN was a nonprobability sample as the target population pertained to predetermined criteria. Sampling of the population was a single stage process in this descriptive study, which did not involve random assignment. The factors considered in calculating the sample size for the study included the statistical significance, the level of power, and the effect size. An alpha level set at .05 helped

minimize the likelihood of Type I errors, and a level of power set at .80 decreased the chance of a Type II error. Many studies reviewed for the current study presented medium effect sizes; the anticipated effect size, Cohen's $f2$, selected for this study involving multiple regression thus is .15, a medium effect size (Bovier et al., 2004; De Lauzon et al., 2004; Duncan et al., 2010; Gravetter & Wallnau, 2010; Kelly et al., 2010). The $f2$ effect size for multiple regression is defined as:

$$f2 = \frac{\mathrm{R}^2}{1 - R^2}$$

The study involved four predictors. Using the sample size calculator provided by Soper (2013) for multiple regression, the current study needed 84 participants to obtain an alpha level of 0.05 and statistical power of 0.8.

Procedures for Recruitment, Participation, and Data Collection

The SPN provides online research opportunities to professionals as well as students conducting research in the disciplines of psychological studies. The student research section of the website present several topics under which student researchers may consider listing their study. In this study, I focused on health behaviors such as smoking abstinence thus the "Other Social Psychology Topics" category under student research page of the SPN site was appropriate. The current study appeared with the title "Tobacco Use Cessation and Health Behaviors" under the Other Social Psychology Topics section. SurveyMonkey was the web-based data collection service used for the present study. A request form to add a study link was submitted, which connected SurveyMonkey to SPN; the request form requires information of affiliated university and

topic of the study. SPN reaches a wide audience thus would ensure the needed number of participants, requiring a minimum of 84.

Participants signed the electronic informed consent on the website prior to starting the questionnaires. The informed consent stated the nature of the study as well as including statements regarding discontinuing the questionnaire at any time. The consent form also included a Walden University research representative's contact information for questions and resources that may assist those in need of psychological help and support. There was no compensation for participating in the study. There were no follow-up interviews for this quantitative study.

After reviewing the informed consent and acknowledging their agreement to participate, participants completed the demographic questionnaire (See Appendix B). Participants answered demographic and qualifying information questions as part of the screening process; those who did not meet the participation criteria would not advance to the questionnaires. Collected demographic information included age, gender, ethnicity, place of residence, citizenship status, tobacco use status, level of income, education, marital status, religious affiliation, and diagnosed physical and mental conditions or disorders. The questions determining participants' tobacco use status or former tobacco use status included, listing a few, ""Are you currently using tobacco?" "If you are currently using tobacco, how many days in a week do you use tobacco or smoke?" "Are you a former smoker or tobacco user?" "During the past 12 months, have you tried to stop using tobacco?" "How many times have you tried to quit using tobacco in your lifetime?" "How many days has it been since the last time you used tobacco or smoked a

cigarette, even a puff?" "How long ago, in years, did you start smoking cigarettes or using tobacco?" "If you smoke cigarettes, about how many cigarettes do you smoke in a typical day?" Participants meeting the inclusion criteria would proceed to the questionnaires used to measure exercise motivation, eating behaviors, social support, and self-compassion.

Instrumentation and Operationalization of Constructs

In this study, the online survey was self-administered questionnaires with Likert-type scale measuring exercise motivation, eating behaviors, social support, and self-compassion. The questionnaire for exercise behavior was the Exercise Regulation Questionnaire BREQ-2 (Markland & Tobin, 2004), using the total scale score. The revised version of the Three-Factor Eating questionnaire was used to measure eating behaviors (DeLauzon et al., 2004). Functional Social Support questionnaire (FSSQ) measured perceived support or need for support on eight areas of support strengths (Broadhead et al., 1998). The questionnaires for self-compassion was the short form of the Self-Compassion scale (Raes et al., 2011). Participants rated their responses on 5-point scales except for the Three-Factor Eating questionnaire with a 4-point scale. The appendix includes the permission letters from the developers to use the aforementioned questionnaires.

Operationalization

Exercise, nutrition, social support, and self-compassion are the research variables measured in this study. The following definitions outline the variables examined in the current study:

- *Exercise Motivation:* Factors or reasons for engaging in exercise, which can include social influences, self-conscience, perceived benefits of exercise, and intrinsic values of exercise. This study measured exercise motivation level among participants (Duncan et al., 2010; Markland & Tobin, 2004).
- *Eating Behaviors:* Reported eating behavior frequency involving cognitive restraint, uncontrolled eating, and emotional eating. Cognitive restraint refers to a person's intentional effort made to resist food triggers or cues and food intake. Uncontrolled eating implies the likelihood of loss of control as a result of food cravings. Emotional eating insinuates a person's inability to resist emotional triggers (De Lauzon et al., 2004).
- *Social support:* Perceived level of support and received resources from others; scores of the perceived availability, quality, and frequency or quantity of support will be calculated (Andrykowski & Cordova, 1998; Bovier, Chamot, & Perneger, 2004).
- *Self-compassion:* The relationship one has with oneself concerning self-kindness and with others in regards to common humanity in addition to mindful awareness of one's holistic existence. Self-compassion scores include self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identified aspects of self-compassion (Raes, Pommier, Neff, & Van Guch, 2011; Neff, 2003).
- *Quit attempt:* Duration of absence of tobacco use or smoking lasting a minimum of 24 hours or longer (Hughes & Callas, 2010; CDC, 2011).

- *Length of the longest quit attempt*: This term refers to the number of days of abstinence from all types of tobacco use and nicotine in a quit attempt that lasts the longest.

Exercise Regulation Questionnaire

The Behavioral Regulation in Exercise Questionnaire (BREQ-2), revised by David Markland and published in 2000, assesses participants' level of motivation for physical exercise. The BREQ-2 consists of 19 items rated on a 5-point scale ranging from 0 as "not true for me" to 4 as "very true for me." The BREQ-2 is an appropriate instrument for examining exercise motivation, one of the independent variables in the current study, as it also aligns with social cognitive theory chosen as the primary theoretical basis for interpretation. The statements in the questionnaire pertained to motivating factors or influential sources of the decision to exercise. The BREQ-2 consists of 5 subscales; in this study, I used one of the subscales, intrinsic motivation, to measure exercise motivation.

Duncan, Hall, Wilson, and Jenny (2010) used the BREQ-12 to assess the influence of motivation on exercise regulation, based on the self-determination theory, among college student volunteers (n = 1054) considering themselves regular exercisers. The five sub-scales of the BREQ-2 measured amotivation, intrinsic, identified, introjected, and external regulation of exercise. Higher scores on the scale of intrinsic regulation of exercise indicate participants enjoy exercise, as it is fun, pleasurable, and satisfying. Higher scores on amotivation indicate no or lower interest in exercising. External regulation refers to social or familial influences. Higher scores on the introjected

regulation indicate participants' guilt, shame, or self-concept as their primary drives to exercise. These sub-scales were validated in this study with Cronbach's α coefficients revealing an internal consistency ranging from .76 to .90, with an internal consistency value of 0.87 for intrinsic motivation (Duncan et al., 2010).

Three-Factor Eating Questionnaire – R18

The revised version of Three-Factor Eating questionnaire (TFEQ-R18) established by DeLauzon et al. (2004) to assess cognitive restraint, uncontrolled eating, and emotional eating. The TFEQ-R18 consists of 18 items ranged from "definitely true" to "definitely false" on a 4-point scale. Cognitive restraint refers to the ability to consciously resist food consumption to manage weight. Uncontrolled eating refers to inability to control food intake because of perceived or subjective hunger. Emotional eating implies failure to resist emotional triggers. In this study, emotional eating were the subscale calculated to determine eating behaviors. Higher scores indicate high level of emotional eating. The questionnaire originally consisted of 51 items constructed in a Swedish population of obese individuals; the revised version was tested among the French general population in Northern France consisting of adults, teenager, and young adults of both genders (DeLauzon et al., 2004). DeLauzon et al. (2004) obtained internal-consistency reliability, estimated by Cronbach's α coefficients for each of the three sub-scales, ranging from 0.78 to 0.87; emotional eating had an internal consistency value of 0.87. The TFEQ-R18 presents high reliability thus relevance to a general population involving adult sample to be recruited in the proposed study. Moreover, the TEQ-R18 is

also an appropriate instrument used to measure health behaviors as it relates to the theoretical foundation for the current study.

Functional Social Support Questionnaire

The Functional Social Support Questionnaire (FSSQ), developed by Broadhead et al. and published in 1988, measured the level or strength of support perceived and received. Responses to the eight questions on the FSSQ ranged from "as I much as I would like" to "much less than I would like" on a 5-point scale. A total score, sum of the scores, was calculated across all eight questions and used in the data analysis. The higher scores present the higher level of perceived social support. This questionnaire was previously used with medical and mental health patients as well as healthy young adults in studies examining effects of social support on mental wellness; FSSQ hence would be a suitable instrument for the current study involving health behaviors and associated factors (Andrykowski & Cordova, 1998; Bovier et al., 2004). In the study involving cancer patients (n = 82), Andrykowski and Cordova (1998) used the FSSQ as the measure for social support. One of the study's independent variables was the level of PTSD symptoms and post breast cancer treatment as the dependent variable; the FSSQ in this study retained an internal consistency for the total score of .86. Similarly, Bovier et al. (2004) also used the FSSQ to ascertain the predictability of social support for attaining mental wellness, though among the healthy population of university students (n = 1257). They, however, modified the FSSQ to construct a 6-item instrument while retaining the two sub-scales, confident support and affective support. This study also preserved an adequate level of internal consistency, 0.70 for affective and 0.79 for confident support;

the researchers used factor analysis to confirm validity and reliability of the instrument (Bovier et al., 2004). In this study, I used the 8-item FSSQ to measure the level of support perceived and received.

Self-Compassion Questionnaire

The long version of the Self-Compassion questionnaire, developed by Kristin Neff and published in 2003, measures the level of self-compassion. In this study, I used the shorter version consisting of 12 instead of 26 items with near perfect correlation with the long scale, which was validated in 2011 by Raes et al. (2010). Responses ranged from 1 to 5 on a Likert scale with 1 as "almost never" and 5 as "almost always". A total score was calculated. Higher overall scores indicate higher level of practice of self-kindness, lower level of self-judgment, higher level of common humanity, lower level of isolation, higher level of mindfulness, and lower level of over-identified aspects of self-compassion (Raes, Pommier, Neff, & Van Guch, 2011; Neff, 2003). Raes et al. (2011) validated the short version in a study involving Dutch-speaking psychology students (n = 271) in Belgium. Raes et al. (2011) obtained satisfactory internal consistency, using Cronbach's alpha, with a high correlation with the long version of the Self-Compasion Scale. Raes et al. (2011) concluded that the short-form Self-Compassion Scale presents high reliability and validity, ranging from 0.80 to 0.92. Like other questionnaires in the study, the Self-Compassion Scale is also a suitable tool measuring health related behaviors as it relates to social cognitive theory, the primary theoretical basis for examining predictors of long-term tobacco abstinence.

Data Analysis Plan

SPSS software version 21 was used for all data analysis. Multiple regressions was the chosen statistical analysis, as the purpose of the present study was to examine the associations of multiple continuous variables; independent variables include exercise motivation level, eating behaviors, level of social support perceived, and level of self-compassion (George & Mallery, 2010). The dependent or criterion variable is the length of smoking or tobacco use abstinence, which is also continuous. Questions such as "Approximately, how many days did your longest quit attempt last?" "Was your longest quit attempt your last quit attempt" will be used to measure the length of the longest quit attempt. The current study presented several research questions: "Will exercise motivation be associated with the length of the longest quit attempt?" "Will eating behaviors be associated with the length of the longest quit attempt?" "Will social support be associated with the length of the longest quit attempt?" "Will self-compassion be associated with the length of the longest quit attempt?", and "Does the combination of exercise motivation, eating behaviors, social support, and self-compassion explain significant variation in the length of the longest quit attempt?" Prior to running the regression, the correlations between each independent variable and the dependent variable was assessed. In addition, the bivariate analysis included age and the length of tobacco use. Analyzed data had an alpha level set at .05. With five hypotheses stated above, a correlation coefficient of .03, effect size of .15, and statistical power of 0.8 was considered parameters for data analysis of a sample size of a minimum of 84 participants.

The null hypothesis stated a significant proportion of the variance in exercise motivation, eating behaviors, level of social support, and self-compassion practice does not account for the length of the longest quit attempt. The alternative hypothesis stated a significant proportion of the variance in exercise motivation, eating behaviors, level of social support, and self-compassion practice does account for the success of long-term smoking abstinence.

Threats to Validity

Like many survey research studies, a number of threats to internal and external validity may arise. Internal validity threats in the proposed study would include selection and mortality. Concerning selection, all participants in the study may share similar characteristics, as they all will be former tobacco users who may present better outlook or high levels of commitment reported for each of the predictor variables. Nonetheless, including all types of tobacco use in this study may minimize this type of internal validity threat. In terms of subject attrition, participants may drop out during the time they go through the questionnaires because of various reasons, one being fatigue associated with the length of completing the many questionnaires. A larger sample size, approximately 120 to 135 participants as opposed to 84, may account for dropouts. The one major threat to external validity in the proposed study, aligned with one of the aforementioned internal validities, would be interaction of selection. The study involved former tobacco users, results thus may not be generalized to the general population of tobacco users.

Ethical Procedures

Institutional Review Board Approvals

In accordance with the American Psychological Association (APA), the current study necessitated approval from the institutional review board (IRB) prior to conducting the study (APA, 2012, 8.01). The IRB application included detailed documents describing the type of treatment of human participants. The documents supporting the dissertation proposal submitted to the IRB included provided informed consent, questionnaires, online research recruitment information, and debriefing statements.

Ethical Concerns

Recruitment Process

To avoid or limit undue physical or psychological stress that may arise from various questionnaires, this study excluded those with reported current medical and or psychiatric concerns. The exclusion criteria were addressed to the potential online participants in the description of the study posted on Social Psychology Network website. This study did not involve monetary incentives and was incompliance with ethical guidelines including confidentiality safeguards.

Data Protection

To protect confidentiality, the survey did not require participants to provide their name or mailing address but general demographic information such as city, date of birth, gender, and tobacco use status. Each anonymous participant had an identification (ID) number to safeguard sensitive and identifiable information. Any data including raw scores and interpretation of results were saved in a secured computer. Only the researcher

had access to the data; electronic questionnaires and any collected data from participants were deleted or destroyed upon conclusion of the study or once the dissertation was complete and finalized.

Informed Consent

To adhere to the APA ethical standards regarding informed consent, participants were presented with information about the nature of the study (APA, 2012, 8.02). Prior to starting the survey, participants read and acknowledged their understanding of the potential length of time spent, which may require 20 to 30 minutes of computer time. Participants understood that participation in this study was voluntary, and there were no incentives offered with this study. Participants understood that they had the right to withdraw from the research or decline to continue to participate at any time once they had begun the study; participants could withdraw at any time they may foresee any kind of risks, discomfort, or adverse effects. Participants were made aware of the confidential nature of the study; they had the contact information for questions they may have about the research as well as their rights (APA, 2012, 8.02). There were no conflict of interest or power differentials as this study was an online research with anonymous data. Without incentives provided, participants may not be inclined to sign up or complete the study; studies with incentives higher than a specified amount may run the risk of enticing participants or removing the intrinsic essence of volunteer participation (APA, 2012, 8.06). Finally, the study did not involve deception, as it explicitly described the study as to measure tobacco-related behaviors.

Summary

The proposed study was a quantitative research involving online survey and former tobacco users as participants. SPN was the recruiting site as well as the site used to conduct the study. SurveyMonkey, a web-based data collection service, was used to enter questionnaires and to link to SPN. SPSS was the software used to run data analysis, which involved multiple regression analysis with four predictors: exercise motivation, eating behaviors, social support, and self-compassion. Existing and validated questionnaires used in the current study were rated on a Likert-type scale. Importantly, informed consent and ethical guidelines for research as well as the IRB approval guided the development of the study.

Chapter 4 presents and explains results of the proposed study. Included in chapter four will be quantitative and statistical analysis reports of the significant and nonsignificant findings. Along with descriptive statistics illustrated in tables and figures, the effect sizes of the various predictor variables will also be part of the report.

Chapter 4: Results

Introduction

The purpose of this study was to examine whether exercise motivation, eating behaviors, social support, and self-compassion, which were social cognitive variables, would predict the length of an individual's attempt at quitting tobacco use. The null hypotheses stated that each of these social cognitive variables was not associated with the length of the longest quit attempt. One of the null hypotheses also stated that a significant proportion of the combined variance of exercise motivation, eating behaviors, social support, and self-compassion would not account for the length of the longest quit attempt. The alternative hypotheses stated that each of these social cognitive variables was associated with the length of the longest quit attempt and a significant proportion of the combined variance of exercise motivation, eating behaviors, social support, and self-compassion would account for the length of the longest quit attempt. In this chapter, the timeframe of data collection, the descriptive and demographic characteristic of the samples, and generalizability of the population are discussed. Research findings are also elements included in this chapter.

Data Collection

The study, consisting of an online survey, commenced upon the IRB approval on February 27, 2014 and the approval of SPN on February 28, 2014 to post the study link. The survey continued until June 20, 2014 after reaching 90 completed surveys. The minimum sample size for this study, as discussed in Chapter 3, was 84. A total of 283 individuals participated in the study; however, 113 participants were disqualified per set

exclusion criteria, and 80 qualified participants did not complete the survey. The study excluded individuals with mental health and chronic health diagnoses and those currently using illicit drugs and methods to quit tobacco use such as electronic cigarettes, nicotine replacement therapy, and behavioral counseling or therapy; those in active duty military, military Reserve, or National Guard were also excluded. Incomplete surveys perhaps resulted from insufficient time, distractions, participants' choice and the right to stop at any time, or the lack of incentives for completing the survey. Hence, out of a potential 283 participants, 90 completed; the study thus achieved a response rate of approximately 32% as expected of an online survey (Kraut et al., 2004).

Demographics

Table 1 displays the demographic characteristics of the participants in this study. Of the 90 participants, 55% were females. Fifty-nine participants were current tobacco users. Of the 59 current tobacco users, nine had not made a quit attempt and 50 had made at least one quit attempt but had returned to tobacco use. Thirty-one participants were former tobacco users at the time of the survey who had not returned to tobacco use after their last quit attempt. The mode of the age groups was 55 to 64 years; the median age group was 45 to 54 years ($M = 46.73$, $SD = 3.58$). Among the participants in this study, the mean number of quit attempts in their lifetime was 5.30 attempts with a standard deviation of 12.23; the median was 2.0; the mode was 2.0. The mean number of years tobacco use was 20.6 years; the median was 20.0 and the mode was 30.0. Of all the 90 participants, three participants among the current tobacco users reported current use of smokeless tobacco and were included in the study.

Table 1

Frequencies and Percentages for Participant Demographics

			N	%	Years of Use	QA#
Gender						
	Male		40	44.4		
	Female		50	55.6		
Age						
	18-24		7	7.8		
	25-34		13	14.4		
	35-44		18	20.0		
	45-54		20	22.2		
	55-64		26	28.9		
	65-74		5	5.6		
	75-84		1	1		
Tobacco Use Status						
	Current		59	65.6		
		Mean			20.72	4.85
		SD			12.18	13.22
	Former		31	34.4		
		Mean			20.35	6.16
		SD			14.03	10.24

Table continues

Race/Ethnicity			
	Hispanic	2	2.2
	African American	9	10
	Caucasian	64	71.1
	American Indian	2	2.2
	Asian American	7	7.8
	Unknown	1	1.1
Marital Status			
	Married	44	48.9
	Never Married	26	28.9
	Divorced	19	21.1
	Unknown	1	1.1
Employment Status			
	Employed	57	63.3
	Unemployed	21	23.3
	Retired	12	13.3
Education Level			
	Below High School	3	3.3
	High School Graduate	28	31.1

Table continues

1Year of College	10	11.1
2 Years of College	10	11.1
3 Years of College	2	2.2
College Graduate	20	22.2
Graduate School	16	17.8
Unknown	1	1.1

Note. Sample of participants with completed surveys *(n* = 90*).*

Preliminary Analyses of Variables

Prior to running the multiple regression analysis, descriptive statistics of possible covariates such as the number of quit attempt, the length of tobacco use, and the length of the longest quit attempt (LQA) were conducted (see Table 2). In addition, the bivariate analysis assessed the correlation between the LQA and the length of tobacco use, the number of quit attempts, and age. Table 3 shows that there were no significant relationships between these possible covariates and the dependent variable (LQA). Descriptive statistics and analysis of outliers as well as normal distribution of each independent variable and the dependent variable were also conducted prior to hypotheses testing.

Table 2

Descriptive Statistics of Quit Related Variables

	Length of Longest Quit Attempt (Years)	Number of Quit Attempt	Years of Use
Mean	4.76	5.3	20.60
Median	.53	2	20
Mode	0	2	30
Standard Deviation	8.34	12.23	12.775

Note. Valid $n = 90$.

Table 3

Pearson Correlation Coefficient between Potential Covariates and Length of the Longest Quit Attempt (logLQA)

		Age	QA#	Years Use	LQA
Age	Pearson Correlation	1	.072	.268*	.117
	Sig. (2-tailed)		.497	.011	.271
QA#	Pearson Correlation		1	.281**	.029
	Sig. (2-tailed)			.008	.783
Years Use	Pearson Correlation			1	-.142
	Sig. (2-tailed)				-.185

Independent Variables

The independent variables consisted of exercise motivation (EM), eating behavior (EB), social support (SS), and self-compassion (SC). Table 4 displays the descriptive statistics including skewness and kurtosis values of these predictor variables. The BREQ-2 measured the intrinsic motivation, which consisted of four questions measured on a 5-point scale. Higher scores suggest higher levels of intrinsic motivation. From the data obtained (n = 90), the total score for exercise motivation ranged from 4 to 20 with a mean of 12.5 and a standard deviation of 4.90. The skewness and kurtosis values of EM scores are within the span of ±1.96, which is the acceptable range for the asymmetry and peak of a distribution (Doane & Seward, 2011). The outlier analysis indicated no outliers for EM scores.

The emotional eating subscale of the TFEQ-R18 consisted of 3 questions. The higher scores suggest higher levels of emotional eating tendency. The total score for eating behavior ranged from 3 to 12 with a mean of 6.10 and a standard deviation of 2.44; the values of skewness and kurtosis are within the acceptable limits of a normal distribution. No outliers were indicated by the univariate analysis of outliers.

The FSSQ is an 8-item instrument used to assess the level of support perceived and received on a 5-point scale; the higher the total score the higher the level of support perceived and received. The total score for social support in this study ranged from 28 to 40 with a mean of 36.27 and a standard deviation of 3.22; the distribution of SS was normal based on the calculation of the skewness and standard error skewness that is

within the ±1.96 range (Doane & Seward, 2011). Outliers were not identified for SS either.

The SCSS is a 12-item instrument used to measure the level of self-compassion on a 5-point scale. The higher total score suggest higher level of self-compassion. The total score for self-compassion in this study ranged from 22 to 57 with a mean of 38.67 and a standard deviation of 7.36, the values of skewness and kurtosis were within the acceptable limits which approximate a normal distribution. There were 5 outliers identified for SC.

Table 4

Descriptive Statistics of the Independent Variables

	Exercise	Eating Behavior	Social Support	Self-Compassion
Mean	12.50	6.10	36.27	38.67
Median	12.00	6.00	37.00	38.00
Mode	16	3	40	37
Standard Deviation	4.90	2.44	3.22	7.36
Skewness	-0.26	0.32	-0.70	0.42
Std. Error of Skewness	0.25	0.25	0.25	0.25
Kurtosis	-0.81	-0.61	-0.35	0.38
Std. Error of Kurtosis	0.50	0.50	0.50	0.50

Note. Valid $n = 90$.

Dependent Variable

The LQA was the dependent variable. A quit attempt was defined as absence of tobacco use or smoking for a minimum of 24 hours or longer (American Psychiatric Association, 2013; DiClemente et al., 1991; Hughes et al., 2003; Japuntich, Piper, Leventhal, Bolt, & Baker, 2011). The LQA obtained among participants (n = 90) yielded a mean of 1735.74 days (4.76 years) and a standard deviation of 3043.22 days (8.34 years). Of the 90 participants, 11 had never made a quit attempt or did not make 24 hours without tobacco use when they attempted to quit, which resulted in 11 zero scores for LQA**.** There was one participant with an LQA of 36.65 years and 3 participants with the next LQA of 30 years, all from the same age group of 65 to 74. In examining LQA outliers, the univariate analysis identified 14 outliers with LQA greater than 13 years; these outliers were included in the log transformation of LQA. The descriptive statistics revealed a positively skewed distribution (see Table 5).

Table 5

Distribution of Length of Longest Quit Attempt (LQA)

	Statistics	Standard Error
Skewness	2.048	.254
Kurtosis	3.62	.503

Note. Valid n = 90.

Considering the positive skewness and the presence of zero scores, log transformation was applied to the LQA to normalize the data. The constant number .80 was added to each LQA score in the data to allow log transformation of zeros; the outliers

were included in the transformation. The skewness value of the transformed LQA is -.23 and the kurtosis value of -1.146, which are within the acceptable range. Figure 2 presents the distribution of LQA after the log transformation.

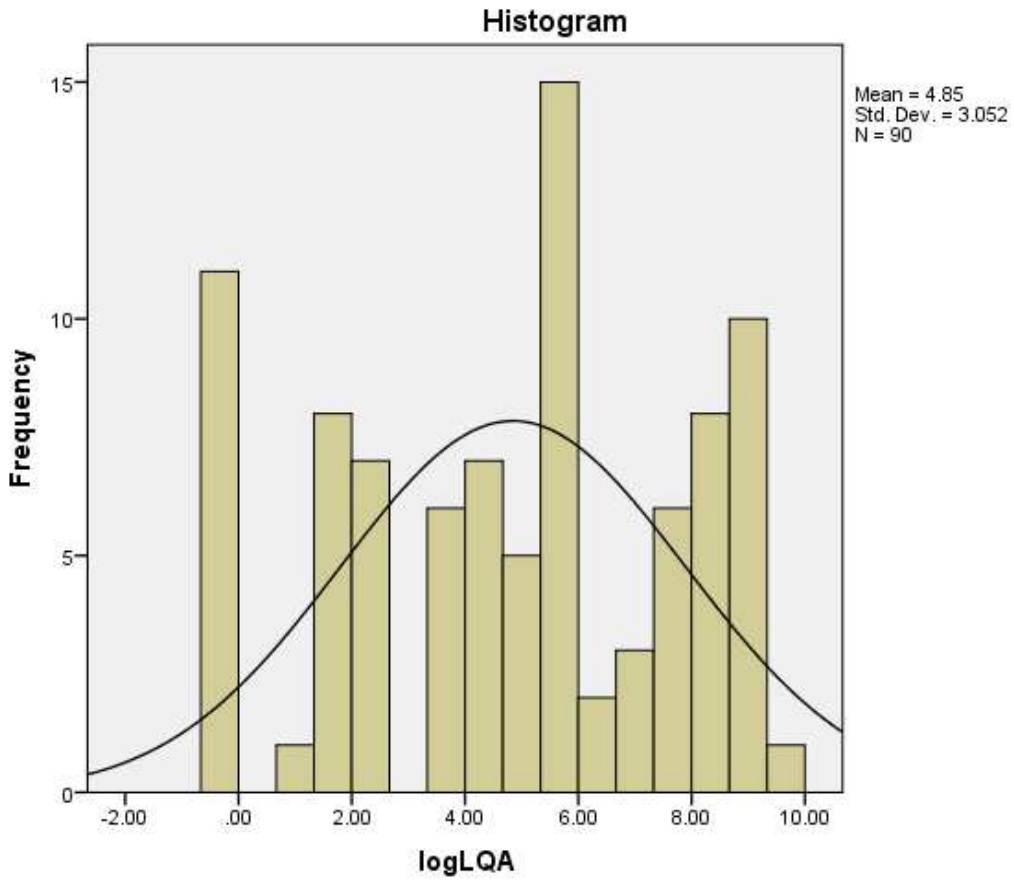

Figure 2 – Distribution of the Log Transformation of the Length of the Longest Quit Attempt (logLQA)

Assumptions of Multiple Regression Analysis

One of the assumptions of multiple regression analysis is that the residuals are normally distributed. It is also assumed that the predictor variables are independent of each other; the variance inflation factor (VIF) values less than 5 would indicate negligible

degrees of multicollinearity (O'Brien, 2007). Additionally, the relationship between the predictor variables and the dependent variable, logLQA, is assumed linear; the distribution of residuals close to a straight line should represent linearity. See results of tests for assumptions below.

Research Questions and Hypotheses Testing

Five research questions were posed to determine the relationship between predictor variables, exercise motivation (EM), eating behavior (EB), social support (SS), self-compassion (SC) and LQA, and whether the combined variance of exercise, eating behavior, social support, and self-compassion predict LQA. Pearson correlation was conducted to test the first four hypotheses examining the association between EM and LQA, EB and LQA, SS and LQA, SC and LQA. The analysis between SC and the dependent variable (LQA) was run with and without SC outliers. Excluding the outliers did not increase or decrease the significance of SC, therefore, these outliers were included in the subsequent analyses. For the fifth hypothesis, multiple regression analysis was used to predict LQA from a combination of EM, EB, SS, and SC. Table 6 presents the correlation between the predictors and LQA.

Table 6

Pearson Correlation Coefficient between Predictor Variables and log transformed Length of the Longest Quit Attempt (logLQA)

		EM	EB	SS	SC	logLQA
EM	Pearson Correlation	1	.123	.146	.017	.061
	Sig. (2-tailed)		.249	.170	.873	.566
EB	Pearson Correlation		1	-.098	-.305**	.012
	Sig. (2-tailed)			.358	.003	.909
SS	Pearson Correlation			1	.249*	.098
	Sig. (2-tailed)				.018	.358
SC	Pearson Correlation				1	.494**
	Sig. (2-tailed)					.000
logLQA	Pearson Correlation					1
	Sig. (2-tailed)					

Note. **Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed). $N = 90$ for all analyses.

Exercise Motivation and the Length of the Longest Quit Attempt

Research question 1 sought to determine if exercise motivation was associated with the length of the longest quit attempt. Results of the correlation analysis indicated that exercise motivation and LQA are not significantly correlated, $r(90) = .061$, $p = .566$. Therefore, the null hypothesis failed to be rejected.

Eating Behavior and the Length of the Longest Quit Attempt

Research question 2 sought to determine if eating behavior was associated with the length of the longest quit attempt. Results of the correlation analysis indicated that eating behavior and LQA were not significantly correlated, $r(90) = .012$, $p = .909$. Therefore, the null hypothesis failed to be rejected.

Social Support and the Length of the Longest Quit Attempt

Research question 3 sought to determine if social support was associated with the length of the longest quit attempt. Results of the correlation analysis indicated that social support and LQA were not significantly correlated, $r(90) = .098$, $p = .358$. Therefore, the null hypothesis also failed to be rejected.

Self-Compassion and the Length of the Longest Quit Attempt

Research question 4 sought to determine if self-compassion was associated with the length of the longest quit attempt. Results of the correlation analysis indicated that eating behavior and LQA were significantly correlated, $r = .494$, $p < .001$. Therefore, the null hypothesis was rejected.

Combined Variance of Predictor Variables and the Length of the Longest Quit Attempt

Research question 5 sought to determine if the combination of exercise motivation, eating behaviors, social support, and self-compassion explained significant variation in the length of the longest quit attempt. The overall model was statistically significant with R^2 of .275, $F(4, 85) = 8.049$, $p < .001$ (see Table 7). The combination of exercise motivation, eating behavior, social support, and self-compassion accounted for

24.1% of the variance in the adjusted length of the longest quit attempt (LQA) as measured by adjusted R^2 (see Table 8). Adjusted R^2 was considered as opposed to R^2 as adjusted R^2 provides the percentage of variation explained by only the predictor variables that affect the dependent variable, the length of the longest quit attempt. The results indicated that self-compassion had a significant influence on the length of the longest quit attempt, $\beta = .553$, $p < .001$. The model predicted that for a one-point increase in the level of self-compassion, LQA increased by 230 days holding exercise motivation, eating behavior, and social support constant. Eating behavior though was nearly significant, $\beta = .174$, $p = .079$, but it did not add to the prediction. Exercise motivation and social support did not add to the prediction either (See Table 9).

The multiple regression analysis did meet the aforementioned assumptions in regards to normality. Figure 4 displays the residuals normal distribution. The distribution of residuals was very close to a straight line assuming linearity (see Figure 3) indicating the validity of the model shown in Table 9 is supported. Additionally, none of the independent variables were highly correlated as observed in the overall regression model. Table 10 displays the VIF value of each independent variable which was less than 5 and tolerance values above 0.20. These values indicated negligible degrees of multicollinearity (O'Brien, 2007).

Table 7

Results of the Overall Model

	SS	Df	MS	*F*	*P*
Regression	227.702	4	56.926	8.049	<.001
Residual	601.132	85	7.072		
Total	828.834	89			

Table 8

Predictor Variables and the Length of the Longest Quit Attempt: Model Summary

R	R^2	Adjusted R^2	Standard Error of the Estimate
.524	.275	.241	2.659

Table 9

Summary of Multiple Regression for Variables Predicting the Length of the Longest Quit Attempt (n = 90)

Variable	Length of Longest Quit Attempt (LQA)					Partial Correlation
	B	SE	Beta	*T*	Sig	
EM	.021	.059	.034	.365	.716	.040
EB	.218	.123	.174	1.779	.079	.189
SS	-.026	.091	-.028	-.288	.774	-.031
SC	.230	.041	.553	5.548	.000	.516

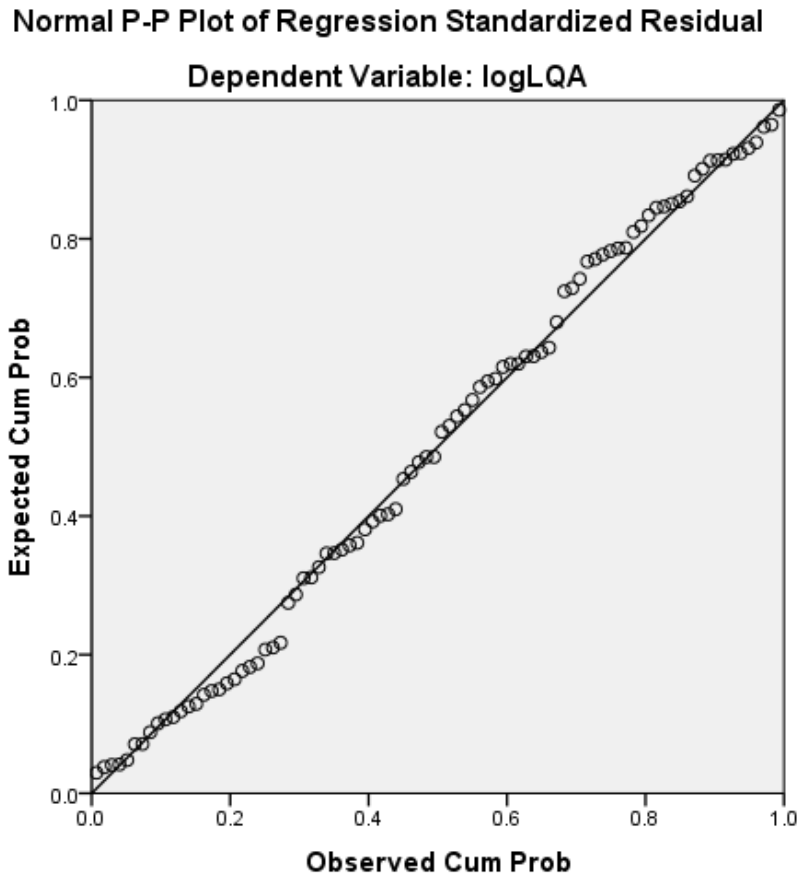

Figure 3 – Normal Probability Plot

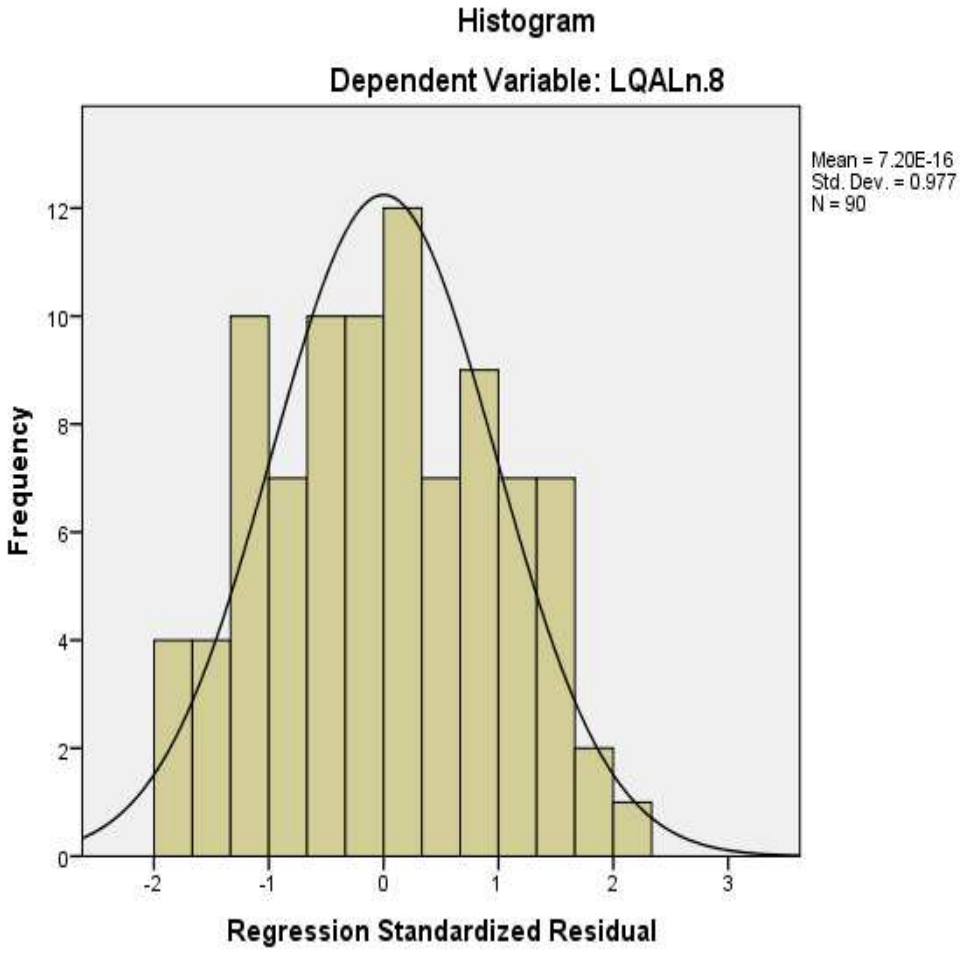

Figure 4 – The Residuals Normal Distribution

Table 10

Collinearity Statistics

	Tolerance	VIF
Exercise Motivation	.959	1.042
Eating Behavior	.889	1.125
Social Support	.916	1.092
Self-Compassion	.858	1.166

Summary of Results

Pearson correlation coefficients were conducted to evaluate the relationship between each independent variable and the dependent variable (n = 90). There was no significant association between exercise motivation, eating behaviors, or social support and the length of the longest quit attempt. These findings failed to reject the first three null hypotheses. However, there was significant evidence to reject the fourth null hypothesis. The results showed that there was a moderate, positive association between self-compassion and the length of the longest quit attempt, indicating higher levels of self-compassion associated with longer length of quit attempt. The results of the overall model and the multiple regression analysis were statistically significant. These findings thus rejected the fifth null hypothesis. About 24.1% of the total variability in the length of the longest quit attempt can be explained by the overall model. However, only self-compassion was significant in predicting the length of the longest quit attempt.

Moreover, the results of this chapter presented a sample size of 90 participants who completed the survey. The descriptive data presented a diverse sample of the adult population of tobacco users in regards to tobacco use characteristics, age, gender, race, education level, marital status, and employment status. Bivariate correlation and multiple regression analysis were used to test the hypotheses in this study. The data obtained did not support the hypothesis that exercise motivation, eating behavior, or social support predicts the length of the longest quit attempt. However, self-compassion was associated with the length of the longest quit attempt. The results also indicated that a significant proportion of the combined variance of exercise motivation, eating behaviors, social

support, and self-compassion accounted for the length of the longest quit attempt. The findings revealed that self-compassion was the only significant predictor of the length of the longest quit attempt.

Chapter 5 will present a more in-depth interpretation of these findings. Limitations, recommendations for future research, and implication for positive social changes will also be discussed in the last chapter.

Chapter 5: Discussion and Conclusion

Introduction

Numerous tobacco researchers have investigated the contributing factors to tobacco use relapse. Few investigators have researched the factors predicting the length of tobacco use abstinence. The purpose of the conducted study was to examine the cognitive behavioral variables including exercise, eating behaviors, social support, and self-compassion as predictor variables for the length of the longest quit attempt. An online survey was used to acquire data from 90 participants who were former or current tobacco users at the time of the study. Exercise motivation was measured using the Exercise Regulation Questionnaire BREQ-2 (Markland & Tobin, 2004), emotional eating was measured using the Three-Factor Eating questionnaire (DeLauzon et al., 2004), social support was measured using the FSSQ (Broadhead et al., 1998), and self-compassion was measured using the short form of the Self-Compassion scale (Raes et al., 2011). Multiple regression was the statistical analysis approach used in the study to determine the significance of the predictor variables from the collected data. This chapter provides interpretations of the findings, the strengths and limitations of the study, and recommendations for future research. Implications for positive social change and conclusions are also to follow in this chapter.

Review of Major Findings

According to data analyses, there was no significant correlations between exercise motivation, emotional eating, or social support and the dependent variable, LQA. Statistically significant results were found for the relationship between self-compassion

and the length of the longest quit. A significant proportion of the combined variance of exercise motivation, eating behaviors, social support, and self-compassion accounted for the length of the longest quit attempt. However, only self-compassion contributed a significant amount of variance to the overall model. Moreover, the findings in this study did not support the previous findings of the significance of exercise motivation, eating behaviors, and social support in predicting maintenance of health behaviors as suggested in the examined literature. Nonetheless, there was a significant correlation between self-compassion and the length of the longest quit attempt. From the analysis of multiple predictors, only self-compassion was a significant predictor of the length of LQA. Interpretations of the finding of each variable are to follow.

Interpretations of the Findings

Exercise Motivation

Exercise motivation, referring to the extrinsic and intrinsic aspects of self-determination and self-efficacy, involves an individual's readiness, willingness, and commitment to initiate and maintain exercise routines (Duncan et al., 2010; Marcus et al., 1992; Rouse et al., 2011; Scioli et al., 2009; Teixeira et al., 2012). Surprisingly, high levels of exercise motivation did not associate with the length of a person's quit attempt, a finding which did not support the findings in the previous studies. Scioli et al. (2009) revealed significantly higher levels of intrinsic motivations for exercise among physically active nonsmokers, who either were former smokers or had never smoked, than among those who were physically active smokers. Other researchers also have suggested the positive effects of exercise on weight management among smokers and increased

probabilities of success with tobacco use cessation (Daniel et al., 2007; Faulkner et al., 2010; Schneider et al.; 2007; Van Rensburg et al., 2009). The population and sample size used in these studies, however, were different from those used in this study which may influence the significant result of exercise motivation. The study conducted by Faulkner et al. (2009) involved 19 participants who were current smokers and the study by Van Rensburg et al. (2009) had a sample size of 10 current smokers. Scioli et al. (2009) studied a large sample (n = 614) of college students which may not be representative of the general population. In this study, the participants' level of education ranged from below high school to graduate school. It is possible that a college student population may exhibit higher exercise motivation levels than the general population. In addition to the differences in the sample size and demographic characteristics, the smoking characteristics in this study were different from the previous studies in regards to the participants' smoking status. In this study, I included current and former tobacco users while aforementioned studies included participants who had never smoked (Scioli et al., 2009), or only current smokers (Faulkner et al., 2009; Van Rensburg et al., 2009). Never smokers may have acquired different health habits than former or current smokers and demonstrated different levels of exercise motivation.

Aside from the differences between this study and previous studies, a possible explanation of the nonsignificant relationship between exercise and tobacco use cessation in this study is that current tobacco users may consider the negative effects of tobacco use and compensate this unhealthy behavior with increased exercise motivation. However, a simple t-test of mean differences conducted between the current and former users on

exercise motivation did not reveal a significant difference, $t(88) = -.428$, $p = .670$. Thus, tobacco use status does not explain the differences in exercise motivation. Another possibility is that former tobacco users or those with longer quit attempts may have observed improved health outcomes associated with prolonged cessation, thus no longer felt the need to exercise. From a theoretical perspective such as the transtheoretical model, a person's readiness to change a particular health behavior may not necessarily suggest his or her same level of readiness for all other health behaviors. Hence, the nonsignificant result of exercise motivation indeed supports the theoretical foundation considered for this study.

Eating Behaviors

In this study, I examined emotional eating, the tendency to respond to stressful feelings with eating, among current and former tobacco users. I did not find a significant association between eating behaviors and maintenance of tobacco use abstinence. The level of emotional eating among current and former tobacco users did not significantly influence the length of the LQA, whether an individual has quit for years or a few days. Controlled eating can hinder smoking cessation efforts (Leeman et al., 2010; Shmueli & Prochaska, 2009). The perceived stress related to restraining food intake may trigger the urges to smoke. Additionally, food deprivation and the stress of tobacco use cessation may influence maintenance of health behaviors. Leemant et al. (2010) found that participants with food deprivation were quicker to resume smoking than those without food deprivation. Similarly, Courbasson et al. (2008) found that participants with higher level of emotional eating or tendency to respond to stress with eating presented higher

confidence to refrain from drug use. This study did not involve food deprivation or participants with clinical diagnoses of eating disorders or substance use disorders like aforementioned studies. Previous tobacco cessation studies did not use the same scale, the Three-Factor Eating Questionnaire, to measure emotional eating which may suggest that it was not an effectual measure of eating behaviors among current or former tobacco users. The finding in this study nonetheless was analogous to the literature of eating behaviors and addictive behaviors as it suggests that healthy eating behaviors may not predict maintenance of health behaviors such as tobacco use abstinence.

Social Support

Unexpectedly, the levels of perceived and received social support did not predict the length of the LQA among current and former tobacco users. Higher level of social support did not suggest longer quit attempts. One possible explanation may relate to the tenets of the TTM, which suggests the stages of change that influence an individual's readiness to quit tobacco use are independent of other factors such as adequate social support (DiClemente et al., 1991). Based on the TTM, individuals may have positive social support yet continue to use tobacco if they are in the P or C stage of change. Future researchers may explore the association between the stages of TTM and the length of tobacco use abstinence. Nonetheless, the results are consistent with findings in the examined literature which suggested that positive support do not predict long-term smoking abstinence beyond the 12 weeks (Lawhorn et al., 2009). Similarly, May et al. (2007) also suggested that social support could not predict long-term success with

quitting smoking either as internal factors; participants' level dependency on nicotine and their perceived confidence in quitting were more important than social factors.

Self-Compassion

Self-compassion refers to the lack of self-criticism, acceptance of inadequacies as part of human experiences, and nonjudgmental attitude toward one's awareness of psychological pain (Neff, 2003). In this study, self-compassion was the only variable that was significantly correlated with a person's length of the longest quit attempt. Participants with higher levels of self-compassion obtained longer lengths of quit attempts than those with lower level of self-compassion. Individuals with higher levels of self-compassion are less self-critical and judgmental and more forgiving and accepting of inadequacies thus experience or perceive less stress and deprivation related to health attainment or maintenance such as tobacco use abstinence. Similarly, in a study of the effect of self-compassion training on smoking, Kelly et al. (2010) also suggested that individuals with lower self-critical tendency or higher level of self-compassion significantly reduced smoking as compared to the group with lower level of self-compassion or higher self-critical tendency. The researchers in this self-compassion training study, however, did not assess the level of self-compassion prior to the interventions. Thus, it is not known whether the training increased or decreased the level of self-compassion. The findings corresponded with the constructs of the social cognitive theory which postulates that perceived ability and control in achieving goals can motivate people to make decisions and take actions (Baban & Craciun, 2007). A higher level of self-compassion involves a high level of self-efficacy that includes self-confidence and

sense of control that may help one continue to maintain a positive health behavior such as maintaining tobacco free. A lower level of self-compassion may indicate a lower sense of control and self-confidence to continue to maintain a healthy change. Moreover, the significant correlation between self-compassion and LQA suggests that judging inadequacies, not accepting common humanity, criticizing inabilities, and lacking self-kindness may intensify the perceived level of stress experienced with the quit process thus impeding the potential of prolonged abstinence.

Theoretical Implications

Exercise motivation, eating behaviors, and social support did not predict the length of the longest quit attempt; however, self-compassion was significantly associated with the length of a quit attempt. From the findings, exercise motivation, eating behaviors, social support did not add significance to the total variance in the length of the longest quit attempt. Self-compassion was the only significant predictor of the length of the longest quit attempt. These significant results can be understood from standpoints of the social cognitive theory, which includes constructs such as coping strategies and self-regulation of health habits. Social cognitive theory postulates that perceived ability and control in achieving goals can motivate individuals to make decisions and take actions such as quitting tobacco and maintaining tobacco free. A sense of control over one's behavior or self-efficacy, the ability to manage health habits such as eating well and exercise can stem from self-compassion. Higher levels of self-compassion correlate with lower levels of emotional eating (healthier eating behaviors). A low level of self-compassion thus may indicate a negative outlook on health maintenance. Hence, stress

management strategies such as exercise and eating may not play a significant role in quitting tobacco use or maintaining a tobacco free life if one continues to be self-critical and judgmental towards various aspects of being. Social support would not have a major impact on one's perceived abilities or control if one struggles to see common humanity in hardships. Individuals with a low level of perceived support may have a low level of self-compassion. In addition, the transtheoretical model may suggest that individuals with a high level of self-compassion and adequate stress coping strategies that include exercise, healthy eating, and social support may be more likely to be in the action or maintenance stage of change. Individuals in the action or maintenance stage would be more ready and committed to use all stress coping skills to manage the challenges associated with a quit attempt. Moreover, self-compassion seems to be an important aspect of mental and social wellness that may influence an individual's success with maintaining a healthy behavior such as long-term tobacco use abstinence.

Limitations of the Study

The limitations in this study primarily involved the nonprobability sampling method, which may pose limits to generalizability, and the self-report nature of responses collected. Though the study involved the nonprobability sample, the inclusion criteria allowed for a more diverse sample in regards to age, race, education level, marital status, and employment status, which contributed to the generalizability of the study. In regards to self-report responses, the current study involved the assumption that participants were truthful with their responses to the questionnaires. Assumed accuracy of self-reports of the length of abstinence as well as several aspects of tobacco use behaviors could present

a reliability threat; however, the anonymity nature of this online study may inhibit the need to impress and generate more honest responses which may counteract potential threats to reliability.

In addition to aforementioned limitations, another limitation, which is common among quantitative research studies, is the lack of the examination of the reasons and meanings associated with participants' health habits and practices (Creswell, 2009). This study does not elucidate the reason why participants' received and perceived social support, exercise motivation, eating behaviors, or self-compassion were or were not at a desired or ideal level that may increase their length of quit attempt. Furthermore, I did not include former or current tobacco users with diagnosed chronic medical and psychiatric or mental health conditions thus findings may not be applicable to the populations with these challenges. Nonetheless, findings from this study are valuable and applicable to several health-related disciplines including other drug addictions and health issues, as they may suggest strategies for health attainment and maintenance or recovery.

Recommendations

Future studies may involve a larger sample size to increase generalizability and reduce potential sampling variability. Inclusion of individuals with chronic health diagnoses in future correlational studies may add more significance to the findings of the predictability of self-compassion, social support, exercise motivation, or eating behaviors in relation to tobacco use cessation. Thus far, few health studies have examined self-compassion as a social cognitive construct or stress management strategy in predicting long-term health behavior maintenance such as tobacco use cessation. Future researchers

can investigate the strength or value of self-compassion in examining effective treatment strategies for individuals with addictive behaviors.

This study involved an online survey that quantified the participants' responses and did not acquire the meanings participants ascribe to their quit attempts as well as quit successes. Future studies involving qualitative methods or mixed methods may explore the motivation or rationale contributing to an individual's length of longest quit attempt, which may further explain the role of exercise, the influence of eating behaviors, the effect of social support, and the strength of self-compassion in relation to the individual's success with quitting tobacco use.

Implications

This study though centered on the maintenance of tobacco use cessation, the findings, however, can be applicable to improving several health behaviors as well as addiction treatment. Tobacco or nicotine use has received more attention and recognition for being an addiction and a health behavior with negative health consequences. Overcoming tobacco use addiction with increased likelihood of maintenance would imply that the cognitive behavioral tools or strategies used for long-term tobacco use abstinence would be useful or effective for overcoming other health behaviors such as weight management or overcoming alcohol and drug addiction.

An application for practice is for health care systems and behavioral health professionals to apply appropriate treatment interventions that involve addressing self-compassion in order to increase treatment effectiveness. Behavioral health practitioners such as mental health or addiction therapists and social workers can encourage tobacco

users to assess and enhance self-compassion. Self-compassion studies have implied that practicing or increasing self-compassion involves mindfulness training and cognitive restructuring such as challenging and changing critical self-talk (Leary, Tate, Adams, Batts Allen, & Hancock, 2007; Roeser et al., 2013). Changing negative inner dialogue, being mindful of the present, making time for oneself, accepting one's imperfection, communicating the truth to self and others, and practicing self-care are also exercises of self-compassion that clinicians may suggest to their patients or clients (Patsiopoulos & Buchanan, 2011; Roeser et al., 2013). Therapeutic interventions involving the need to practice and increase self-compassion can increase individual chances to maintain longer periods of tobacco use cessation.

Positive Social Change

The findings from this study can potentially benefit the society in regards to health care concerns and healthcare costs. Tobacco use poses risks not only to the users but also those around them as it has been linked to direct and indirect health effects (Edwards, 2009; Swan & Lessov-Schlaggar, 2007). Tobacco users may develop health issues such as chronic obstructive pulmonary diseases, increased cancer risks, and increased heart diseases. Second-hand smoke or environmental tobacco smoke (ETS) has also been a public health issue as toxic chemicals can have negative effects on one's overall health (Handel et al., 2011; Sundstrom & Nystrom, 2008; Sundstrom, Nystrom, & Hallmans, 2008; Swan & Lessov-Schlaggar, 2007). Health effects of tobacco use and ETS not only have cost healthcare billions of dollars annually but also decreased productivity for corporations (Baard & Baard, 2009; CDC, 2012; Durazzo, Meyerhoff, &

Nixon, 2010; Nuebeck, 2006). Moreover, the findings from this study have implications for treatment interventions that may prolong abstinence from tobacco use; increased length of tobacco cessation and quit maintenance may decrease health risks, increase productivity, and lower health care costs.

Conclusion

Tobacco use remains prevalent despite the negative health consequences, rising healthcare costs, and being one of the leading causes of preventable disabilities and death. Tobacco use is not solely a public health concern; the DSM-5 has classified tobacco use as nicotine use disorder or nicotine dependence, which implies addiction. Relapse on tobacco use has also remained high, which indicates the need for more effective interventions. The literature has identified stress as a common barrier to the maintenance of health behaviors. Studies have found cognitive behavioral variables consisting of exercise, nutrition management, social support, and self-compassion to be vital components of stress management. Maintaining long-term abstinence from an addictive behavior such as tobacco use would require effective stress management skills. The current study, unlike several tobacco research studies, is one of the few to examine the cognitive behavioral variables that may predict an individual's chance at prolonging a quit attempt.

The current study involved an online study with a sample (n = 90) of current and former tobacco users who self-reported their tobacco use history and information as well as the ratings of their levels of exercise motivation, emotional eating, perceived and received social support, and self-compassion. In reviewing the results, the multiple

regression analysis revealed a significant positive correlation between self-compassion and the length of the longest quit attempt. The results also suggested a significant proportion of the variance of exercise motivation, eating behaviors, social support, and self-compassion accounted for the length of the longest quit attempt. However, exercise motivation, eating behaviors, and social support were not a factor in predicting the length of the longest quit attempt as self-compassion accounted for almost all of the variance in the length of the longest quit attempt.

This study presented some preliminary findings as they suggest the importance of examining self-compassion in health maintenance; however, further research on the predictability of social cognitive variables is recommended. Nonetheless, findings from this study may have unearthed one of the key components of successful maintenance of positive changes such as maintaining a tobacco free life. Whilst the social cognitive theory primarily provided the theoretical foundation for the current study, TTM and functionalism also provided some principles in examining and predicting human behaviors. Based on the TTM concepts, for the society to change, individuals have to be ready to make the needed changes. Derived from functionalism, social changes occur when the social forces influence an individual's behavior. Maintaining positive changes among individuals via the means of social cognitive interventions in turn may transpire positive social changes. Future studies may incorporate TTM more effectively by assessing participants' stage of change and examine the correlation between the stages of change and social cognitive variables.

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Appendix A: Consent Form

You are invited to take part in a research study of tobacco use and health-related behaviors including exercise, social support, eating behavior, and self-compassion. The researcher is inviting former and current tobacco users who are not using any form of nicotine replacement or involved in a behavioral intervention, or counseling, for tobacco cessation to be in the study. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Tam Villar, who is a doctoral student at Walden University.

Background Information:
The purpose of this study is to determine whether health-related behaviors would predict long-term quit maintenance.

Procedures:
If you agree to be in this study, you will be asked to:

- Answer the questionnaires by choosing and checking the appropriate rating. Each questionnaire may take 5-10 minutes to complete. Data will be collected one time.
- You will first sign this consent form prior to starting the demographic questionnaire.
- After completing the demographic questionnaire, you will complete the questionnaires for exercise, social support, eating behavior, and self-compassion.
- Here are some sample questions:

  Exercise Questionnaire

  I exercise because it is fun.

Not true for me		sometimes true for me		Very True for me
0	1	2	3	4

  Self-Compassion Questionnaire

Almost never				Almost always
1	2	3	4	5

  When times are really difficult, I tend to be tough on myself.

Voluntary Nature of the Study:
Your participation in this study is voluntary. Everyone will respect your decision of whether or not you choose to be in the study. No one at Walden University or Social Psychology Network will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind later. You may stop at any time.

Risks and Benefits of Being in the Study:
Being in this type of study involves some risk of the minor discomforts that can be encountered in daily life, such as fatigue, stress or mild anxiety. Being in this study would not pose risk to your safety or wellbeing. You may withdraw from the study at anytime or may decline to answer any questions. Your participation may benefit professionals as well as individuals for identifying helpful strategies may improve their chances of successful quit efforts.

Payment:
There will be no compensation provided for participating in this study.

Privacy:
Any information you provide will be kept confidential and anonymous. The researcher will not use your personal information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in the study reports. Data will be kept secure by passwords and encryption. Data will be kept for a period of at least 5 years, as required by the university.

Contacts and Questions:
You may ask any questions you have now. Or if you have questions later, you may contact the researcher via nhu-tam.villar@waldenu.edu. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 1-800-925-3368, extension 1210. Walden University's approval number for this study is **02-27-14-0201308** and it expires on **February 26, 2015.**

Please print or save this consent form for your records.

Statement of Consent:

I have read the above information and I feel I understand the study well enough to make a decision about my involvement. By clicking the link below, "I consent", I understand that I am agreeing to the terms described above.

Appendix B: Screening and Demographic Questionnaire

1. In what state or US territory do you live?
2. Are you male or female?
3. What is your age?
4. How many years of education have you completed?
5. Which of the following categories best describes your employment status?
   Employed Unemployed Retired
6. Are you White, Black, or African –American, American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, or some other race?
7. Are you married, widowed, divorced, separated, or never married?
   Married Widowed Divorced Separated Never Married
8. Are you currently serving in the US military or National Guard?
9. Do you have a history of depression?
10. Are you currently experiencing depression?
11. Do you have a history of anxiety?
12. Are you currently experiencing anxiety?
13. Are you currently using nicotine patch, gum, lozenge, inhaler, nasal spray, electronic cigarettes, Wellbutrin, Chantix, Bupropion, or any medication to stop using tobacco?
14. Are you currently diagnosed with a chronic medical condition such as COPD, cancer, HIV/AIDS, or coronary heart disease?
15. Are you currently using illicit drugs?
16. Are you currently using prescription drugs?
17. Are you currently receiving counseling or psychological treatment interventions for addiction, mental health issues, or anything?

18. Are you currently using tobacco?
19. If you are currently using tobacco, how many days in a week do you use tobacco or smoke?
20. Are you a former smoker or tobacco user?

21. During the past 12 months, have you tried to stop using tobacco?
22. How many times have you tried to quit using tobacco in your lifetime?
23. How many days has it been since the last time you used tobacco or smoked a cigarette, even a puff?
24. How long ago, in years, did you start smoking cigarettes or using tobacco?
25. If you smoke cigarettes, about how many cigarettes do you smoke in a typical day?

Less than a pack A pack More than a pack 2 packs More than 2 packs

26. If you use smokeless tobacco, about how much tobacco do you use in a typical day?
27. If you have ever tried to quit, how long in years, months, or days was your LONGEST quit attempt?
28. Did you start using tobacco again AFTER your LONGEST quit attempt?
29. IF you started using tobacco again after your LONGEST quit attempt, how long ago was your LONGEST quit attempt?

Appendix C: Study Questionnaires

BREQ – Intrinsic Regulation Questionnaire

1. I exercise because it is fun.
2. I enjoy my exercise sessions
3. I find exercise a pleasurable activity
4. I get pleasure and satisfaction from participating in exercise

Questions are scored on a 1-5 scale:

Definitely not true for me	0
Somewhat not true for me	1
Sometimes true for me	2
Somewhat True for me	3
Definitely True for me	4

The Three-Factor Eating Questionnaire– Emotional Eating

1. When I feel anxious, I find myself eating
2. When I feel blue, I often overeat
3. When I feel lonely, I console myself by eating

Questions are scored on a 1-4 scale:

Definitely true	4
Mostly true	3
Mostly false	2
Definitely false	1

Duke-UNC Functional Social Support Questionnaire

Participants rank their responses, using the following scale:

As much as I would like	5
Almost as much as I would like	4
Some but would like more	3
Less than I would like	2
Much less than I would like	1

1. I have people who care what happens to me.
2. I get love and affection.
3. I get chances to talk to someone about problems at work or with my housework.
4. I get chances to talk to someone I trust about my personal or family problems.
5. I get chances to talk about money matters.
6. I get invitations to go out and do things with other people.
7. I get useful advice about important things in life.
8. I get help when I am sick in bed.

Self-Compassion Short-Scale Questionnaire

Participants rank how often they behave, using the following scale:

Almost never				Almost always
1	2	3	4	5

_____1. When I fail at something important to me I become consumed by feelings of inadequacy.

_____2. I try to be understanding and patient towards those aspects of my personality I don't like.

_____3. When something painful happens I try to take a balanced view of the situation.

_____4. When I'm feeling down, I tend to feel like most other people are probably happier than I am.

_____5. I try to see my failings as part of the human condition.

_____6. When I'm going through a very hard time, I give myself the caring and tenderness I need.

_____7. When something upsets me I try to keep my emotions in balance.

_____8. When I fail at something that's important to me, I tend to feel alone in my failure

_____9. When I'm feeling down I tend to obsess and fixate on everything that's wrong.

_____10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

_____11. I'm disapproving and judgmental about my own flaws and inadequacies.

_____12. I'm intolerant and impatient towards those aspects of my personality I don't like.

Curriculum Vitae

EDUCATION

2015	Doctor of Philosophy in Psychology – Health Psychology Walden University, Minneapolis, Minnesota
2002	Master of Arts in Mental Health Counseling Seattle University, Seattle, Washington
1998	Bachelor of Arts in Psychology University of Washington, Seattle, Washington

CREDENTIALS

06/30/09 - 06/30/15	Licensed Clinical Alcohol and Drug Counselor – Nevada # 00116-LC
07/09/09 - 09/30/15	Supervisor of Certified Alcohol and Drug Counselor Interns #0003-LCS
10/21/06 - 07/21/15	National Certified Counselor #217655
09/13/10 - 07/31/15	Distance Credentialed Counselor

PROFESSIONAL EXPERIENCE

6/2014 – Present: Seven Hills Hospital
Position: Chemical Dependency Coordinator
Responsibilities: Design program curriculum, facilitate group therapy sessions, participate in multidisciplinary team meetings, complete therapy notes, and develop treatment plans.

9/2013 – 5/2014: Division of Public and Behavioral Health
Position: Health Program Specialist
Responsibilities: Provide oversights to drug treatment programs, develop policies and procedures, conduct program monitors (quality assurance), provide technical assistance to programs, and monitor programs' compliance with grant objectives.

10/2006 – Present: University of Phoenix
Position: Part-time Instructor
Responsibilities: Served as Area Chair for one year with duties including mentoring new faculty, evaluating faculty classroom performance, proctoring exams, and conducting quarterly meetings. As a part-time instructor, duties include preparing class materials,

facilitate classroom discussions; provide human services and counseling education to students.

6/2003 – 8/2013: University of Nevada School of Medicine
Position: Clinical Counselor Supervisor/State Approved Supervisor of Drug and Alcohol Counselor Interns
Responsibilities: Supervise certified and licensed counselors; conduct clinical meetings; perform administrative duties; develop program guidelines and protocol; provide nicotine dependence treatment including intake interviews, individualized treatment plans, client progress monitoring; co-lead group therapy sessions

4/2002 – 12/2002: Seattle Mental Health
Position: Therapist/Case Manager Intern
Responsibilities: Provide individual and couples psychotherapy to adult clients with mental health/substance abuse problems. Provide case management services, including making treatment plans, monitoring clients' progress, crisis and short-term intervention, intake interviews and assessment. Co-facilitate a stress-management counseling group (with psycho-education component) for women

9/1999 – 3/2003: Asian Counseling and Referral Service
Position: Day Activities Assistant
Responsibilities: Provide clinical service to adult clients with chronic mental illness (schizophrenia, bipolar, etc). Help multi-cultural clients achieve personal adjustment and independence through mental health day activities programs such as basic survival skills, ESL, social skills, leisure time activities, art projects, individual and group therapy, vocational preparation, job placement and support. Assist in preparing reports and special duties related to the programs. Report monthly progress and attendance in client records