The Effects of a Happiness Intervention on Measures of Psychological Well-Being and Motivation to Quit Smoking among Smokers with Depressive Symptoms

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ABSTRACT

The Effects of a Happiness Intervention on Measures of Psychological Well-Being and Motivation to Quit Smoking among Smokers with Depressive Symptoms

Kelly A. Bailey

Depressed smokers are a group of individuals whose health and overall functioning can benefit from interventions aimed to enhance well-being. Researchers have recently found significant relations between positive affect and smoking cessation success, and between low affect and smoking relapse, and unsuccessful abstinence (Cook et al., 2010; Leventhal et al., 2008, 2009; Niemiec, 2010). The examination of the effects of happiness interventions for a population considered to be "underserved" has only just begun (Borrelli, 2010, p. 2; Kahler et al., 2013). In this study, the independent variable was a happiness intervention and the outcome variables were psychological well-being and motivation to quit smoking. Using motivation to quit as a definition of success for smokers, this study included smokers who could benefit from treatment, yet who may not be ready to begin smoking cessation treatment. Smokers with depression who were interested in self-administering a happiness intervention, known at West Virginia University as the *chillPACK*, were randomly assigned to the treatment group with the chillPACK or to a comparison condition. Both groups were instructed to report their time spent completing activities intended to enhance their happiness. It was hypothesized that increases in psychological well-being and motivation to quit smoking from baseline to post-treatment would be greater in the treatment group compared to the comparison group. Although the hypothesized group differences over time were not supported, results showed improvements over time on measures of psychological well-being and motivation to quit smoking for all participants who completed the study. Results also showed relationships between minutes completing positive activities and satisfaction with life and motivation to quit smoking after the study period. Non-white participants who were relatively less stressed and higher in motivation to quit smoking prior to the study period were more likely to spend time completing positive activities. The findings from this study may improve our understanding of ways to: (a) increase psychological well-being and motivation to quit smoking among depressed smokers, (b) advance the design of specialized smoking cessation treatments for depressed smokers, and (c) decrease the considerable public health burden associated with depression, smoking, and the comorbidity of depression and smoking.

DEDICATION

To Ron, Ethan, Charlotte, and Eli

I love you more than words can say!

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Chapter 1

Purpose of the Study

The purpose of this study was to examine the effects of a happiness intervention on psychological well-being and motivation to quit smoking among smokers with depressive symptoms. Happiness interventions have been shown to improve aspects of health in addition to psychological well-being (Wood, Froh, & Geraghty, 2010). More importantly, the effects of happiness interventions combined with standard smoking cessation treatments for smokers with symptoms of depression appear promising (Kahler et al., 2013; MacPherson et al., 2010). In this study, smoking cessation was not the intended effect or goal of the happiness intervention; smoking cessation treatment is not that easy. Rather, the smoking variable of interest was motivation to quit smoking. With increased motivation to quit smoking as the hypothesized effect of the happiness intervention, an attempt was made to help smokers at every stage of change, including those not yet ready to begin smoking cessation treatment. Results from this study could be used to advance treatments for smokers with depression, which is a population of smokers that is considered to be "underserved" with existing smoking cessation treatments (Borrelli, 2010, p. 2).

There are at least two factors that support the rationale for this study, which I address below. First, the relation between depression and smoking has been shown to be robust (Luger, Suls, & Vander Weg, 2014), and changes in psychological well-being have been related to positive changes in smoking status (van der Meer, Willemsem, Smit, & Cuijpers, 2013). Second, research suggests there is a need for improved, specialized treatments for smokers with depression, especially interventions that increase positive affect (Cook, Spring, McChargue, & Doran, 2010; Kahler et al., 2013, Leventhal, Piper, Japuntich, Baker, & Cook, 2014).

Introduction to the Research Problem

Almost one in five patients who walk into the office of a primary care provider for a routine visit will have clinical levels of depression, that is, major depressive disorder (MDD) or dysthymia, and a slightly greater number of patients will have nicotine dependence (Centers for Disease Control and Prevention [CDC], 2010; O'Conner, Whitlock, Gaynes, & Beil, 2009). These numbers are very similar (approximately 23%) for college settings (Halperin, Smith, Heiligenstein, Brown, & Fleming, 2010). In addition, approximately 10% of primary care patients will have subsyndromal depression, which also causes significant functional impairment, deficits in quality of life, and decrements in health (Ayuso-Mateos, Nuevo, Verdes, Naidoo, & Chatterji, 2011; Lima & Fleck, 2007; Mitchell, Rao, & Vaze, 2011). Despite the prevalence of depression and smoking, there is inadequate treatment for these problems (Gilbody, Bower, Fletcher, Richards, & Sutton, 2006; Jameson & Blank, 2010; Mitchell et al., 2011; Schnoll, Rukstalis, Wileyto, & Shields, 2006; Woods & Jaén, 2010). Recommendations to improve treatment are vital as the cost to individuals and to society for ignoring depression and smoking becomes evident (Donahue & Pincus, 2007; Mathers & Loncar, 2006).

The burden of depression and smoking on individuals, society, and the world, is significant. Smoking is the leading cause of preventable death in the United States, and is "responsible for 10% of deaths globally" (Mathers & Loncar, 2006, p. 2011; Lee & Kahende, 2007). It has been estimated that depression will be the world's second leading cause of burden of disease by 2030 (Mathers & Loncar, 2006). Only HIV/AIDS represents a greater burden. Prioritizing treatment efforts for smokers with depression is essential, especially given the high number of smokers who are concurrently depressed.

Comorbid depression and smoking. Recent data from the National Health and Nutrition Examination Surveys conducted in the United States demonstrate the common presentation of comorbid depression and smoking. For example, 43% of adults 20 and over with depression were found to be current smokers, whereas significantly fewer adults without depression (22%) were current smokers (Pratt & Brody, 2010). This survey also showed smoking status to be significantly greater for adults with even mild levels of depression (men: 35%, women: 24%) than for adults without depression (men: 25%, women: 17%). Overall, smoking rates were shown to significantly increase with the severity level of depression.

Sadly, the comorbidy rates of smoking and depression have not improved within the United States and elsewhere. Similar to today, smoking rates from the National Comorbidity Study (NCS) conducted in the early 1990s were 44.7%, 38.2%, and 22.5% for major depression, dysthymia, and no mental illness, respectively (Lasser et al., 2000). The Canadian Community Health Survey conducted in 2002-2003 found 10.6% of smokers reported having major depression over the last year, compared to 3.9% of non-smokers (Khaled, Bulloch, Exner, & Patten, 2009). Data after the 1990s from Canada and England suggest that a smoker is three times more likely than a non-smoker to have depression (Farrell et al., 2001; Murphy et al., 2003).

Data from several large studies suggest depression to be a predictor of smoking behavior and a barrier for smoking cessation (Breslau, Peterson, Schultz, Chilcoat, & Andreski., 1998; Murphy et al., 2003). The most recent publication on the topic of depression and smoking with data from the NCS showed major depression and dysthymia predicted the onset of daily smoking and nicotine dependence; the combined results supported a model that posited depression to be a possible cause for smoking, and treatment for depression as prevention for the onset of smoking

(Breslau, Novak, & Kessler, 2004). In a 5-year prospective study with 1007 young adults and three follow-up periods, Breslau and colleagues (1998) found that MDD at baseline predicted the progression to daily smoking. In other words, among the individuals who had never smoked daily, individuals with MDD at baseline were significantly more likely to progress to daily smoking for at least one month (23.0%) than were individuals without MDD at baseline (9.3%). In a 40-year prospective study with over 1,000 adults, Murphy et al. found that the study's cohort of individuals who became depressed between 1970 and 1992 were more likely to start smoking and continue smoking than those who never had depression during that time. In a sample of 248,000 adults from the United States, smokers who were unsuccessful at quitting smoking within the last year were found to be more likely than successful quitters to have current and lifetime depression (McClave et al., 2009). More specifically, among the successful quitters, only 8% had current depression and only 16.7% had lifetime depression, and among the unsuccessful quitters, 18.8% had current depression and 26.9% had lifetime depression. Kenney et al. (2009) found that mild levels of depression predicted a lower likelihood of smoking cessation at three follow-up periods. More specifically, smoking status at 1 year, 4 years, or 10 years out, was predicted by smokers' depressive symptoms from the previous time period. NCS data showed that smoking quit rates in the past month among smokers with current depression and dysthymia were significantly lower than those of individuals without mental illness (26.0%, 22%, and 42.5%, respectively; Lasser et al., 2000). In summary, longitudinal data suggest that depression often leads to smoking, and maintains smoking behavior because it is a risk factor for smoking cessation failure.

Problems with existing treatments. Depressed smokers can benefit from treatments that improve their psychological well-being before or during a separate smoking cessation treatment

(Richards, Cohen, Morrell, Watson, & Low, 2013). Smoking cessation treatment studies have shown that depression hinders treatment engagement; that is, participation, attrition, and adherence (Curtin, Brown, & Sales, 2000; Haug et al., 2005; Levine, Marcus, & Perkins, 2003), and response to treatment (Burgess et al., 2002; Kahler et al., 2002; Japuntich et al., 2007; Kenney et al., 2009; Niaura et al., 2001; Prochaska et al., 2008). The poor engagement and response to smoking cessation treatment among individuals with depression necessitates improvement in the research and practice of smoking interventions for this underserved population. Researchers agree the development of specialized smoking cessation treatment for smokers with depression is an important consideration (Borrelli, 2010; McChargue & Cook, 2007; Prochaska et al., 2004, 2008).

Evidence-based smoking cessation treatments designed for a heterogeneous, general population of smokers may be less effective for smokers with depression because they do not target the unique needs of the latter group. Similarly, treatments targeted to the unique needs of smokers with depression, a comparatively homogeneous group, have the potential to be more effective than evidence-based smoking cessation treatments designed for the general population of smokers. Borrelli (2010) advocates smokers with depression are an underserved population deserving a modified intervention because of the differences between smokers with depression and general smokers. Differences include: "(a) smoking rates, (b) disproportionate burden of tobacco-related health disparities, (c) predictors of smoking behavior, (d) risk factors for treatment failure, (e) protective factors that facilitate quitting, (f) treatment engagement, (g) treatment response, and (h) perceived validity of the evidence-based treatment" (Borrelli, p. 4).

The success of smoking-cessation interventions among smokers with depression is contingent on addressing how this group differs from the general population of smokers

(Borrelli, 2010). Research will be reviewed below that shows that predictors of smoking behavior, risk factors for treatment failure, and treatment outcomes, are influenced by levels of positive affect in addition to levels of negative affect among smokers with depression. The low proportion of studies investigating positive affect relative to those investigating negative affect has likely contributed to discrepancies within the smoking and depression literature, and the limited effectiveness of extant smoking cessation treatment for smokers with depression (Cook, Spring, McChargue, & Doran, 2010; Leventhal, Ramsey, Brown, LaChance, & Kahler, 2008).

The established effects of mood management (Brown et al., 2001; Cinciripini et al., 2010; MacPherson et al., 2010) and antidepressant medication (Brown et al., 2007; Haas, Munoz, Humfleet, Reus, & Hall, 2004; Kapson & Haaga, 2010; Spring et al., 2007; Strong et al., 2009) on smoking cessation for smokers with depression are promising, but more research in this area is necessary. Therapeutic mood management for smoking cessation has included cognitive-behavioral therapy for depression (CBT-D), interpersonal psychotherapy, and behavioral activation (Brown et al., 2001; Cinciripini et al., 2010; MacPherson et al., 2010). Although mood management before or within smoking cessation interventions has been suggested for smokers with depression (Branstrom, Penilla, Perez-Stable, Munoz, 2010; Rabois & Haaga, 2003), determining the necessary and sufficient ingredients of mood management for smoking cessation, and for which population(s) of smokers with depression it is best suited, is ongoing.

Inconsistent treatment effects of mood management for smoking cessation have been found, and researchers have speculated reasons for the discrepant findings (Haaga, Thorndike, Friedman-Wheeler, Pearlman, & Wernicke, 2004). For one, some studies may have had insufficient power to detect mood management treatment effects that may have been found had the entire sample been smokers with depression; community samples generally include limited

numbers of smokers with depression (Brown et al., 2001, 2007). Second, some samples could have been overly inclusive. More specifically, research has found beneficial effects of mood management for smokers with a history of recurrent depression, but not for smokers with a general history of depression, because the latter group includes smokers with only a single episode of depression who probably do not require mood management (Brown et al., 2001, 2007; Cohn, Strong, Abrantes, & Brown, 2010; Haas et al., 2004). Third, it may be that mood management interventions fail when the skills they provide depressed smokers are insufficient to meet their needs. Researchers investigating treatment effects of mood management for smoking cessation and smoking-related variables, such as motivation to quit smoking, should consider these findings, and the specific findings on negative mood management mentioned below when designing their studies.

The research on negative mood management for smokers with depression is noteworthy in consideration of the current study's focus on positive as opposed to negative mood management. Negative mood management may be inappropriate in some cases. Kahler and colleagues (2002) found the addition of a negative mood management component to smoking cessation treatment for smokers with a history of MDD sometimes increased participants' risk for depressive symptoms, including a major depressive episode, probably because the focus on negative affect was too risky. Also, although participants with low levels of depression appear to need specialized smoking cessation treatment (Berlin & Covey, 2006; Kenney et al., 2009; Niaura et al., 2001), they may question their need for a depression-focused treatment. Studies have shown mood management interventions have differential effects on abstinence from smoking depending on participants' baseline level of depressive symptoms (Cinciripini et al., 2010; Kapson & Haaga, 2010). Smokers with severe levels of depression have been found to

benefit from mood management; however, smokers with non-clinical, low levels of depression have been found to benefit more from health education, control conditions, than from the mood management conditions (Cinciripini et al., 2010; Kapson & Haaga, 2010).

Other findings from mood management studies suggest there is no significant relation between smoking cessation success and improvement in negative mood (Brown et al., 2001; Haas et al., 2004). Haas and colleagues (2004) found that individuals with recurrent depression who received smoking cessation treatment with cognitive-behavioral therapy (CBT), including a mood management component, did not differ in end-of-treatment mood disturbance from those who received treatment without a mood management component, even though they were more likely to become non-smokers. Parenthetically, a defining feature of CBT is that symptoms will improve with therapy designed to modify dysfunctional thinking (as cited in Butler, Chapman, Forman, & Beck, 2006). Similar findings were shown by Brown and colleagues (2001), who failed to find an effect of CBT on depressive symptoms, despite positive smoking cessation outcomes overall. Perhaps participants benefited from certain components of the CBT they received, relative to the control condition, but not necessarily those components designed to manage negative mood. Participants in mood management studies may become less likely to return to smoking because they benefit from learning ways to increase pleasant activities in their lives, a component of these interventions deserving more attention.

Researchers are becoming increasingly aware of the value of studying positive indices when abstinence from smoking is the goal (Niemiec, Ryan, Patrick, Deci, & Williams, 2010). Self-reported baseline positive affect/mood (Branstrom et al., 2010; Doran et al., 2006), improvement of positive affect during treatment (Blalock, Robinson, Wetter, Schreindorfer, & Cinciripini, 2008), vitality (Niemiec et al.), life meaning (Konkoly Thege, Bachner, Kushnir, &

Kopp, 2009; Konkoly Thege, Bachner, Martos, & Kushnir, 2009), and engagement in pleasurable activities (Cohen, McChargue, & Morrell, 2007; MacPherson et al., 2010) are examples of positive indices that have been investigated within the smoking cessation literature thus far. Effects of these variables on treatment retention, decreased smoking, quit attempts, persistence to quit, and abstinence have been in expected directions (Blalock et al.; Cohen et al.; Branstrom et al., Doran et al.; Niemiec et al.).

Only one study has investigated positivity among smokers with depression (Blalock et al., 2008). Blalock and colleagues examined abstinence in smokers with depression who had undergone smoking cessation treatment and a 3-month follow-up. Of the 20 participants, 9 participants were considered abstainers at follow-up. Results showed that positive affect, which was assessed every week during treatment, significantly increased over time for the abstainers relative to the non-abstainers. Depressive symptoms significantly decreased over time for the abstainers relative to the non-abstainers. Significantly more abstainers were no longer depressed at follow-up (44%) than were non-abstainers (0%). Interestingly, the changes in positive affect and depression that appeared to be responsible for the differences between abstinence groups over time occurred prior to quit date. In the end, the authors concluded, "enhancement of positive affect and reduction of depressive symptoms may be important treatment goals during the *prequit period* [italics added] for smokers with MDD" (Blalock et al., p. 127). Similar conclusions about the importance of increasing positive affect before treatment have been drawn when smokers from the general population have been studied (Strong et al., 2009), especially for those who have relatively low levels of positive affect at baseline (Branstrom et al. 2010; Doran et al., 2006; Presson, Chassin, & Sherman, 2002).

A number of conclusions can be drawn from the research on mood management for smoking cessation among smokers with depression. For one, aspects of therapeutic mood management for smoking cessation among smokers with depression should continue to be investigated because successful outcomes have been evidenced (Brown et al., 2001; Cinciripini et al., 2010; MacPherson et al., 2010). Second, mood management that includes the enhancement of positive affect in addition to the management of negative affect may improve smoking cessation outcomes for smokers with depression, especially when it occurs prior to the smoking cessation intervention (Blalock et al., 2008; Doran et al., 2006; Strong et al., 2009). For example, an intervention that has the potential to help smokers improve their mood and ability to cope may be better than a negative mood management intervention that can lead to participants focusing on the inevitable negative mood associated with cessation (Kahler et al., 2002). Third, an intervention that has the potential to help smokers improve their positive affect may be ideal because changes in negative mood do not seem to be the reason for mood management effects on smoking cessation outcomes (Brown et al.; Haas et al., 2004). Finally, the validity of an intervention that is designed to increase levels of happiness versus decrease levels of depression might be trusted and appreciated by a more inclusive group of smokers with depression (Cinciripini et al., 2010), including those with mild levels of depression or those with anhedonia only. Smokers with low levels of positive affect may be particularly well-matched candidates for a happiness intervention.

Statement of the Problem

Smokers with depression are an underserved population in need of specialized treatments (Borrelli, 2010). Although data are accumulating on the relations between positive affect and smoking cessation success (Branstrom et al., 2010; Doran et al., 2006; Niemiec et al., 2010),

including data from smokers with depression (Blalock et al., 2008), researchers have just begun to study the effects of happiness interventions on smoking variables for smokers with depression (Kahler et al., 2013)). Additional research in this area may help improve the limited effectiveness of current smoking cessation treatments for smokers with depression, and with decreasing the considerable public health burden associated with depression, smoking, and the comorbidity of depression and smoking. By investigating the effects of an easily self-administered happiness intervention, the results from this study may lead to a better understanding of simple ways that smokers with depressive symptoms can improve their psychological well-being and increase their motivation to quit smoking.

By investigating treatment-related changes in levels of motivation to quit smoking as an outcome variable indicative of success, and not only the potentially less attainable outcomes such as actual smoking cessation or abstinence from smoking, this study will lead to a better understanding of ways in which smokers at every stage of change can feel good about having made small successes in their journey toward quitting. These small successes can be reflected and rewarded by healthcare providers in order to increase consumer demand for evidence-based smoking cessation treatments and tools (Woods & Jaén, 2010).

Theoretical Rationale

Happiness interventions have the potential to: (a) alleviate factors that research has shown influence depressed smokers' specific reasons for smoking and their specific reasons for having difficulty quitting; and (b) improve participants' resources, such as those that come from feeling good, which can then be used to facilitate positive behavior change. For example, happiness interventions have the potential to decrease recognized motives for smoking among depressed smokers, such as smoking to regulate negative affect (Malpass & Higgs, 2009), and

factors that predict smoking cessation treatment failure, such as baseline anhedonic-depressive symptoms (Leventhal, Ramsey, Brown, LaChance, & Kahler, 2008). In other words, if depressed smokers smoke in part to help cope with the symptoms of depression, including insufficient joy, or cannot imagine quitting because they lack positive states-of-mind, and a happiness intervention improves these symptoms and states-of-mind, these smokers should be able to maintain greater levels of motivation to quit smoking. Altogether, motivation to quit smoking is theorized to increase over time for smokers with depressive symptoms according to the principles of two models, the transtheoretical model of behavior change (Prochaska & DiClemente, 1983) and the broaden-and-build theory (Fredrickson, 2001), described below.

Transtheoretical Model (TTM). The TTM is the "dominant model of health behavior change" (Armitage, 2009, p. 195). It was developed in the early 1970s as a way to understand and explain healthy changes in smoking behavior. It has received the most research attention in this area, but it has been applied to other behavioral changes such as weight loss and exercise. The utility of other measures of motivation to quit smoking are often compared to the stages of change (SOC) within the TTM (Herzog & Blagg, 2007). The SOC is the concept that is most often associated with the TTM. The SOC organizes the model and includes five stages that individuals go through while modifying their behavior, which in this case, is quitting smoking (DiClemente et al., 1991). DiClemente and colleagues identified five SOC: precontemplation, contemplation, preparation, action, and maintenance. Smokers in the precontemplation stage are not thinking about quitting. Smokers in the contemplation stage are thinking about quitting within the next six months. Smokers in the preparation stage are thinking about quitting within the next 30 days and they have had one 24-hour quit attempt in the past year. Individuals in the action and maintenance stages are those who distinguish themselves as former smokers. If they

have quit smoking within the last six months, they are considered to be in the action stage. If they have been a non-smoker for longer than six months, they are considered to be in the maintenance stage. The first four stages of the SOC will be assessed in this study because all participants will be smokers at the beginning of the intervention, and the intervention is shorter than six months.

In addition to the SOC, the TTM includes variables that are theorized to predict and mark stage transitions (Fava, Velicer, & Prochaska, 1995; Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992). The decisional balance scale measures the pros and cons of smoking. Theoretically, a smoker becomes increasingly motivated to quit smoking when his or her endorsement of the cons associated with smoking increase and his or her endorsement of the pros associated with smoking decrease over time. The temptation scale measures the lure of smoking during particular situations, which is the opposite of self-efficacy to resist smoking. Tempting situations include experiences with craving, bad feelings, and positive social encounters. Theoretically, a smoker becomes increasingly motivated to quit when he or she expresses fewer temptations to smoke than he or she did in the past. Lastly, the processes of change are the strategies people use to change their unwanted behavior or maintain a welcomed behavior (Prochaska et al., 1992).

Initially, when first publishing about the TMM, Prochaska (1979) believed no one system of psychotherapy was superior over another; he sought to integrate the systems by highlighting their basic and shared processes of change. Today, the authors of the TTM posit that people change their behavior by using the following ten change processes: (a) consciousness raising, (b) dramatic relief, (c) environmental re-evaluation, (d) social liberation, (e) self-re-evaluation, (f) stimulus control, (g) helping relationship, (h) counter conditioning, (i) reinforcement

management, and (j) self-liberation (Prochaska & DiClemente, 1983; Prochaska et al., 1992). Below are succinct definitions of the processes of change:

> *Consciousness raising* taps the extent to which people are seeking and assimilating new information; *dramatic relief* concerns the identification and expression of emotions regarding the problem behavior; *environmental re-evaluation* involves assessing the effects of the problem behavior on the physical and social environment; *self-re-evaluation* involves appraising one's values with respect to a problem behavior; and *social liberation* measures perceptions of whether society is supportive of a person's health choices. *Counter conditioning* involves substituting the problem behavior with alternatives; *helping relationships* assesses the access and use of social support; *reinforcement management* concerns the use of reward in making positive changes; *self-liberation* taps people's commitment to changing the behavior in question; and *stimulus control* involves controlling the environmental triggers to the problem behavior (Armitage, 2009, p. 203).

According to Prochaska and colleagues, some processes of change are used more frequently than others during particular stage transitions (Prochaska & DiClemente, 1983; Prochaska et al., 1992). More specifically, consciousness raising, dramatic relief, and environmental reevaluation are emphasized by smokers who are beginning to contemplate smoking cessation. Smokers who are preparing themselves to quit use self-reevaluation. Self-liberation is endorsed by smokers who are ready to quit and who make quit attempts; longitudinal data has supported this finding (Segan, Borland, & Greenwood, 2002).

Smokers' levels of motivation to quit smoking, whether it is conceptualized as SOC, decision-making balance, temptation, or use of the processes of change, is meaningful when it

increases over time. Smokers may feel less tempted to smoke in situations that are emotionally distressing after having experienced decreased sadness over time. Smokers may begin to think about quitting within the next six months when they have spent time pondering their deeply felt gratitude for their family members. This latter idea is better understood with the following theory in mind.

Broaden-and-build theory. According to the *broaden-and-build theory* (Fredrickson, 2001), one function of positive emotions is to broaden our perspective, which in turn, facilitates building personal resources for a better future. Having a broadened perspective may include an outlook toward problem-solving that is novel and more effective, for example. When our perspective has been broadened, we become more likely to recognize and build upon our psychological and social resources. If smokers with depressive symptoms learn to experience more positive emotions through happiness interventions, it is expected that broadening and building will increase their motivation to quit smoking because more effective ways to accomplish the quitting behavior they reportedly desire should become more psychologically available to them (Fitzpatrick & Stalikas, 2008; Herzog & Blagg, 2007).

The experience of having more positive emotions, coupled with broadening such as healthier problem-solving and coping, should lead to having more personal resources, for example, purpose in life and social support, and an upward spiral with more of the same, until there are fewer reasons to smoke, and more reasons to quit smoking. Research shows that especially smokers with depression report smoking for psychological reasons associated with improving their emotional states, to stimulate their ability to problem-solve, and to cope with their negative thoughts (Malpass & Higgs, 2009; Piper et al., 2010). Instead of reaching for a cigarette when psychologically motivated to do so, smokers who have completed happiness

interventions may develop a broadened mind, and begin to think and behave in novel ways in order to facilitate healthier problem solving and coping than what is reportedly experienced through smoking.

In addition to broadening that leads to new perspectives, possibilities, and resources, broadening should also help to "undo" the negative emotions experienced by smokers with depression (Falkenstern, Schiffrin, Nelson, Ford, & Keyser, 2009). Negative emotions often lead to smoking behavior (Malpass & Higgs, 2009) and likely prevent thinking about the possibility of change. Instead of developing a narrow, ruminating focus as a result of their negative affect, smokers with depression who have participated in a happiness intervention should become less vulnerable to the downward spiral caused by rumination. Instead of feeling a need to cope through smoking, smokers who experience increased levels of positive affect within a happiness intervention may develop increased feelings of resiliency, defined as the ability to respond flexibly to challenging situations, and increased thoughts of life satisfaction (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009). Instead of smoking when sad, smokers who have participated in a happiness intervention may free the time they had previously spent smoking, and develop long-lasting resources for quitting behavior. Finally, if smokers with depression spend less time smoking for affect regulation, they will also decrease their risk for future depressive symptoms that can result from smoking (Flensborg-Madsen et al., 2011).

Research suggests increased levels of positive affect may be what smokers with depression need in order to quit smoking (Blalock et al., 2008). Having additional experiences of positive emotions could facilitate healthy behavioral changes other than the hypothesized changes in smoking behavior, but thoughts of changing smoking behavior should be exceptionally prominent for smokers with depressive symptoms. The consideration of a change

in smoking behavior should become easier for smokers with depressive symptoms at every level of change, for example, as they become interested in quitting for the first time, or, as they develop, implement, or maintain a plan to quit smoking.

Summary of theoretical rationale. If smokers with depression experience decreased levels of depression and increased levels of happiness, then they will have fewer emotional reasons for smoking, such as smoking to regulate affect, problem-solve, and cope, fewer emotional reasons to fail their attempts at quitting smoking, and greater personal resources to make changes in health behavior. Smokers with depression who participate in happiness interventions may become more inclined to value fewer pros of smoking, respect greater cons of smoking, and have fewer temptations to smoke in situations that are emotionally distressing. For example, they may become less likely to endorse the following pros of smoking on the TTM's decisional balance scale (Velicer, DiClemente, Prochaska, & Brandenburg, 1985), "If I try to stop smoking I'll be irritable and a pain to be around," "My family and friends like me better when I am happily smoking than when I am miserably trying to quit," and "Smoking helps me concentrate and do better work." Participants may also become less likely to endorse the following items that measure temptation to smoke in situations that are emotionally distressing (Velicer, DiClemente, Rossi, & Prochaska, 1990), "When things are not going the way I want and I am frustrated" and "When I am extremely depressed." Smokers with depression who have participated in happiness exercises may develop more reasons to engage in the processes of change when they experience less depression, greater levels of happiness, and more personal resources.

For example, when precontemplative smokers become psychological healthier, they may become more inclined to believe that they could benefit from changing their unhealthy smoking

behavior through the processes of change including consciousness raising, dramatic relief, and environmental re-evaluation. When they become more satisfied with life, they may become more concerned about the long-term effects of smoking. They may begin to raise their consciousness and recall more information about smoking and quitting (consciousness raising). Knowing that they have more resources and resiliency to cope with their problems, they may allow themselves to feel upset when they see the problems associated with smoking (dramatic relief). As they develop increased levels of life meaning, they may become more aware of the effect that smoking has on their significant others and their environment (environmental re-evaluation). In support of some of these propositions, Das and Fennis (2008) showed that smokers who were in a manipulated positive mood were more sensitive, as indicated by reaction time, to self-threatening words than to neutral words after they read about negative health consequences of smoking.

Contemplators may begin engaging in the cognitive-experiential process of self-reevaluation after completing happiness interventions. When contemplators become more familiar with happiness, life satisfaction, and having meaning in life, they may more frequently observe how their smoking behavior does not fit in with newly discovered values. For example, if happiness interventions help them to realize meaningful life goals such as being healthy, they may become more willing to mindfully acknowledge that smoking behavior is contradictory. After conducting a national survey in Hungary of more than 12,000 people, Konkoly Thege and colleagues (2009) highlighted the value of including interventions to enhance purpose and meaning within smoking prevention and cessation programs. Evidence from this study suggested that having a relatively strong sense of meaning in life increases the chances of becoming a former smoker than remaining a current smoker (Konkoly Thege et al.). Results showed that

smokers had significantly less life meaning than individuals who had quit smoking and those who had never smoked, and were found to be similar to results in another study that used a different measure of life meaning (Konkoly Thege, Bachner, Martos, & Kushnir, 2009).

Preparers may begin to engage in the process of self-liberation, which involves believing in their ability to quit smoking and committing to quitting, such as New Year's resolutions. When preparers become more familiar with happiness, life satisfaction, and having meaning in life, they may even make quit attempts. Their broadened capacity to problem solve and to cope with their problems should free some of their time spent smoking, allowing them to feel freer to choose healthier options, and become more likely to endorse the following item on the TTM's processes of change scale, "I tell myself I am able to quit smoking if I want to (Prochaska, Velicer, DiClemente, & Fava, 1988)."

Overall, when the principles of the TTM and the broaden-and-build theory are applied, a smoker becomes more motivated to quit smoking over time. Changes may stem from improvements in affect regulation and improvements in coping and problem solving. Making improvements in psychological well-being has the potential to enhance health behavior beyond effects caused by a reduction in depressive symptoms (Diener & Chan, 2011; Fredrickson, 2001; Steptoe, Dockray, & Wardle, 2009).

Definitions of Important Terms and Concepts

Smokers with depressive symptoms. Smokers in the present study had at least low levels of depression or anhedonia according to the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). The definition of smokers with depressive symptoms was guided by research on the CES-D symptoms of depression that predicted smokers' difficulty with smoking cessation (Leventhal et al., 2008). More specifically, Leventhal and colleagues found

participants with a mean CES-D item score greater than 0.5 at baseline, and participants with a mean reversed positive affect subscale item score greater than 0.6 at baseline, were more likely to have relapsed after smoking cessation than were their counterparts at 8, 16, and 24 weeks post-quit date. Parenthetically, Leventhal et al. presumably offered mean item scores over total scores or subscale total scores because the data for all subscales were efficiently represented in a figure format with a bar graph; the range for all items on the CES-D is 0-3 and the ranges for the subscale and total scores vary. Smokers with depressive symptoms were eligible to participate in this study if they had a mean CES-D item score greater than 0.5 or a mean reversed positive affect subscale item score greater than 0.6. Either condition is sufficient to reach the inclusionary criterion for this study. Research on the effects of a happiness intervention combined with smoking cessation treatment for a sample of smokers low in positive affect has also used the CES-D low positive affect score as an inclusionary criterion for their sample (Kahler et al., 2013).

Smokers in this study included those who admitted to smoking at least one cigarette in the last six months. This relatively inclusive definition of a smoker was used for several reasons. For one, recruitment efficiency was important due to time constraints and the use of the question, "Have you smoked at least one cigarette in the past six months?" has been recommended as a useful screener for identifying current smokers (Diemert et al., 2008). Diemert and colleagues showed this screening question had at least 99.7% sensitivity and at least 87.1% specificity for predicting commonly-used definitions of smoking status, such as the definition proposed by the United States Centers for Disease Control; commonly-used definitions of smoking status were shared by these authors. Secondly, relatively little is known about occasional or atypical smokers. By including participants who smoke according to this definition of smoker, it allowed

for the tracking of behavior change for a larger group of adults who could benefit from gaining increased motivation to quit smoking. According to the Transtheoretical Model of Change, smokers who have not quit smoking for at least six months are not yet in the final stage of change known as maintenance (DiClemente et al., 1991). Although some of the smokers recruited for the study were atypical smokers, some were probably good candidates for being former smokers at risk for relapse (Dienert et al., 2008). Atypical smokers are still smokers, whether or not they identify as being a smoker. A safe lower limit for smoking has not been found and stable light smoking has been found to be a risk factor for cardiovascular disease (Schane, Ling, & Glantz, 2010). Finally, it has been advocated that more efforts should be made to motivate occasional smokers to quit smoking in light of the fact that occasional smokers are making up an increasing portion of smokers (Nylenna, 2013).

The independent variable: The happiness intervention. The treatment intervention was WELLWVU's Office of Wellness and Health Promotion's chillPACK (West Virginia University's WELLWVU, 2011). The chillPACK is promoted by WELLWVU as a resource that can change one's perspective for the better. It includes 30 self-administered daily activities such as journaling, reminiscing, offering kindness, meditation, and primarily, offering gratitude. The chillPACK activities are similar in nature to activities research has shown improve psychological well-being (Lyubomirsky, Sheldon, & Schkade, 2005; Parks-Sheiner, 2009; Seligman, Steen, & Park, 2005; Seligman, Rashid, & Parks, 2006; Sin & Lyubomirsky, 2009; Warner & Vroman, 2011).

The dependent variables: Motivation to quit smoking. Motivation to quit smoking, which is conceptualized here by change, activity, or progress toward quitting smoking, was assessed in this study with two measures. One measure was the contemplation ladder, which is a

one-item scale measuring a 10-point range of motivation from *no thought of quitting* to *taking action to quit*. A second measure was measure of motivation to quit smoking from the transtheoretical model of behavior change (TTM; Prochaska & DiClemente, 1983), that is, the Stages of Change (SOC). Changes from pre-treatment to post-treatment were examined for each of these measures. See Appendix A for the items that will be used to measure these constructs.

The dependent variable: Psychological well-being. The Flourishing Scale (FS; Diener et al., 2010) was used to measure psychological well-being, which includes having positive relationships, purpose and meaning in life, engagement in activities, feelings of competence, self-respect, and optimism.

Chapter 2

Review of Selected Literature

The literature reviewed in this chapter was used to develop the current study's sample and hypotheses, and extends topics introduced in Chapter 1. As previously stated, it was hypothesized that increases in psychological well-being and motivation to quit smoking among smokers with depressive symptoms would result from the completion of a happiness intervention, and would be greatest among participants who completed the happiness intervention relative to the waitlist control group. In this chapter, significant studies from three bodies of literature are presented, that is, literature that contributed to the knowledge that depressed smokers deserve specialized treatment, literature on depression and motivation to quit smoking, and literature on happiness interventions of the chillPACK.

Factors to be considered for depressed smokers' specialized treatment. The development of specialized smoking cessation treatments will benefit from a focus on factors that distinguish smokers with depression from the general population of smokers. Factors with distinguishing features include predictors of smoking, such as a need to smoke for affect regulation, and risk factors for smoking cessation treatment failure, such as difficulties related to coping with negative affect (Borrelli, 2010).

Predictors of smoking behavior among smokers with depression. People smoke for different reasons. For example, an internal state or an external situation might cue some, but not all, smokers. If smokers could be depicted according to their motives, treatments could be matched accordingly. Shiffman (1993) reviewed popular measures of smoking patterns and motives and concluded that there was an underlying construct among the measures that was strongly related to nicotine dependence, but one that was broader than nicotine dependence.

Today, there is considerable content overlap among assessments of smoking motives (McEwen, West, & McRobbie, 2008; Piper et al., 2004; Shiffman, 1993; Smith et al., 2010). It is now well established that smoking motives include psychological facets of dependence in addition to those that are physical or pharmacological.

A sound measure of smoking motives is the Wisconsin Inventory of Smoking Dependence Motives (WISDM; Piper et al., 2004). The authors have suggested that there are thirteen smoking motives with two underlying factors, which they call "primary dependence motives" and "secondary dependence motives." Primary dependence motives have been conceptualized to be the necessary and sufficient features of a nicotine dependence diagnosis and include four subscales: loss of control, craving, automaticity, and tolerance (Piasecki, Piper, & Baker, 2010). Secondary dependence motives incorporate nine subscales: affiliative attachment, behavioral choice/melioration, cognitive enhancement, cue exposure/associative processes, negative reinforcement, positive reinforcement, social/environmental goads, taste/sensory processes, and weight control (Piasecki et al.).

The categorization of motives according to certain features or relations has proven helpful (Piasecki et al., 2010, p. 513). For example, it has been shown that the secondary dependence motives of the WISDM are more strongly related to withdrawal symptoms than the primary dependence motives (Piasecki et al.). Researchers have also uncovered specific smoking motives for individuals with mental health problems, including depression (Malpass & Higgs, 2009; McEwen et al., 2008; Piper et al., 2010). Not surprisingly, these motives have been psychological in nature. In other words, the withdrawal symptoms that cause problems for smoking cessation among smokers with depression are often a result of psychological motives for smoking and may not be due to primary dependence motives.

Using theoretically generated smoking motives from the WISDM, Piper and colleagues found that patients in smoking cessation treatment with lifetime anxiety disorders, mood disorders, and substance use disorders endorse some smoking motives more frequently than do smokers without each diagnosis (Piper et al., 2010). For example, compared to patients without a mood disorder, patients with a lifetime history of depression reported having stronger affiliative attachment, cognitive enhancement, and negative reinforcement motives than did their counterparts (Piper et al.). Item examples from these respective subscales include: "Cigarettes keep me company, like a good friend," "I smoke when I really need to concentrate," and "Smoking helps me deal with stress" (Piper et al., 2004, p. 151-152). Other examined motives, that is, primary dependence motives such as craving and automaticity, and social/environmental goads, resulted in no significant differences (Piper et al., 2010).

Similarly, McEwen and colleagues found that patients with mental health problems, who were participating in smoking cessation treatment, more frequently endorsed the use of smoking in order to improve concentration, relieve stress, and decrease feelings of discomfort than did patients without mental health problems (McEwen et al., 2008). No significant differences were found for other smoking motives including: to help with socialization, to relieve boredom, to control weight, or to increase pleasure through smoking. Although their findings were not specific to participants with depression, these authors found similar results to those of Piper et al., that is, cognitive enhancement and negative reinforcement motives.

Malpass and Higgs (2009) used open-ended questions about motivations for smoking and were successful in adding to the understanding of the maintenance of smoking behavior among depressed individuals. Through qualitative analysis, they found most smokers with depression almost always mentioned they smoked out of habit and also because they felt they were addicted

(Malpass & Higgs). They also reported smoking when they experienced negative feelings because they believed smoking would improve their mood (Malpass & Higgs).

Additional analyses led to their proposal of a model that includes particular reasons individuals with depression light up when they are feeling distressed (Malpass & Higgs, 2009). Emerging themes from the data included helplessness, negative thoughts, and a lack of positive reinforcement. More specifically, data suggested that smokers with depression are vulnerable to experiencing a state of helplessness. While feeling helpless, they smoke cigarettes in order to cope with their negative thoughts. For example, they believe that smoking increases their problem-solving ability, and/or that smoking therapeutically distracts them from their helplessness state. Most participants in their study felt that smoking has calming effects. Depressed smokers acquire increased feelings of autonomy for having found a way to cope, that is, coping through smoking, and they feel less distressed after smoking. Therefore, smoking behavior is positively reinforced by the pleasant outcome of feeling autonomous and smoking behavior is negatively reinforced by the removal of the stress and distress. With their needs met in the short-term, depressed smokers are less inclined to seek positive reinforcement from the social environment, which is where many participants expressed having difficulty in the first place. Without positive reinforcement from the social environment, they maintain their vulnerability to helplessness through their isolation, and corresponding negative thoughts and emotions. Ultimately, their smoking behavior and their vulnerability to depression are upheld, and potentially worsened.

Smokers with depression have acknowledged they smoke in order to reduce their negative affect (Breslau et al., 1998; Carton, Jouvent, & Widlocher, 1994; Lerman et al., 1996; Malpass & Higgs, 2009). They admit to self-medicating to modify their experiences of many

negative emotions and moods, including anger, sadness, disgust, fear, and guilt (Carton et al. 1994), and their efforts appear to be successful. Research including data collected with personal digital assistants found daily mood ratings among participants to be at their best just after smoking (Carter et al., 2008). Additionally, the use of smoking as self-medication has been suggested by various sets of longitudinal data (Breslau et al., 1998; Cohen, McCarthy, Brown, & Myers, 2002; Heinz, Kassel, Berbaum, & Mermelstein, 2010).

Smokers appear to self-medicate their undesirable feelings, both negative and the lack of positive, but grouping all feelings together limits progress in research and treatment design. It has been suggested that an underlying common correlate of nicotine dependence and these two depressive phenotypes, that is, having negative affect or low positive affect/anhedonia (Leventhal, Kahler, Ray, & Zimmerman, 2009), may be responsible for having comorbid nicotine dependence and smoking. It may be that having low levels of dopamine and a brain reward system that is relatively less responsive is responsible (Carton et al., 1994; Cook, Spring, McChargue, & Hedeker, 2004; Cook, Spring, & McChargue, 2007; Leventhal et al.). At the same time, however, differential effects of positive and negative affect on smoking behavior have been found (Bailey, Goldfine, Branstetter, Kamien, & Amass, 2006; Carton et al., 1994; Cook et al., 2004; Leventhal et al., 2008; Leventhal, 2010; Presson et al.; Rose et al., 2007). Therefore, the examination of low levels of positive affect or anhedonia, in addition to high levels of negative affect, within the smoking and depression research, is important.

Summary of predictors of smoking behavior. In summary, although smokers with depression report smoking for reasons associated with being addicted to nicotine, it is important to note that depressed smokers admit to smoking in order to feel better at higher rates than smokers from the general population. They also report smoking in order to stimulate their ability

to problem-solve, and to cope with their difficulties. Importantly, feeling better through smoking is desired through the relief of negative affect and the enhancement of low positive affect. Increasing positive affect may be a critical treatment goal for smokers with depression, especially smokers with anhedonia.

Supporting evidence from biology. None of the above mentioned predictors of smoking behavior are surprising when nicotine's effect on the brain is considered, which is described by D'Souza and Markou (2011) and partially summarized here. Nicotine binds to the same receptors on post-synaptic neurons in the brain as acetylcholine, which are, in fact, termed "nicotinic cholinergic receptors." Acetylcholine is an endogenous neurotransmitter that affects, among other things, our emotions, our level of energy, and our ability to learn because of its influence on attention and memory. Nicotine dependence is initiated because nicotine interacts with nicotinic acetylcholinergic receptors (nAChRs) on dopaminergic, glutamatergic and GABAergic neurons. Less studied neurotransmitters such as opioids, norepinephrine, serotonin, orexin, and cannabinoids may also influence nicotine dependence because nAChRs are present on neurons that release these substances too. What is known is that smokers experience rewarding effects such as mild euphoria from an increase of dopamine caused by nicotine in the mesolimbic system of the brain. In addition, glutamate and GABA transmission increase dopamine levels and inhibit dopaminergic receptors, respectively. Glutamate appears to help smokers remember the rewarding effects of smoking. Pharmacological treatment for smoking cessation and abstinence that considers dopamine neurotransmission has been fairly effective, for example, buproprion. Also, as pharmacologists create new anti-depressant medications, they are considering the dysregulation of the cholinergic system, which involves the activation and desensitization of nAChRs, caused by nicotine (Mineur & Picciotto, 2010). Other non-

pharmacological treatments for smoking cessation and depression can benefit from activating similar parts of the brain as those described above. Importantly, subjective positive experiences, which happiness interventions can influence, have been shown to depend on dopamine and GABA (Burgdorf & Panksepp, 2006).

Risk factors for smoking cessation treatment failure. Smokers with depression are a diverse group, and variations of "smokers with depression" have been found to predict smoking cessation difficulties. Researchers and practitioners who are interested in smoking cessation for smokers with depression could benefit from understanding which "smokers with depression" are at risk for smoking cessation failure. Risk factors for smoking cessation failure that place smokers with depression at greater risk than smokers from the general population are especially important considerations for specialized smoking cessation treatment.

Differential risk factors of depression. The heterogeneity of depression as a mood disorder and the many meanings of "depression" have made it difficult to ascertain the precise criteria that make smokers with depression vulnerable to smoking cessation failure. Ideally, at the point of recommending a smoking cessation program to a patient, health practitioners would know the depression variables that hinder a patient who wants to quit smoking in order to tailor his or her cessation treatment. For now, questions such as the following remain: What depression screeners might be helpful for smoking cessation treatment planning: current MDD, current depressive symptoms, specific depressive symptoms, a past history of depression, chronic depression, recurrent depression, a combination of these variables, or some other variable that is related to depression vulnerability? At what point during a smoking cessation program should these depression variables be considered, prior to treatment or only after failure to quit? Do smokers with depression have significant distress, at baseline, during treatment, and/or following

treatment? Should these depression variables, and others, be considered for every patient with nicotine dependence? Some of these questions will be considered below.

History of depression. The extent to which history of depression should be considered as a risk factor for smoking cessation difficulty is undecided. Results from a meta-analysis on history of depression and smoking cessation outcome suggest having the knowledge that a smoker has a history of depression may not reveal anything about his or her ability to quit smoking (Hitsman, Borrelli, McChargue, Spring, & Niaura, 2003). However, the meta-analysis contained methodological problems (Covey, 2004; Japuntich et al., 2007), and it included only 15 studies, despite hundreds of papers on the topic of depression and smoking between 1971 and 2000. In contrast, several authors have concluded from their studies that history of depression is a variable to be regarded when considering targeted smoking cessation treatments to underserved smokers (Burgess et al., 2002; Covey; Covey, Bomback, & Yan, 2006; Levine et al., 2003; Japuntich et al.). For example, the effect of history of depression on smoking status one week after quit date was found to be independent of the effect of current depression (Japuntich et al.). Additionally, research is beginning to suggest that a history of recurrent depression versus a history of a single episode of depression may be the risk factor for smoking cessation treatment failure deserving attention (Cohn et al., 2010; Strong et al., 2010).

Recency of depressive episode or depressive symptoms. At least a few studies support the notion that current symptoms of depression, including symptoms experienced within the last year before treatment, have a greater influence on difficulty with quitting than does a prior history of depression (Niaura et al., 2001; Piper et al., 2010). Results from Piper et al. are particularly compelling. These authors compared smoking cessation rates after treatment among patients with no history of depression, those with a history of depression, which may have included an episode

within the last year, and those who experienced a depressive episode within the last year, which may have included the experience of a current episode. Eight weeks after quitting smoking, only 28.2% of individuals with depression in the last year were still not smoking, 39.5% of patients with a history of depression were not smoking, and 47.4% of individuals with no history of depression were not smoking. While the latter group had odds of not smoking that were significantly higher than the former groups, this difference was no longer significant when patients who had an episode within the last year were excluded from analysis. Altogether, these results suggest that the closer in time the episode is to the quit date, the more difficult it is to maintain cessation.

Current major depressive disorder. Having current MDD appears particularly risky for smoking cessation difficulty (Japuntich et al., 2007). Japuntich and colleagues found smokers with a history of depression (36%), which included those with current or past depression, to be significantly more likely to drop out of treatment than those with no history of depression (20%). Importantly, individuals with current MDD (96%) were significantly more likely to be smoking one week after quit day than those with past depression only (75%) or no history (36%). As previously stated, model building showed that the current MDD and past depression only groups independently predicted smoking status one week after quit day. In general, however, there is little known about the impact of current major depression on smoking cessation efforts, particularly MDD. Although Japuntich et al. did not exclude participants with current MDD, many researchers examining smoking cessation outcomes do make these exclusions (van der Meer et al., 2013).

Recurrent depression. Recent data from the National Comorbidity Survey-Replication showed that smokers with a history of recurrent depression smoke more cigarettes, have higher

rates of nicotine dependence, and make fewer attempts at quitting than smokers with a single episode of depression or no history of depression (Strong et al., 2009). Baseline levels of depression, mood, and self-efficacy to cope with negative affect have been found to be significantly worse for smokers with recurrent depression than for smokers with a single episode of depression in a smoking cessation treatment study (Cohn et al., 2010). Having a significantly higher baseline level of functional impairment, which is the case for smokers with MDD-R, poses risks for smoking cessation failure; for example, their vulnerability increases when they experience increasing depressive symptoms while quitting (Burgess et al., 2002; Strong et al.). Finally, smoking cessation treatment for individuals with recurrent depression has been found to be more effective when a mood management component is included (Brown et al., 2001; Haas et al., 2004).

Baseline symptoms of depression. Although data have led researchers to suggest having MDD is a greater risk factor smoking cessation difficulty than having only non-clinical symptoms of depression, baseline symptoms of depression, including positive affect, negative affect, negative cognitive style, and especially depression proneness, have been shown to contribute to smoking cessation difficulty (Japuntich et al., 2007). Even when smokers with a current depression disorder have been excluded from studies, baseline depressive symptoms have predicted cessation difficulty (Berlin & Covey, 2006; Cinciripini et al., 2003). Additionally, effects of baseline depressive symptoms on cessation difficulty have been found among samples not selected on the basis of depression history (Berlin & Covey), and effects have been shown to be independent of the effect of depression history (Cinciripini et al.). In the end, baseline depressive symptoms, including different types of depressive symptoms such as low positive

affect and high negative affect may predict having difficulty with smoking cessation, regardless of history of MDD.

Severity of baseline depressive symptoms has been shown to be positively correlated with the level of smoking cessation difficulty (Burgess et al., 2002; Kenney et al., 2009), but even low levels of depression can be problematic (Berlin & Covey, 2006; Kenney et al.; Niaura et al., 2001). Using the Beck Depression Inventory (BDI), Berlin and Covey showed that having at least mild levels of depression (BDI > 9; Beck, Steer, & Garbin, 1988) predicted inability to sustain abstinence. Niaura et al. showed low levels of depressive symptoms, assessed with three different measures of depressed mood in three different samples, predicted relapse after successful quitting (Niaura et al.). Finally, Kenney and colleagues found low levels of depressive symptoms, which included depressed mood and behavioral indices such as crying, predicted the inability to quit smoking at three different time periods over the course of ten years (Kenney et al.).

Low positive affect/anhedonia. A lack of attention to low positive affect/anhedonia as a symptom within the heterogeneous construct of depression has likely contributed to the inconsistent and questionable findings within the depression and smoking cessation literature. In theory, research samples of smokers with depression, including MDD, might not include participants with anhedonia as a symptom. Interestingly, even after statistically controlling for level of nicotine dependence, frequency of smoking, and history of major depression, levels of low positive affect/anhedonia have been found to be better predictors of withdrawal and poor abstinence outcomes following smoking cessation treatment than negative affect and somatic features of depression (Leventhal et al., 2008). Research has shown low positive

mood/anhedonia to predict relapse (Leventhal, Waters, Kahler, Ray, & Sussman, 2009; Niemiec et al., 2010; Strong et al., 2009) and unsuccessful, long-term abstinence (Doran et al., 2006).

The ability to quit smoking may be difficult for individuals with low positive affect/anhedonia because they appear particularly sensitive to the effects of nicotine following nicotine deprivation (Cook et al., 2004, 2007; Leventhal, Waters, et al., 2009), which likely results in high temptation to smoke (Rabois & Haaga, 2003). When anhedonic and hedonic smokers were induced into a positive mood after being randomly assigned to smoke cigarettes with or without nicotine, Cook and colleagues showed that nicotine had a significantly larger effect on positive mood for anhedonic smokers than it did for hedonic smokers (Cook et al., 2007). In another study, Cook and colleagues showed that smokers with relatively low levels of hedonic capacity had higher levels of craving for nicotine than their counterparts following 24 hours of nicotine deprivation (Cook et al., 2004). Importantly, decreasing levels of positive affect associated with nicotine deprivation, and not increasing levels of negative affect, were found to mediate the relation between level of hedonia and craving in this study (Cook et al., 2004). Results from these studies suggest that increasing positive affect prior to a cessation attempt will benefit smokers with anhedonia.

Leventhal and colleagues sought to further understand nicotine craving following deprivation by measuring two distinct smoking urges, appetitive, defined as the "anticipation of pleasure," and "aversive," defined as the "anticipation of relief from negative affect," in a non-depressed sample (Leventhal, Waters, et al., 2009, p. 1049). After adjusting for baseline negative affect, levels of anhedonia moderated the relation between nicotine deprivation and appetitive smoking urges, but not aversive smoking urges. Overall, it appears that individuals with anhedonia have a high level of susceptibility to the loss of pleasure during initial periods of

quitting smoking (Cook et al., 2004, 2007), which leaves them tempted to smoke because they want to recover this loss of pleasure (Leventhal et al.; Rabois & Haaga, 2003). Successful smoking abstinence may be achieved by replacing the pleasure that anhedonic smokers gain from smoking with an alternative pleasurable experience.

Summary of risk factors for smoking cessation treatment failure. Many manifestations of depression appear to place smokers at risk for smoking cessation failure. The effect of depression history on smoking cessation and abstinence is relatively controversial; however, most of the evidence suggests it is a variable to be regarded by practitioners and researchers interested in smoking cessation. Recurrent depression, and early onset, chronic depression, appear to be especially problematic for smoking cessation. Severity of depressive symptoms plays a role; however, low levels of depressive symptoms, independent of depression history, have also been found to pose a risk. Interestingly, and importantly for the current study, levels of anhedonia or low levels of positive affect have been found to predict abstinence significantly better than levels of negative affect (Branstrom et al., 2010). Overall, smokers with depression who are interested in quitting smoking may benefit from treatment that targets their depressive symptoms, including their depressed mood and anhedonia.

Motivation to quit smoking and depression. The value of increasing individuals' motivation for changing an unhealthy behavior such as smoking cannot be underestimated. For one, all theoretical orientations to psychotherapy contain ideas about the importance of client motivation (Ryan, Lynch, Vansteenkiste, & Deci, 2011). Second, it has been suggested it is not possible to quit smoking without having motivation to quit smoking, and it might be the only condition that is needed to quit (Balmford & Borland, 2008,). Third, motivation to quit smoking is predictive of smokers' attempts to quit smoking and success rates of quitting (as cited in

Nezami, Sussman, & Pentz, 2003; Vangeli, Stapleton, Smit, Borland, & West, 2011; Zhou et al., 2008). Fourth, meta-analyses of the effects of motivational interviewing for smoking cessation show that smokers are significantly more likely to achieve abstinence after having experienced motivational interviewing than smokers who have not (Heckman, Egleston, & Hofmann, 2010). Fifth, in order to enhance the demand for evidenced-based smoking cessation tools and services, nationally based recommendations to health care providers are to recognize quitting smoking is more than one single event, and to reward patients at every encounter for their small successes toward quitting (Woods & Jaén, 2010). Finally, enhancing motivation to quit smoking is a public health guideline proposed by the United States Department of Health and Human Services (Fiore et al., 2009). Overall, all smokers can benefit from enhancing or maintaining their level of motivation to quit smoking.

Increasing motivation to quit smoking for all smokers, including those with depression, should be an important goal (Haug et al., 2005; Prochaska et al., 2004; Tsoh & Hall, 2004). Most smokers (75.6%) are not ready to quit smoking within the next month, and a smoker in the preparation stage is three times more likely to quit smoking than a smoker in the precontemplation or contemplation stage (Prochaska et al., 2004). Research has shown that a smoker's advancement from the precontemplation stage to the contemplation stage, or to the preparation stage, increases the likelihood of having quit smoking two years later by 40% and 80%, respectively (Abrams, Herzog, Emmon, & Linnan, 2000). Regardless of whether or not smokers with depression have less motivation to quit smoking than general smokers, the room for motivational improvement should not be ignored.

The level of motivation to quit smoking among smokers with depression is unclear. Some studies have suggested smokers with depression to be no less motivated to quit smoking than

smokers from the general population (Siru, Hulse, & Tait, 2009) and other studies have found them to be more motivated to quit smoking than other smokers (Haukkala, Uutela, Vartainen, McAlister, & Knekt, 2000; Schorr et al., 2009). When motivation to quit smoking was measured by some TTM constructs (Acton, Prochaska, Kaplan, Small, & Hall, 2001; Cargill, Emmons, Kahler, & Brown, 2001; Lerman et al., 1996; Prochaska et al., 2004; Tsoh & Hall, 2004), or a one question item, "Would you like to stop smoking?" (p. 312, Haukkala et al.), motivation to quit smoking was not found to be associated with depressive symptoms and/or a history of depression among psychiatric outpatients (Acton et al.), hospitalized smokers (Cargill et al.), smokers seeking cessation treatment (Lerman et al.), smokers from the general population (Tsoh & Hall, 2004), and currently depressed smokers (Prochaska et al.). On the other hand, Tsoh and Hall did find positive correlations between four of fifteen TTM constructs and depressive symptoms (Tsoh & Hall, 2004). Constructs included the pros of smoking, temptation to smoke in addictive situations and situations that are emotionally distressing, and the self-re-evaluation process of change. Additionally, smokers with depression have difficulty remaining in smoking cessation treatment (Curtin et al., 2000; Levine et al., 2003), and maintaining their non-smoking status after quitting (Burgess et al., 2002; Kahler et al., 2002; Niaura et al., 2001). In the end, it has been concluded that smokers with depressive symptoms could benefit from treatment for depressive symptoms in order to support their attempts at quitting smoking (Tsoh & Hall).

A few studies have suggested a link between depression and the TTM's contemplation stage of quitting smoking. Smokers with depression seem to be more inclined to contemplate quitting smoking than to disregard the idea of quitting altogether (Acton et al., 2001; Haukkala et al., 2000; Prochaska et al., 2004). Smokers with depression probably understand that their negative affect is linked with their smoking habit; therefore, they may want to quit even more

than do other smokers, but the idea of quitting smoking within the next six months may exacerbate depressive symptoms (Acton et al., 2001; Tsoh & Hall, 2004). Schorr and colleagues (2009) found smokers with reduced levels of mental health, including depressive symptoms, were significantly more likely to be in the contemplation stage of smoking versus the precontemplation stage of smoking. Acton and colleagues (2001) demonstrated that smokers' levels of depression were highest in the contemplation stage related to other SOC; although the trend failed to reach statistical significance, the authors suggested the lack of significance may have been the result of a limited sample size. In the only study that examined the distribution of SOC for a sample of smokers with depression, Prochaska and colleagues showed that most of their sample (55%) was found to be in the contemplation stage, while 21% and 24% were in the precontemplation and preparation stages, respectively. These frequencies differ from those found in the general population of smokers, where approximately 40% of smokers were found to be in the precontemplation stage, 40% were found to be in the contemplation stage, and 20% were found to be in the preparation stage (Velicer et al., 1995). Smokers with depression who are mostly contemplating quitting and not preparing for it may need additional reasons and resources to change their smoking behavior than do other smokers. The development of fewer psychological reasons to smoke in situations that are emotionally distressing, coupled with healthier, happier thoughts and feelings that can facilitate quitting, may be important mechanisms to motivate smokers with depression to think, feel, and behave beyond contemplation.

As discussed in Chapter 1, smokers with depression who are in the contemplation stage might benefit from interventions tied to characteristic change processes, for example, interventions that help them to reevaluate themselves and their values with respect to their

smoking (Prochaska et al., 1992). chillPACK exercises are likely to lead participants to reevaluate themselves positively, for example, when they are asked to ponder what they appreciate in life. Smokers with depression should benefit from the hypothesized effect of the chillPACK on happiness that could lead to more helpful self-reevaluation than the critical self-reevaluation thought to be tied to depressive symptoms (Tsoh & Hall, 2004).

Finally, the findings of Haug and colleagues are emphasized here because these authors shared my interest in examining the effects of a treatment for depression on motivation to quit smoking. Haug et al. (2005) examined the relation between depression and motivation to quit smoking following an intervention designed to enhance smoking cessation treatment acceptance. They found those smokers with a current depressive disorder to be most likely to accept a smoking cessation treatment were the participants taking an antidepressant. If an antidepressant can have such an effect on motivation to change smoking status, it is likely that other forms of treatment for depression will be beneficial. Although exploring the role of psychopharmacology on depression and smoking cessation is beyond the scope of this study, both pharmacotherapy and psychotherapy have been shown to effectively lessen the symptoms of depression (Spielmans, Berman, & Usitalo, 2011); therefore, both types of therapies may also affect variables like motivation to quit smoking that are related to symptoms of depression.

Happiness-inducing exercises of the chillPACK. As previously stated, the chillPACK includes 30 self-administered daily activities such as journaling, reminiscing, offering kindness, meditation, and primarily, offering gratitude. The activities of the chillPACK are similar in nature to activities shown to improve psychological well-being (Lyubomirsky et al., 2005; Parks-Sheiner, 2009; Seligman et al., 2005; 2006; Sin & Lyubomirsky, 2009; Warner & Vroman, 2011). The utilization of chillPACK involves behavioral, cognitive, and volitional activities that

participants choose to complete in order to become happier. Research has shown that increased activity intended to enhance happiness can be effective in doing so (Lyubomirsky et al.). Intentional activities improve happiness levels best when the activities are legitimately efficacious, the participants are motivated, and the participants demonstrate ongoing effort (Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011). Importantly, intentional activity, as opposed to circumstances like life status factors, contributes to sustainable happiness (Lyubomirsky et al., 2005). All but eight of the chillPACK activities are gratitude exercises; therefore, gratitude research will be highlighted here.

Gratitude, which is best conceptualized as a general noticing and appreciating of what is positive, has been robustly related to happiness and related constructs (Wood et al., 2010). In a review of the literature on gratitude and well-being, Wood and colleagues documented twenty studies showing a relation between gratitude and several indicators of well-being: psychopathology, including depression; emotional functioning, including life satisfaction, positive affect, and optimism; and theoretical conceptions of happiness, such as eudaimonia, which lacks an agreed upon definition in the field, but generally includes elements such as growth, authenticity, meaning, and excellence (Huta & Waterman, 2013). Importantly, research supports an impressively unique relation between gratitude and well-being, for example, one that is significantly different from positive affect and personality, and a causal model for the relation between gratitude and psychological well-being (Wood et al.).

The relation between gratitude and well-being is undoubtedly multiply determined, and evidence in support of a number of hypothesized mechanisms from cross-sectional, experimental, and longitudinal studies is accumulating (Emmons & Mishra, 2011). One model for understanding the numerous effects of gratitude interventions is to understand the experience

of gratitude to be associated with increases in positive thoughts and feelings, which leads to broadening, and the building of personal, social, and spiritual resources (Fredrickson, 2004; Wood et al., 2010). Currently, the strongest evidence for the link between feeling grateful and well-being is from the effect of gratitude on the growth of social resources (Wood et al.). However, as suggested, being grateful is more than feeling thankful toward others for their acts of kindness, it is a life orientation or an attitude toward the self, others, and the world, and it stands in contrast to Beck's negative cognitive triad associated with depression. Not surprisingly, the effects of gratitude on depressive symptoms have been shown to be mediated by changes in positive reframing and positive affect (Lambert, Fincham, & Stillman, 2012).

Although gratitude intervention research is not without its limitations, primarily related to sufficient control groups, a substantial body of evidence shows that several simple gratitude exercises are promising interventions for improving levels of psychological well-being (Wood et al., 2010). Gratitude interventions have included gratitude lists, grateful contemplation, and expressions of gratitude. Wood and colleagues documented twelve studies with effects of gratitude interventions on measures of well-being, such as happiness, life satisfaction, positive affect, negative affect, and depression, with some effects lasting up to six months.

In addition to well-being, gratitude has also been associated with related constructs such as personality, relationships, health, and goal attainment (Emmons & Mishra, 2011; Wood et al., 2010). Although gratitude and health research is scarce, it has been shown through cross-sectional and gratitude intervention research that sleep and exercise benefit from feeling grateful (Emmons & McCullough, 2003; Wood, Joseph, Lloyd, & Atkins, 2009). Simple, gratitude listing exercises, completed weekly over ten weeks, contributed to treatment and control group differences on these outcomes (Emmons & McCullough). The pathways hypothesized to explain

the relation between gratitude and health include gratitude's effect on inhibiting unhealthy attitudes, improving ability to cope, and reducing levels of physiological stress (Emmons & Mishra).

Research Hypotheses

1. It was hypothesized that levels of psychological well-being, as measured by the Flourishing Scale (FS) would increase following the completion of a self-administered happiness intervention, that is, the chillPACK, among smokers with levels of depression or anhedonia that have been shown to predict difficulty with smoking cessation, as defined by a mean CES-D item score greater than 0.5 or a mean positive affect subscale item score greater than 0.6 (Leventhal et al., 2008). Effects were hypothesized to be greater in the treatment group with the chillPACK compared to the comparison group. The comparison group was asked to wait to use the chillPACK.
2. It was hypothesized that levels of motivation to quit smoking, as measured by the Transtheoretical Model's Stages of Change (SOC) and the Contemplation Ladder, will increase following the completion of a self-administered happiness intervention, that is, the chillPACK, among smokers with levels of depression or anhedonia that have been shown to predict difficulty with smoking cessation, as defined by a mean CES-D item score greater than 0.5 or a mean positive affect subscale item score greater than 0.6 (Leventhal et al., 2008). Effects were hypothesized to be greater in the treatment group with the chillPACK compared to the comparison group. The comparison group was asked to wait to use the chillPACK

Chapter 3

Method

Participants. Participants were eligible to participate in the study if they were over the age of 18 years, met research-guided cutoffs for depressive symptoms, and smoked at least one cigarette over the last six months. Refer to the definitions of smoker and depressive symptoms introduced in Chapter 1 and see the discussion of depressive symptoms using the CES-D under the Measures section below. Participants were primarily recruited from West Virginia University, Frostburg State University, Washington and Jefferson College, and Waynesburg University. Recruitment was also completed through social media and word-of-mouth, which is when students from other universities or non-student adults were made aware of the study.

Participants were enrolled in the study until a sufficient number of participants met the design specifications of the current study, which was determined via a power analysis to be 60 participants, 30 participants who completed the study in the treatment group and 30 participants who completed the study in the comparison group. In the end, the method of recruitment allowed for 68 participants or 34 participants in each group to complete the study. The WVU Institutional Review Board approved up to 400 enrollees in the study in order to cover potential drop-outs or other unusable data sets, for example, non-depressed participants. Data from non-depressed smokers were also collected because it was anticipated that non-depressed smokers would be interested in the study. This procedure allowed all interested adults who smoke cigarettes to participate in the study and avoided having to exclude interested participants on the basis of their depressive symptoms. Analyses with these non-depressed participants were not relevant to current study's hypotheses; however, these data may be used in future studies. See the consent form in Appendix A.

Procedure. Following IRB approval, participants were recruited through advertisements. See Appendix B. Flyers were posted on walls and bulletin boards around campuses, and were made available in offices where students may gather (e.g., waiting rooms in counseling centers and student health centers). Advertisements were placed on the Mountaineer Information Xpress Web platform where WVU students can check email and find out what is happening on campus (Campus Announcements), in the *Daily Athenaeum,* which is the student newspaper, and on Facebook, an online social networking service. For example, an ad was placed on WELLWVU's Facebook wall. Similar ways of recruitment occured within other university settings, including newspapers (*Red & Black, The Botton Line, Yellow Jacket)*, emails, announcements, and flyers. The potential for selection bias was minimized as much as possible by using consistent recruitment methods across campuses; however, consistency was not always possible, for example, Waynesburg State University did not allow emails to be sent to students. Advertisements included a link to the study, that is, the website, www.findhappiness.info, where participants could read a cover letter. Participants were told they would receive a $10 gift card and a chance to win a $100 gift card for their participation.

Participants were automatically assigned a code number by the online survey program, Qualtrics, which they were required to enter at the beginning of all surveys in order to link their answers throughout the study. Pre-treatment measures included the following (see Appendix C through H) for select measures and Footnotes for copyright permission to reprint): (a) general demographic survey, (b) Center for Epidemiologic Studies Depression Scale (CES-D), (c) Perceived Stress Scale (PSS-10), (d) Satisfaction with Life Scale (SWLS), (e) Flourishing Scale (FS), (f) TTM Motivation to Quit Smoking: Stages of Change, (g) TTM Motivation to Quit Smoking: Self-Efficacy to Resist Smoking in Tempting Situations, (h) the contemplation ladder,

and (i) questions about whether or not participants are considering a variety of smoking cessation tools or services. The time to complete all pre-treatment survey questions was estimated to be about 20 minutes. Some of these measures mentioned above were used in primary analyses, which were limited due to sample size and estimated effect size, and some were considered to be subsidiary measures that were used in exploratory analyses.

Participants were randomly assigned to either the treatment group or a comparison group until 60 participants who met the inclusionary criteria (30 participants in each group) completed the study. Participants were randomly assigned to groups using a random list generator (https://www.random.org/lists/). Initially, the items in the list that was randomized by the list generator were 0 (comparison) and 1 (treatment). However, the completion rate for the post-treatment survey among participants in the comparison group was approximately twice as high as the completion rate among participants in the treatment group; thus, as soon as the proportion of group members completing the study was realized, the items in the list to be randomized were switched to 0 (comparison), 1 (treatment), and 1 (treatment). In other words, the list generator was set up to generate a list that included twice as many 1s than 0s. A total of 60 participants was determined through a series of power analyses using the program, G*Power 3 (http://www.psycho.uni-duesseldorf.de/abteilungen/aap/gpower3/) (Faul, Erdfelder, Lang, & Buchner, 2007), with consideration of effect size recommendations of Cohen (1992), and the current study's questions and data. See discussion on power analysis within the data analysis section below.

Participants were notified of their group assignment by email within 24 hours after completing the pre-treatment survey. Participants in the treatment group were emailed instructions for participation in the study, instructions for accessing the chillPACK,

psychoeducation about the effect of intentional activities on levels of happiness (see below), and a link to a smoking cessation packet from smokefree.gov. Participants in the treatment group were told they must complete at least two chillPACK activities per week in order to complete the study. They were told that they could complete the same activity multiple times, if desired. They were told they were free to choose any two of the 30 chillPACK activities over the course of the week. The participants in the comparison group received a similar email, except they did not receive instructions for accessing or using the chillPACK. Participants in the comparison group were also asked not to use a resource called the chillPACK until the study was over.

Participants were provided with the following statements that served as the psychoeducational component, with the exception that the comparison group was not provided the statements about the chillPACK:

Before you begin the study, please read and consider the following:

(1) We know from research that we can influence about 40% of all the things that make us happy.

(2) As for the other 60%, our genetic set point contributes the most, and our circumstances, things like our gender, our age, where we live, and whether or not we are married, contributes a little.

(3) Importantly, we can increase, and even sustain, our happiness set point by doing certain activities on a regular basis, like the stuff you'll learn by using the chillPACK!

(4) The things we can influence (again, up to 40% of what makes us happy) are called "intentional activities" by researchers. Intentional activities involve the way we think and behave, and the decisions we make. I hope you will enjoy the intentional

activities in the chillPACK that you will complete over the next 30 days. Research shows that doing intentional activities will make you feel better.

The provision of psychoeducation on the importance of engaging in intentional activity in order to improve psychological well-being (Lyubomirsky et al., 2005) was an attempt to encourage participants to make healthy behavioral choices, and to strengthen participants' engagement in the study. Enhancing participant expectations about beneficial outcomes, and their internal locus of control, is important when administering unguided interventions in order to maintain their participation in the intervention (Geraghty, Wood, & Hyland, 2010).

A week after receiving the email with group assignment and psychoeducation, participants in both groups were asked to complete the first of four weekly surveys about the amount of time they dedicated to activities intended to increase their happiness. The question read, *Think about how you spent your time over the last week. How much time (in minutes) did you intentionally engage in activities to improve your level of psychological well-being? Things you might have done to improve your well-being include: exercising, socializing with friends, reading a book, appreciating nature, or anything else that made you feel better. How many minutes did you spend doing these things this past week?* Participants in the treatment group were also asked weekly questions about their chillPACK activity.

Thus, participants in both groups were provided with a reason to enhance their activities intended to increase happiness before the intervention period and a weekly assessment of their effort and/or motivation to do so during the intervention period. Notably, only the treatment group was explicitly instructed to increase their intentional activities; the explicit instruction was to complete at least two weekly chillPACK activities. Although the comparison group was not explicitly directed to increase intentional activity, the early provision of psychoeducation and the

weekly assessment of intentional activity provided reasons for increasing their intentional activity. In summary, the psychoeducation and weekly assessment of intentional activity was intended to increase both groups of participants' efforts to be happy in similar, engaging ways. The only difference between groups was the variable being tested, that is, the chillPACK.

The final post-treatment survey was completed four weeks after participants completed their pre-treatment questionnaires. The final survey included the questions related to their weekly activity (e.g., chillPACK activity), and the same measures included in the pre-treatment survey.

Treatment intervention. The primary treatment intervention was WELLWVU's Office of Wellness and Health Promotion's chillPACK. The chillPACK is part of larger programming offered by WELLWVU called chillWELL and liveWELL. The programming offered by WELLWVU's Office of Wellness and Health Promotion aims to educate and influence students to be healthy, happy, and productive. The liveWELL program provides WVU students with opportunities to learn more about a variety of wellness topics such as alcohol, sexual health, healthy relationships, stress, nutrition, sleep, and fitness. Programs are offered monthly in residence halls and key locations on campus according to the liveWELL theme of the month, for example, loveWELL, drinkWELL, sleepWELL, eatWELL, and chillWELL. Programs can be requested any time of year for delivery to any group of students. chillWELL is generally offered in November and December. The chillPACK is one activity within the chillWELL theme.

The chillPACK was of interest to the current study because of its focus on the positive. Participants were told to complete two or more of its 30 activities per week instead of one activity per day, as it was designed, because research has shown it is possible to overwhelm participants in self-administered positive psychology interventions, and less is sometimes more (Lyubomirsky et al., 2005; Schueller & Parks, 2012). The chillPACK was offered to participants

through the following link, http://well.wvu.edu/chillpack. At the chillPACK site, participants could read over the chillPACK activities, choose from among them, and for some activities (i.e., Days 1, 3, 5, 12, 13, 14, 19, 23, 25, 26, and 29), enter their answers into the fields provided. On the same days with fields to enter responses, participants were instructed to enter their anonymous code number provided to them as a way to verify treatment adherence. See Table 1 for the daily chillPACK activities.

Measures

Demographic questionnaire. Within the pre-treatment and post-treatment survey, participants were asked questions related to their age, gender, race, school, year in school, status of smoke-free environment at school, current participation in counseling, current participation in smoking cessation, and how they learned about the study. Participants also answered questions related to their smoking behavior (see Appendix C).

Treatment adherence and engagement. Participants were sent weekly surveys through email in order to increase treatment adherence and engagement. As mentioned, each week, they were asked to indicate: (a) the chillPACK activities completed for the week, (b) the amount of time they spent completing the chillPACK activities, and (c) the amount of time they spent doing other activities to improve psychological well-being. The comparison group received the last question only. Only when participants reported completing at least two chillPACK activities, at least three of the four weeks, was their data used in this study. One participant in the comparison group was inadvertently included in the analyses after having completed two of the four weeks. Answers to question (a) were also used to understand the frequency with which each chillPACK activity was chosen, which may impact recommendations for treatment and future programming. Answers to questions (b) and (c) were intended to be used as control variables or dependent

variables when comparing differences between groups. The self-report nature of these data limited the study's internal validity due to measurement error. Some participant data were entered into the online chillPACK; therefore, chillPACK activities were verified when possible. Only 11 of the 30 online chillPACK activities were created with a field to allow participants to enter a user identification code, which in the case of the current study, was their designated code used for all surveys.

Depressive symptoms. The Center for Epidemiologic Studies Depression Scale (CES-D) was used to screen potential participants according to their level of depression, including low positive affect. The CES-D is a widely-used, free, self-report measure of depressive symptoms experienced within the last week. It was created by selecting items from previously validated self-report measures (Radloff, 1977).

The CES-D is a 20-item measure that assesses four dimensions of depression, including negative affect, positive affect, somatic disturbance, and interpersonal distress. Items on each of the subscales include the following symptoms. The negative affect subscale includes seven items that capture sadness, crying, blues, depression, loneliness, fear, and failure. The positive affect subscale includes four items related to hope, enjoyment, feeling as good as others, and happiness. The seven somatic subscale items include symptoms related to appetite, sleep, and motivation. The interpersonal distress subscale includes two items, the feeling of being disliked and the perceived unfriendliness of others. The four dimensions of depression have been supported by factor analysis (Leventhal et al., 2008; Radloff, 1977; Shafer, 2006; Wong, 2000). Furthermore, the four-factor model has been found to be a better fit of the data than the single factor model, and thus, the use of subscales has been supported (Leventhal et al.).

Total scores range from 0 to 60 and higher scores are indicative of greater levels of depression. Participants endorse the frequency with which they have experienced each of the 20 symptoms/items over the last week: 0 = *rarely or none of the time (less than 1 day)*; 1 = *some or a little of the time (1-2 days)*; 2 = *occasionally or a moderate amount of time (3-4 days)*; 3 = *most or all of the time (5-7 days)*. Data analysis included examining changes related to the chillPACK for participants whom have levels of depression shown to predict difficulty with quitting smoking (Leventhal et al., 2008). More specifically, Leventhal et al. (2008) showed abstinence after smoking cessation treatment was predicted by an average item score greater than 0.5 for all CES-D items or a reversed average item score greater than 0.6 for the positive affect subscale items (0.6). Participants in this study were included if their average item score for the total 20 CES-D items was greater than 10 (0.5 x 20 items) or if their average reversed item score for positive affect subscale items was greater than 2 (0.6 x 4 items).

It was understood that the use of two qualifying inclusionary criteria for depressive symptoms could have resulted in some participants having low positive affect without overall elevated levels of depression. However, including this group with low positive affect was important for several reasons. First, participants with low positive affect without overall elevated symptoms of depression may be more likely to engage and adhere to treatment than participants with overall elevated levels of depression. The possibility of gaining engagement and adherence to treatment was important because the feasibility and acceptability of the chillPACK was unknown. Treatment outcomes are dependent on adherence, and outcomes related to the chillPACK, or any happiness intervention, are meaningful among all groups of smokers with depressive symptoms, and especially those at risk for smoking cessation. Second, participants with low levels of positive affect may be particularly likely to benefit from a happiness

intervention (Kahler et al., 2013). Third, individuals with low levels of positive affect may be especially likely to have clinical depression (Olson, Presniak, & MacGregor, 2010; Santor & Coyne, 2001); therefore, the inclusion of a group of smokers with low levels of positive affect was unlikely to seriously jeopardize the homogeneity of the sample. Last, homogeneity of variance was not assumed for parametric statistical tests; therefore, the robustness of data analytic techniques was not threatened by the inclusion of the group with low positive affect only.

Overall, participants with a total CES-D cutoff score of greater than 10 or a positive affect subscale score greater than 2 may not be clinically depressed, but importantly, they are more likely to be experiencing levels of depression that put them at risk for having difficulty with quitting smoking and problems with functioning (Leventhal et al., 2008; Low, 2011). Data suggest that the emotional, social, and psychological functioning of these students would be relatively poor. More specifically, Low (2011) showed that the mean CES-D score for college students who were considered to be flourishing in the areas of emotional, social, and psychological functioning was 6.9 and significantly lower than the mean CES-D score of 10.6 for their counterparts.

The CES-D has been validated in community (Radloff, 1977), primary care (Zich, Attkisson, & Greenfield, 1990), and student populations (Shafer, 2006; Shean & Baldwin, 2008). It has demonstrated high internal consistency among samples of community members (Spearman Brown coefficient of .86; Radloff, 1977; Cronbach's alpha coefficients of .89 for the full scale and an average of .70 for the positive affect subscale; Wong, 2000). It has also demonstrated adequate test-retest reliability (r = .59 for six weeks) and sensitivity to changes due to treatment (Radloff). Construct validity has been demonstrated with its ability to discriminate between

patients with and without major depressive disorder (Geisser, Roth, & Robinson, 1997; Shean & Baldwin), and its established convergence/divergence with other self-report measures of depression (Low; Radloff). There is some suggestion that scores of 16 or greater may be indicative of at least mild levels of depression, with 21% of the population meeting this criterion (Radloff; Zich et al.). Low (2011) found 21.8% of their student population to qualify as depressed based on a CES-D score of 16 or greater. Overall, the CES-D was used in this study because of its demonstrated construct validity, adequate psychometric properties, and its capacity to be sensitive to the changes expected in this study as demonstrated by others (Branstrom et al., 2000; Cinciripini et al., 2010; Leventhal et al., 2008). The Cronbach's alpha coefficient, a measure of internal consistency, was calculated for the samples in the current study at pre-treatment ($N = 210$) and post-treatment ($N = 65$) and was found to be .76 and .82, respectively.

Psychological well-being as flourishing. The Flourishing Scale (FS) is a short and psychometrically sound, self-report measure of overall psychological well-being (Diener et al., 2010). The FS was developed with consideration of numerous theories of psychological well-being, including those from humanistic psychology and positive psychology. The necessary components of psychological well-being were deduced to experiencing positive relationships, purpose and meaning in life, engagement in activities, feelings of competence, self-respect, and optimism. Its eight items are answered on a 7-point scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Total scores range from 0 to 56. Means and standard deviations from five U. S. college samples ranged from 43.2 (7.8) to 48.1 (4.9). Initial testing of its psychometric properties showed that the FS is a promising scale of overall psychological well-being, and its length makes it preferable over longer scales of psychological well-being, such as the Ryff scales with 54-items that measure autonomy, growth, mastery, relationships, self-esteem, purpose and

meaning, and the Basic Need Satisfaction Scale with 21 items that measures competency, relatedness, and autonomy (Diener et al., 2010). Diener and colleagues found its internal consistency reliability and its convergent validity to be high. Cronbach's alpha was found to be .87. A principal factor analysis showed the FS to have one factor that accounts for 53% of the variance in the items, and factor loadings ranging from .61 to .77. Test-retest reliability over one month was found to be .71. Correlations with the summed scores of other well-being measures such as Ryan and Deci's Basic Need Satisfaction Scale and Ryff's scales were found to be .78 and .73, respectively. The Cronbach's alpha coefficient, a measure of internal consistency, was calculated for the samples in the current study at pre-treatment ($N = 217$) and post-treatment ($N = 68$) and was found to be .93 and .93, respectively.

Motivation to quit smoking: Contemplation ladder. The contemplation ladder is a measure of motivation to quit smoking, or more specifically, readiness to consider quitting smoking (Biener & Abrams, 1991). It is copyrighted and permission to reprint was not obtained. The scale is displayed with a figure in the article by Biener and Abrams (1991). It is an 11-point ladder with the lowest rung 0 representing *no thought of quitting* and the highest rung 10 representing *taking action to quit* (Biener & Abrams, p. 361). There are three other anchors, including 2 (*think I need to consider quitting someday*), 5 (*think I should quit but not quite ready*), and 8 (starting *to think about how to change my smoking patterns*). Higher rungs on the ladder represent greater motivation to quit smoking, which is conceptualized here as having greater willingness to exert effort in the pursuit of smoking cessation. Notably, the contemplation ladder was not administered to participants in the current study as it was intended. Although the graphic of the contemplation ladder, with its five anchors at 0, 2, 5, 8, and 10, was provided,

participants were inadvertently given 12 options (0–11) instead of 11 options (0–10) from which to choose. This mistake may have inflated average scores.

The contemplation ladder was used to complement the TTM's SOC because the validity of the SOC as a measure of motivation to quit smoking is not ideal (Herzog, 2007; Herzog & Blagg, 2007). For example, ten participants completing the happiness intervention may increase their level of motivation to quit smoking from a 5 (*think I should quit but not quite ready*) to an 8 (*think I need to consider quitting someday*) on the contemplation ladder, which could be a meaningful effect. These same ten participants may not necessarily move from one SOC to a higher SOC, for example, from contemplation to preparation, particularly because of arbitrary SOC criteria. For example, a participant may be in the contemplation stage at the beginning of treatment and he may be ready to quit within the next month by the end of treatment, but unless he has also made an attempt to quit within the last year, a change in motivation to quit smoking would not be apparent according to the SOC.

The best measure of motivation to quit smoking should predict smoking cessation status in the future, and be sensitive to changes in variables theorized to predict it. As predictors of cessation, the SOC and the contemplation ladder appear comparable (Abrams et al., 2000). No other suitable measures of motivation to quit smoking have demonstrated greater validity for predicting smoking cessation than the contemplation ladder or SOC. Also, the TTM's processes of change have been shown to predict progressive motivation to quit smoking on the contemplation ladder; whereas, the same database did not demonstrate this effect for the SOC (Herzog, Abrams, Emmons, & Linnan, 2000). As a measure of sensitivity of change, the Contemplation Ladder may have been found to be superior over the SOC, but the SOC is the field's standard measure in the area of motivation to quit smoking (Herzog & Blagg, 2007).

Overall, there is no agreed upon superior measure of the construct; thus, I used both the Contemplation Ladder and the SOC in this study so that the ability to demonstrate hypothesized changes in motivation to quit smoking will be strengthened.

Original data on the Contemplation Ladder, which were collected from over 400 smokers employed at a manufacturing company, showed the mean score was 5.14, the mode and median were 5, and 69.9% of participants selected the midpoint or higher (Biener & Abrams, 1991). A more recent study showed the mode to be 5, with 83.3% of a community sample selecting the midpoint or higher (Herzog & Blagg, 2007). In support of the measure's construct validity, Biener and Abrams found the mean score of smokers enrolled in smoking cessation treatment were significantly higher (9.83) than the mean score of smokers from workplace settings (5.14), and all treatment participants placed their level of readiness to quit higher than rung 7 on the ladder.

Concurrent validity of the measure has been demonstrated. Biener and Abrams (1991) found scores from the contemplation ladder correlated with a measure of intention to quit (Pearson $r = .64$) and with measures of constructs that previous research has demonstrated to be related to readiness to quit smoking, for example, the number of cigarettes smoked per day (Pearson $r = .12$), and variables related to cessation, such as the number of prior quit attempts (Pearson $r = .33$) and support for quitting as defined by the number of co-workers who had encouraged the participant to quit (Pearson $r = .25$). In another study with a large, diverse sample of employees, Abrams and Biener (1992) found the number of cigarettes smoked per day, minutes to first cigarette, co-worker encouragement to quit, and the perception of co-workers believing smoking is unacceptable were found to significantly predict scores on the contemplation ladder. When the contemplation ladder was categorized to resemble the categories

of the SOC (scores of 0-2, 3-7, and 8-10 on the ladder versus precontemplation, contemplation, and preparation), the classification schemes were found to be correlated (Pearson $r = .58$); however, smokers appear more motivationally ready on the contemplation ladder and on other one item measures of motivation compared to the SOC (Herzog et al., 2007, Herzog & Blagg, 2000).

Overall, research has suggested that smokers have more motivation to quit smoking according to the contemplation ladder versus other measures of motivation to quit and that the contemplation ladder is "uniquely suited to measuring earlier stages of readiness," which is important for capturing the majority of smokers with depression (Biener & Abrams, 1991, p. 363; Prochaska et al., 2004). An analysis of the predictive validity of the contemplation ladder showed it outperformed an intention to quit measure when regressed on variables that were believed to be indicative of relatively low levels of readiness (Biener & Abrams). More specifically, the contemplation ladder, and not the intention measure, predicted variance in measurements made during a worksite intervention, such as willingness to provide saliva to be assayed for cotinine, a metabolite of nicotine, while being paid $20, and participation in awareness events such as tests of lung functioning and addiction. The contemplation ladder was also found to predict quit event measures, but the measure of intention to quit was superior in measuring quit events. As stated, a measure that is sensitive to early stages of motivation to quit is particularly important when most smokers with depression are not ready to quit smoking (Prochaska et al.). It is expected that the contemplation ladder will be sensitive to the baseline distribution of scores for the current study's sample and to the hypothesized treatment effects because participants will not be selected according to their interest in quitting smoking.

As described earlier, Abrams and colleagues (2000) demonstrated baseline scores on the contemplation ladder predicted smoking cessation one and two years later. Significantly different contemplation ladder scores for those who continued to smoke and those who had quit smoking two years out were 5.63 (2.75) and 6.23 (2.69) at baseline. The contemplation ladder was one of the most successful predictors of cessation in this study, outperforming cigarettes per day and number of quit attempts in the past year (*Odds Ratio* = 1.12, *Wald* = 34.15, $p < .0001$, $r = .11$). In another study, the TTM's processes of change were found to predict progressive changes on the contemplation ladder one and two years after baseline (Herzog et al., 2000).

With the exception of Herzog and colleagues (Abrams et al., 2000; Herzog et al., 2000, Herzog & Blagg, 2007), other researchers who have used the "contemplation ladder" have modified the anchors of the ladder (Klinkhammer, Patten, Sadosty, Stevens, & Ebbert, 2005; Shah et al., 2010); therefore, additional progress with demonstrating the psychometric properties of the original contemplation ladder has been limited. As stated, the original contemplation ladder (Biener & Abrams, 1991) will be used in this study, but the use of any version of the contemplation ladder in the literature suggests a preference for a continuous measure of motivation to quit smoking over measures with a yes/no forced choice format, for example, "Do you want to quit smoking?" or the SOC with its temporal boundaries. Furthermore, the predictive ability of a Likert-type scale measure of motivation to quit smoking that slightly resembles the original scale is noteworthy. Shah et al. (2010) found cardiac inpatients that were prepared to quit were significantly more likely to make a quit attempt, and to be more successful with quitting, one month after discharge than their counterparts. Participant preparedness was defined as having a score 6 or higher on their version of the contemplation ladder, which was anchored with the statement, "I definitely plan to quit smoking in the next 6 months" (Shah et al., p. 27).

Motivation to Quit Smoking: Stages of Change (SOC). The SOC algorithm will be used to assess participants' SOC according to the Transtheoretical Model of behavior change. The SOC are ordinal data with five stages including the precontemplation, contemplation, preparation, maintenance, and action stages. Each stage was assigned a score from 1 to 5, respectively, with the numbers increasing with the level of motivation to quit. For example, participants in the precontemplation stage were given a value of 1, participants in the contemplation stage were given a value of 2, and so forth, up to 5. If a participant responded to the first question of the SOC algorithm, "Are you currently a smoker?" with "No, I quit within the last 6 months" he or she was assigned to the action Stage and assigned a value of 4. If a participant responded to the first question with, "No, I quit more than 6 months ago," he or she was considered to be in the maintenance stage and was assigned a 5. The SOC goes on to ask respondents, "In the last year, how many times have you quit smoking for at least 24 hours?" and "Are you seriously thinking of quitting smoking?" If the respondent answers "yes" to the latter question, he or she is asked, "Within the next 30 days?" If the respondent answers "yes" to the latter question and he or she has had at least one 24-hour quit attempt in the past year, then he or she was considered to be in the preparation SOC and was assigned a 3. If he or she has not had at least one quit attempt in the past year, then he or she was considered to be in the contemplation SOC and was assigned a 2. If respondent answers "no" to "Within the next 30 days?," he or she is asked, "Within the next 6 months?" If respondent answers "yes," he or she is in the contemplation stage, and if respondent answers "no," then he or she is in the precontemplation stage. Researchers interested in group differences on the progression through the SOC following an intervention have examined SOC change scores by examining difference scores (Richardson, 2007).

In the current study, a sixth stage was added because as mentioned, the SOC algorithm begins with the question, "Are you currently a smoker?" Respondents who answered "No, I have never smoked" to this question were classified according to the SOC algorithm as an atypical smoker and assigned the value of 6. This final stage of 6 was included when testing the hypotheses of the study. When descriptive statistics and correlations were provided, data without the participants who were given a 6 were also provided in order to maintain the psychometric properties of the SOC and to compare results to other studies using the SOC.

In the original analysis of the precontemplation, contemplation, and preparation stages of change during the process of smoking cessation, construct validity was strongly demonstrated with both concurrent and predictive validity (DiClemente et al., 1991). With a large sample of volunteer subjects recruited through newspaper advertisements to complete questionnaires and participate in a minimal smoking cessation intervention, results "overwhelmingly support[ed] the stage categories" (DiClemente et al., p. 301). With every measure, which were determined through research to be related to theoretical stage transitions, that is, smoking abstinence self-efficacy, smoking decisional balance, smoking processes of change, quit attempts, and point-prevalence abstinence rates, the ordering of effects was in the predicted direction. For example, participants in the preparation stage had significantly more self-efficacy and favorable valuation of the cons of smoking than participants in the contemplation stage, and participants in the contemplation stage had significantly more of same than those in the precontemplation stage. At one-month and six-month follow-ups, point prevalence rates for the smokers in the precontemplation (n = 166), contemplation (n = 794), and preparation (n = 506) stages were 1.8%, 4.8%, 11.9% and 6.0%, 9.1%, and 16.2%, respectively. Other data have demonstrated

similar relations among the SOC and the TTM's key constructs (Fava et al., 1995; Velicer et al., 1995).

Although some researchers question the validity of the SOC, and prefer continuous measures of motivation to quit smoking (Herzog & Blagg, 2007), reviewers of the TTM recognize its practical value (Armitage, 2009). Herzog and Blagg (2007) conducted a cross-sectional study with various measures of motivation to change and determined that the SOC underestimated motivation to change relative to the other measures, and that the stages were not mutually exclusive categories, which is a condition that should be met for stage theories. Herzog and Blagg found that 45% of precontemplators want to quit smoking, but they might not know when they want to quit. On the other hand, Armitage reminds readers that while continuum measures may be preferred to stage measures, only the latter helps with targeting discrete groups for treatment.

Data Analysis

Hypothesis testing. In order to test the two hypotheses of this study, two statistical procedures, the Mann-Whitney test and analysis of variance (ANOVA), were planned. See Table 2 for an overview of the variables within each test. Two procedures were necessary because the nature of two dependent variables required non-parametric tests. Although there were two hypotheses in this study, statistical analyses tested the two hypotheses simultaneously. More specifically, the first hypothesis was that positive outcomes would be experienced over time for participants using the chillPACK. The second hypothesis was that positive outcomes would be greater for participants using the chillPACK compared to the comparison group. Therefore, for all analyses, one independent variable was group with two levels (i.e., the chillPACK and comparison), and another independent variable was time with two levels (i.e., pre-treatment and

post-treatment). The analysis of the effect of time, and how it was entered into SPSS-10, depended on the data and the statistical procedure. In the Mann-Whitney tests, time was analyzed by subtracting pre-treatment scores from post-treatment scores. In the ANOVA, both pre-treatment and post-treatment scores were entered into SPSS-10 and the interaction between group, which was dummy coded, and time, which was two scores, was tested.

Mann-Whitney test. Two Mann-Whitney tests were conducted because there were two dependent variables that required a non-parametric statistical test. As stated, time was analyzed by subtracting pre-treatment scores from post-treatment scores. Each test examined differences in changes over time between the two groups (i.e., the chillPACK and comparison), on two dependent variables, the SOC and the contemplation ladder.

ANOVA. A 2 (chillPACK, comparison) x 2 (pre-treatment, post-treatment) repeated measures ANOVA with a between-subjects factor of group and a within-subjects factor of time was performed on a measure of psychological well-being, that is, the Flourishing scale.

Descriptive statistics and correlations among variables. It was proposed to present descriptive statistics and a correlation matrix for all variables, including the subsidiary measures.

Sample size calculations. The sample size was determined by following advice found in a primer on power by Jacob Cohen (1992) and a statistical power analysis program, G*Power 3 (http://www.psycho.uni-duesseldorf.de/abteilungen/aap/gpower3/) (Faul et al., 2007). The necessary parameters for the *a priori* calculations for sample size include estimated effect size, alpha level (or Type I error rate), and power (1 - the Type II error rate), in addition to other parameters that vary according to statistical tests. It is anticipated that the effect size for this study would be at least medium to large based on several reviews of studies that have investigated the effects of positive psychology interventions and gratitude interventions on

psychological well-being (Bolier et al., 2013; Sin & Lyubomirsky, 2009; Wood et al., 2010). These studies have shown that effect sizes are very heterogeneous and range from negative (below 0) to very large (2.4), and effect sizes are in the moderate range on average. Notably, Sin and Lyubormirsky found effects sizes for positive psychology interventions to be large on average, that is, Cohen's *d* was found to be .61 for well-being and .65 for depression. Bolier and colleagues showed that larger effects are found when interventions are offered to individuals with psychosocial problems like depression and suggested that effectiveness can be further improved by getting participants to adhere to treatment. No studies have investigated positive psychology interventions on motivation to quit smoking, but studies have investigated the effects of gratitude on health-promoting variables such as hours spent exercising (d = .34 and d = .33) and improvements with sleep (d = .59) (Emmons & McCullough, 2003). The alpha level for the calculations was entered as 0.05. The power was entered at 0.80, "which is a convention proposed for general use" (Cohen, 1992, p. 156).

The statistical analyses proposed for this study included two Mann-Whitney tests and one 2 (Treatment, Comparison) x 2 (Pre-treatment, Post-treatment) repeated measures ANOVA with a within-between interaction. Initially, it was determined that these two statistical analyses would be best to test the hypotheses; however, after the data were tested for assumptions of parametric tests, and the FS was found to violate the assumption of normality, the decision to use the Related Samples Wilcoxon Signed Rank Test instead of the ANOVA was made. Thus, in the end, the Mann Whitney test was used to examine group differences over time and the Wilcoxon Signed Rank Test was used to examine effects over time. Computations with G*Power 3 yielded the following required sample sizes according to the ANOVA and Mann-Whitney tests and corresponding parameters. For the Mann-Whitney test with two groups and the following

parameters: (a) alpha level = 0.05/2 or 0.025, (b) desired statistical power level = 0.8, (c) degrees of freedom = 1, and (d) one-tail, the minimum required sample size was found to be 54 when the anticipated effect size (*d*) was large (0.80) and 134 when the anticipated effect size (*d*) was medium (0.50). Using G*Power 3 (Faul et al.) to compute the required sample size for the repeated measures ANOVA with a within-between interaction and the following parameters: (a) alpha level = 0.05, (b) desired statistical power level = 0.80, (c) number of groups = 2, and (d) number of measurements = 2, the minimum required sample size = 16 when the anticipated effect size (*f*) is large (0.40) and 34 when the anticipated effect size (*f*) is medium (0.25). Overall, the sufficient power to find the hypothesized effects was determined to be achievable with 60 participants because it is greater than the minimum required sample sizes with medium effects. Readers unfamiliar with Cohen's *d* and *f* are referred to Cohen (1992) for a brief summary of effect size indexes and conventional values, and to his power handbook for a complete review (Cohen, 1988). The estimation of enrolling and screening 200 to 400 participants was based on research showing the mean CES-D scores for college students are in the 10 to 12 range (Low, 2011; Shean & Baldwin, 2008), 40% of college smokers screen positive for clinical levels of depression (Cranford, Eisenberg, & Serras, 2009), and attrition rates for self-administered positive psychology interventions are approximately 55% (Schueller & Parks, 2012).

Subsidiary Measures

The following variables were of interest because they are additional measures of psychological well-being and motivation to quit smoking. Comparative analyses with inferential statistics were limited in this study due to having a small sample size and insufficient power; thus, analyses with these measures were used for exploratory purposes only.

Stress. Participants in this study completed the Perceived Stress Scale-10 (PSS-10; Cohen & Williamson, 1988) in order to assess their level of perceived stress. The use of this measure was requested by staff at WELLWVU. The PSS-10 is copyrighted and permission to reprint it was not obtained. It can be obtained from the publisher, Mind Garden, at www.mindgarden.com. The PSS-10 "measures the degree to which one perceives aspects of one's life as uncontrollable, unpredictable, and overloading" (Roberti, Harrington, & Storch, 2006, p. 136). Respondents are asked to indicate how often (0 = *never* to 4 = *very often*) they have felt or thought a certain way over the last month. Items include, for example, "In the last month, how often have you been upset because of something that happened unexpectedly?" and "In the last month, how often have you felt that things were not going your way?" Scores range from 0 to 40.

Exploratory factor analysis with a college sample suggested a two-factor structure, which accounted for 61.9% of the variance (Roberti et al., 2006). Factors were labeled, Perceived Helplessness, which has 6 items and Perceived Self-Efficacy, which has 4 items. Confirmatory factor analysis supported the two-factor model. Cronbach's alpha reliability coefficients were found to be .89, .85, and.82 for the total score and factor scores, respectively.

In addition to establishing the factor structure of the PSS-10, Roberti and colleagues (2006) presented normative data for a college sample and construct validity data. Means and standard deviations for college men and women were found to be 17.4 (6.1) and 18.4 (6.5), respectively. No significant differences between men and women were found. Convergent validity was demonstrated with associations between the PSS-10 and the State Trait Anxiety Inventory total score, anxiety score and depression score; significant correlations were .73, .59, and .72, respectively. Divergent validity was shown through non-significant correlations with

measures of sensation-seeking, religious faith, and overt aggression. The PSS-10 was chosen to be used in this study because WELLWVU is interested in these data and how they compare to previous WELLWVU data with the PSS-10. The Cronbach's alpha coefficient, a measure of internal consistency, was calculated for the samples in the current study at pre-treatment (n = 214) and post-treatment (*n* = 68) and was found to be .58 and .63, respectively.

Life satisfaction. The Satisfaction with Life Scale (SWLS; Diener et al., 1985) was used to assess life satisfaction. The SWLS is a 5-item measure with participants rating items on a 1 *(strongly disagree)* to 7 *(strongly agree)* scale. Scores range from 5 to 35 and a score of 20 represents neutrality. Factor analytic studies have replicated a one-factor solution, which has been found to represent 66% of the variance of the scale (Diener et al.; Pavot & Diener, 2008).

The SWLS is a measure of respondents' cognitive judgment of their satisfaction with life from a global perspective, for example, "In most ways, my life is close to my ideal" (Diener et al., 1985, p. 72). In other words, the items do not reflect affective content, nor do they represent valuation of specific life domains such as family or work satisfaction. Although affect and judgment of specific life domains may affect one's overall judgment of satisfaction with life, it is up to the individual respondent to consider and weigh his or her own criteria that determine life satisfaction. Given the broad base of the SWLS, intervention-based changes in life satisfaction are "very impressive" (Pavot & Diener, p. 148).

Pavot and Diener (2008) updated their review of psychometric data on the SWLS from their initial review in 1993. They presented normative data on 31 samples, including cross-cultural adult samples, clinical samples, and health-related samples. Average scores from these samples ranged from 12.9 (individuals with traumatic brain injury: injury and post traumatic stress disorder) to 27 (Kenyan sample). Range of standard deviations was 3.0 to 12.2. Most

(76%) of the 41 mean SWLS scores were above 20, indicating that the presented groups, on average, were satisfied with their lives.

Pavot and Diener (2008) reviewed research demonstrating adequate reliability and validity of the SWLS. Its internal consistency coefficient alphas have been found to be as high as .89 and test-retest reliability coefficients as high as .84 for a one month interval. Researchers have also found lower test-retest reliability coefficients for longer intervals, for example, .54 for four years and longer; thus, taken together with the shorter interval correlations, the measure appears to have temporal stability and sensitivity to change. Finally, the SWLS has been found to be moderately correlated with many measures of emotion variables, including positive affect (Pearson *r* values ranging from .36 to .55) and suicidal ideation (Pearson *r* = .44) (Pavot & Diener, 2008). Overall, the SWLS will be used in this study because of its demonstrated construct validity, adequate psychometric properties, and its capacity to be sensitive to the changes expected in this study as demonstrated by others (Parks-Sheiner, 2009; Seligman et al., 2006). The Cronbach's alpha coefficient, a measure of internal consistency, was calculated for the samples in the current study at pre-treatment ($N = 220$) and post-treatment ($N = 68$) and was found to be .89 and .91, respectively.

Motivation to Quit Smoking: Current consideration for using recommended smoking-cessation tools or services. These are tools and services recommended by smokefree.gov, which is a web site created by the Tobacco Control Research Branch of the National Cancer Institute. If participants endorsed consideration of any tool or service, this was considered as having motivation to quit smoking. If participants endorsed consideration of more tools or services at post-treatment than at pre-treatment, this was considered as having increased

motivation to quit smoking. These data were not used in this study, but may be used in future analyses not proposed here.

Motivation to Quit Smoking: TTM self-efficacy to resist temptation to smoke. The long form of the Situational Temptation Inventory was used to assess self-efficacy to resist smoking in situations that lead people to smoke (Velicer et al., 1990). There are three subscales including situations that are emotionally distressing, habitual/craving situations, and positive affect/social situations. Items on respective subscales include, for example, "when I am extremely depressed," "when I am happy and celebrating," and "with friends at a party" (Velicer et al., p. 277). Each item is rated on a 1 to 5 scale, ranging from *not at all* tempted to smoke to *extremely* tempted to smoke.

Prior to the work of Velicer and colleagues, models of self-efficacy to quit smoking that conceptualized self-efficacy as a single construct competed with models of relapse situations with discrete categories (Velicer et al., 1990). Velicer and colleagues integrated the theoretical models and analyzed five alternative measurement models of the self-efficacy construct. Principal component analyses with items that described emotions and situations thought to elicit smoking behavior indicated a three-component solution. Results from structural equation modeling with two samples of subjects and two different response formats (Confidence and Temptation) were consistent. In other words, results suggested self-efficacy and temptation measures have the same hierarchical structure. The first sample of smokers was from a naturalistic study and the second sample of smokers was recruited to participate in an intervention. The best fit of the data was hierarchical with three first order constructs labeled Positive/Social, Negative/Affective, and Habit/Addictive and a general second order construct labeled Confidence or Temptation. The Goodness of Fit Indices were .855 and .906. The internal

consistency alpha coefficients ranged from .800 for the Habit/Addictive scale to .946 for the Negative/Affective scale. The Cronbach's alpha coefficient, a measure of internal consistency, was calculated for the samples in the current study for the total score at pre-treatment ($N = 210$) and post-treatment ($N = 68$) and was found to be .96 and .94, respectively.

Assessments of the criterion validity for the Situational Temptations Inventory have been scarce and predicting abstinence from smoking with the measure has been unsuccessful (Breitling, Twardella, Raum, & Brenner, 2009). Nonetheless, the authors of the TTM suggest that temptations to smoke decrease across the five SOC (Velicer, Prochaska, Fava, Norman & Redding, 1998). Recent longitudinal data support this postulate (Schumann et al., 2005). Schumann and colleagues found Negative/Affective situational temptation scores significantly decreased over six months by -1.00 for smokers transitioning from precontemplation to contemplation or preparation and by -8.32 for smokers transitioning from contemplation to preparation, action, or maintenance.

Chapter 4

Results

Preliminary Analyses and Sample Description. Among the 224 participants who consented to participate in the study, 128 participants met the inclusionary criteria. They were over 18-years of age, identified as having at least one cigarette over the last six months, had levels of depression that were above inclusionary cutoffs, completed the pre-treatment survey in a valid manner, and were not participating in smoking cessation treatment. A total of 96 participants were excluded from group assignment or analyses because they were under the age of 18-years (*n* = 1, .4%), had not smoked at least one cigarette within the last six months (*n* = 27, 12.0%), had levels of depression that were below inclusionary cutoffs (*n* = 46, 20.5%), had an invalid CES-D score (i.e., no variation among the 20 items, including reverse scored items) (*n* = 3, 1.3%), did not finish the initial pre-treatment survey (*n* = 13, 5.8%), or were participating in a smoking cessation treatment (*n* = 6, 2.7%).

Among the 128 participants who met inclusionary criteria for the study, a total of 68 participants, 34 in each group, completed the study over the four-week study period. A sample size of 60 participants had been proposed as necessary to obtain sufficient statistical power for the proposed analyses. In the time required to collect a full data set from 60 participants, full data sets from 68 participants were collected. In order to obtain the 68 participants who completed the study, 44 participants had been randomly assigned to the comparison group and 84 participants had been randomly assigned to the treatment group. As previously explained in Chapter 3, it was recognized in the early stage of data collection that twice as many participants in the comparison group were completing the study; therefore, the number of participants assigned to each group was adjusted to reflect the trend. The difference between the percentage of participants who

completed the study in the comparison group (34/44 or 77%) was significantly greater than the percentage of participants who completed the study in the treatment group (34/84 or 40%), X^2, (1, N = 128) = 15.7, p < .001. In other words, significantly more participants in the treatment group dropped out of the study than those in the comparison group. Altogether, 68 out of 128 (53%) participants assigned to a group completed the study.

Table 3 includes the demographics for the entire sample of participants who consented for the study (n = 224), which were organized according to five groups: (a) the participants who were excluded from the sample (n = 96), the participants who were assigned to the treatment group who did not complete the study (n = 50), the participants who were assigned to the comparison group but did not complete the study (n = 10), the participants who were assigned to the treatment group and completed the study (n = 34), and the participants who were assigned to the comparison group who completed the study (n = 34). Depending on the nature of the demographic variable, an analysis of variance or a chi-square analysis was used to test demographic differences among these five groups at pre-treatment. No significant group differences were found for age F(4, 213) = 1.22, p = .31, gender X^2 (8, N = 223) = 14.3, p = .07, race X^2 (4, N = 223) = 8.46, p = .07, year in college X^2 (16, N = 201) = 8.17, p = .94, location of college X^2 (8, N = 223) = 3.49, p = .90, or method of recruitment X^2 (16, N = 223) = 10.66, p = .83. The racial makeup of the sample was as follows: White alone (78%), Black alone (6%), Native American alone (1%), Asian alone (5%), Multi-racial (5%), White Hispanic (4%), and Black Hispanic (1%). The percentage of participants who were attending each college or university was as follows: West Virginia University (55%), Frostburg State University (21%), Washington and Jefferson College (2%), Waynesburg University (4%), and other universities (9%). These latter participants were most likely from the University of Wisconsin – Stevens

Point Campus where a colleague of the researcher shared the study with her classes. Some (9%) of participants were not enrolled in a college or university. Most participants who completed the study were female, white, senior students from a university in the southeast region of the United States, who were recruited by email.

Table 4 includes descriptive statistics for the five groups on the primary measures of interest. Given that participants were excluded from participation based on their level of depression at pre-treatment, statistically significant group differences with the excluded group for measures of psychological well-being at pre-treatment were not surprising. Analyses of variance showed significant effects of the CES-D and the FS, $F(4, 206) = 30.6$, $p < .001$, and $F(4, 212) = 11.3$, $p < .001$, respectively. Post hoc analyses using the Tukey LSD criterion for significance showed the participants who were excluded from the consented sample had significantly lower CES-D scores and significantly higher FS scores than their counterparts (all p-values $< .05$); there were no other group differences (all p-values $> .05$). Parenthetically, as stated above, participants were excluded from participating in the study for reasons other than their level of depression, for example, when they were concurrently participating in smoking cessation treatment. In the end, although the inclusionary criterion for depression was not based on the CES-D cutoff for mild depression (i.e., scores above 15; (Radloff, 1977; Zich et al., 1990), it is notable that half (50.3%) of the participants who consented for the study, and most of the participants (70%) who were included in the analyses, were at least mildly depressed.

Additional analyses to test for pre-treatment group differences with the entire sample (n = 224) and the included sample (n = 128) were completed with the CES-D in order to rule out potential confounds at baseline. As noted previously, smokers with depressive symptoms were eligible to participate in this study if they had a mean CES-D item score greater than 0.5 or a

mean reversed positive affect subscale item score greater than 0.6 because previous research has shown these groups to be at risk for having difficulty with smoking cessation treatment success. Either condition was sufficient to reach the inclusionary criterion for this study. Thus, participants fell into one of three groups: (1) both low positive affect and high overall depressive symptoms, (2) low positive affect only, or (3) high overall depressive symptoms without low positive affect. Of course, the excluded group had significantly fewer participants in one of these inclusionary groups compared to the four groups who were included in the study, X^2 (12, N = 208) = 129.91, $p < .001$. Additionally, chi-square analysis with four groups (non-completers: comparison, treatment; completers: comparison, treatment) showed no group differences on these depression categories, X^2 (6, N = 128) = 3.03, p = .806, p = .806. In the end, most of the participants who were included in the study had depressive symptoms that included low positive affect (n = 99, 77.3%). Some participants (n = 8, 6.3%) had symptoms of low positive affect only; in other words, their reversed positive affect subscale scores on the CES-D were greater than 2, but their overall levels of depressive symptoms were less than 10 on the CES-D. Some participants (n = 21, 16.4%) did not have low positive affect according to the reversed positive affect subscale scores on the CES-D.

Analyses of variance with four groups (non-completers: comparison, treatment; completers: comparison, treatment) showed no group differences on the Contemplation Ladder and the SOC. All *significance levels* were $p > .05$. Only four groups were compared for the Contemplation Ladder and SOC because group differences with the excluded group were irrelevant to the current study's method and results.

Analysis of variance with the five groups resulted in no significant effect for the number of cigarettes smoked yesterday, $p > .05$. Although participants were included in the study based

on having smoked at least one cigarette within the last six months, which was assessed with the question, “When was the last time you smoked a cigarette?,” analyses with the number of cigarettes smoked within the last six months were not completed because the self-report data were determined to be unreliable; for example, the reported number of cigarettes smoked over the last six months was sometimes lower than the reported number of cigarettes smoked within the last month. Self-reported smoking is generally underestimated (Gorber, Schofield-Hurwitz, Hardt, Levasseur, & Tremblay, 2009) and it is likely that the recall of the number of cigarettes smoked over a six-month period is more prone to errors of recall and underestimation than shorter time periods. This likelihood finds support in that some reports were numerically anomalous. Therefore, no comparisons using six-month recall data were undertaken.

Table 4 also includes data indicative of participants’ level of engagement in the study, that is, the number of weeks with completed weekly surveys in the four-week study period and the number of minutes reportedly spent on activities intended to enhance their levels of happiness, which will be labeled “intentional minutes.” Analyses of variance with four groups (non-completers: comparison, treatment; completers: comparison, treatment) demonstrated a group effect for the number of weeks for completed weekly surveys and the number of intentional minutes, $F(3, 124) = 223.3$, $p < .001$ and $F(3, 124) = 38.3$, $p < .001$, respectively. As expected, post hoc analyses using the Tukey LSD criterion for significance showed the participants who completed the study completed significantly more weekly surveys and intentional minutes than did the participants who did not complete the study (all p-values $< .05$). A Repeated measures MANOVA with two groups (Completers, Non-completers) and four weeks found no group effect or no interaction effect of group and the number of weeks in the study for the number of weekly minutes spent on activities intended to enhance their happiness, $F(3, 124)$

= 211.4, $p < .001$. In other words, participants who dropped out of the study were similarly engaged with the time they spent on increasing their psychological well-being while they remained in the study. The effect of weeks on the number of minutes spent on intentional activity was found to be significant, Greenhouse-Geisser $T(3, 23) = 5.6$, $p < .01$, partial eta squared = .085. Participants increased their time spent on intentional activities from week 1 to week 2. Subsequently, time spent on activities leveled off over weeks 2, 3 and 4.

The nature and amount of participants' activity. Activity was measured by chillPACK activity, minutes dedicated to intentional activities, and reading about available smoking cessation tools that were provided on pre-treatment survey. On average, participants in the chillPACK group reported completing almost 40 weekly activities each week. Many activities were completed more than once each week. Table 5 shows the reported number of chillPACK activities completed each week, the reported number of unique chillPACK activities completed each week, and the reported number of minutes dedicated to the chillPACK each week. In addition, the number of minutes participants reportedly spent intentionally engaged in activities in order to improve their level of psychological well-being are presented for both groups. Participants in the comparison group completed significantly more intentional activities than did participants in the treatment group, $F(1, 66) = 9.58$, $p < .01$. However, when the number of total minutes (i.e., chillPACK minutes plus other minutes) for the treatment group was compared to the number of minutes for the comparison group, no significant group differences were found, $F(1, 66) = .896$, $p > .05$. Finally, most participants (92.6%) reported reading about smoking cessation tools that were provided on the pre-treatment survey, which was a brief summary of tools provided on smokefree.gov. The percentage of participants who read the materials was not different between groups, X^2 $(1, N = 68) = 1.94$, $p = .163$.

In Table 6 below, the frequency with which participants completed each chillPACK Day or each chillPACK activity is provided in order to show participants' relative interest in each activity. The chillPACK activity among the 30 activities that was completed most often was Day 2. The Day 2 activity was a suggestion to email, text, or call someone to thank them for a recent or good deed, kind word, or action, or just for being a good friend, coworker, or family member. Most participants completed this activity one time. In general, the modal frequency with which most activities were completed was zero times. Exceptions to this were Days 1, 2, and 7; these activities were more likely to be completed by most participants once or twice rather than not at all. The Day 1 activity was to list three things you are grateful and the Day 7 activity was to take a picture of something around you for which you are grateful and share your gratitude with someone else by forwarding the picture or by posting it. On average, the mean number of times participants completed each chillPACK activity was 4.8 times.

As stated previously, participants in the chillPACK group were instructed to enter into the online chillPACK their anonymous code number provided to them as a way to verify treatment adherence; unfortunately, only 11 of the 30 chillPACK activities had been created by WELLWVU with fields to allow for this instruction. Only 27 of the 88 participants assigned to the chillPACK group followed this instruction and only 11 of the 34 participants who completed the study followed this instruction. For those activities that could be verified online, the frequency with which participants entered their daily chillPACK responses into the online fields is also reported in Table 6. As can be seen, the proportion of participants who verified through online data their completion of activities on Days 5, 12, 13, 14, 19, 23, 25, 26, and 29 was much lower than the proportion on Days 1 and 3.

Relations among measures. In order to demonstrate relations among psychological well-being, motivation to quit smoking, and engagement in the study, measures were tested with Spearman's rho correlations. Spearman's rho correlation coefficients were chosen because of the ordinal nature of some variables and the non-normally distributed values of the FS. See Table 7 for correlations among pre-treatment measures, and Table 8 for correlations among post-treatment measures.

Relations between measures were in the expected directions. The measures of psychological well-being, the CES-D and the FS, were found to significantly correlate with one another. The measures of motivation to quit smoking, the SOC and the Contemplation Ladder, were found to significantly correlate with one another. The measures of engagement in the study, that is, the number of chillPACK activities and the number of minutes spent completing activities intended to increase psychological well-being, were significantly positively correlated. The minutes were labeled intentional minutes and included time dedicated to chillPACK activities and other self-selected activities for the treatment group and self-selected activities for the comparison group. The SOC was significantly positively correlated with intentional minutes. Participants were more likely to spend time on activities if they had relatively high levels motivation to quit smoking at pre-treatment. As can be seen from the post-treatment measures in Table 8, the intentional minutes were positively correlated to both measures of motivation to quit smoking at post-treatment, that is, the SOC and the Contemplation Ladder.

Outcomes following a happiness intervention or a comparison condition. Assumptions of parametric statistics were tested using the Kolmogorov-Smirnov test of normality, and scores on the FS, were negatively skewed and significantly non-normal, $D(126) = 0.13$, $p < .01$; therefore, non-parametric tests were used instead of the repeated measures

ANOVA that had been proposed. The Mann-Whitney U test was used to examine group differences and the Related Samples Wilcoxon Signed Rank test was used to examine effects over time. In order to examine group differences on the outcome measures, the pre-treatment score was first subtracted from the post-treatment score and the result was used within analyses. The Mann-Whitney *U* is calculated using the following equation, $U = N_1N_2 + ((N_1(N_1 + 1))/2) - R_1$ where *N* represents the sample sizes for each group and *R* represents the sum of ranks for one group. The groups are related; thus, the *U* can be calculated for either group. The significance test for the Related Samples Wilcoxon Signed Rank test is the *T* statistic and the equation for testing the *T* statistic is provided below. The *T* values within a Related Samples Wilcoxon Signed Rank test are sums of ranks that come from positive differences and negative differences between scores over time. The statistic that is used to calculate the significance of the test is the smaller of the two *T* values. The $\bar{T}$, and the standard error for $\bar{T}$, are calculated using the following equations, $\bar{T} = n(n+1)/4$ and $SE_T \sqrt{\frac{n(n+1)(2n+1)}{24}}$. With $\bar{T}$, and the SE_T, the test statistic is converted to a standardized test statistic with the following equation, $\frac{T - \bar{T}}{SE_T}$. The measure of the effect size for the Mann Whitney U test and the Related Samples Wilcoxon Signed Rank test is calculated with the standardized test statistic *Z* divided by the square root of the overall sample size. The strength of the association between the rankings made by the two groups can be interpreted as an effect size represented by the rank biserial correlation coefficient, r_{rb}. This correlation coefficient measures the relationship between ranking data and dichotomous data, such as the comparison group and the treatment group; it is distributed as the Mann-Whitney U statistic.

Contrary to the first hypothesis, changes over time on the FS (post-treatment minus pre-treatment) were not found to differ between the treatment and comparison groups, $U = 656.50$, *ns*, $r = .12$. When the effect of time on the FS scores was examined separately for the comparison and treatment groups, they were also found to be non-significant, $T = 275.00$, *ns*, $r = .29$ and $T = 351.00$, *ns*, $r = .28$, respectively. However, when participants in the treatment and comparison groups were examined together, FS scores were significantly higher at post-treatment ($Mdn = 47$) than pre-treatment ($Mdn = 44$), $T = 1252.50$, $p < .05$, $r = .30$. However, although the 3-point difference on a 56-point scale may have been found to be statistically significantly different, this average difference is unlikely to be clinically meaningful.

Contrary to the second hypothesis, changes over time on the SOC and the Contemplation Ladder (post-treatment minus pre-treatment) were not found to differ between the treatment and comparison groups, $U = 573.00$, *ns*, $r = .01$ and $U = 603.00$, *ns*, $r = .12$, respectively. There were no changes in SOC scores over time for the comparison group or the treatment group when examined separately, $T = 62.5$, *ns*, $r = .33$ and $T = 101.5$, *ns*, $r = .31$, respectively. However, yet again, when participants in the treatment and comparison groups were examined together, SOC scores were significantly higher at post-treatment ($Mdn = 3$) than pre-treatment ($Mdn = 2$), $T = 311.00$, $p < .01$, $r = .31$. As shown in Table 9, 27.9% of the sample identified themselves as having quit smoking according to the SOC algorithm at pre-treatment. At post-treatment, 41.2% of the sample had identified themselves as having quit smoking. The difference in proportion of quitters between pre-treatment and post-treatment was significant, (X^2 (1, $N = 68$) = 31.23, $p < .001$). Nine participants (13.2%), including five participants in the preparation SOC, reportedly quit smoking during the four-week study period. Here, a quitter was defined as being in the precontemplative, contemplative, or preparation SOC at pre-treatment and in the action SOC at

post-treatment. No effects of time for the Contemplation Ladder were found, including when all participants who completed the study were examined, $T = 521.00$, *ns*, $r = .05$, or when only the comparison group was examined, $T = 105.00$, *ns*, $r = .04$, or when only the treatment group was examined, $T = 163.50$, *ns*, $r = .15$.

Table 9 shows the average changes over time for the primary measures of interest. Notably, the atypical smoker in Table 9 was a category created with the SOC algorithm that is specific to the current study; atypical smokers included participants who answered with "No, I have never smoked" to the SOC question, "Are you currently a smoker?" These participants were included in the current study because they endorsed smoking in the last six months. In fact, some atypical smokers smoked more frequently than other participants who endorsed being a smoker according to the SOC algorithm. See the discussion on ad hoc analyses below to better understand the nature of the current sample in terms of smoking status and the effect of removing smokers who have reportedly quit smoking from some analyses.

Exploratory analyses with subsidiary measures. Given the demonstrated effects related to engagement in the study, which was conceptualized as intentional minutes, analyses were completed to understand the participants in the sample who were most likely to engage in the study. Engagement in the study was measured by the number of minutes spent completing activities intended to enhance happiness. Spearman's rho correlations between intentional minutes and the subsidiary measures at pre-treatment were found to be the following: PSS-10 (-.29, $p < .01$), SWLS (.13, *ns*), and STI (-.04, *ns*). Participants with relatively high levels of stress were less likely to engage in treatment. All pre-treatment measures of psychological well-being and motivation to quit smoking that were found to be significantly correlated with intentional minutes (i.e., SOC, PSS-10) were entered with demographic variables (i.e., age,

gender, race) into a regression model as predictors of intentional minutes. A linear stepwise regression showed characteristics of the sample significantly predicted the amount of time participants spent completing activities intended to enhance their happiness, $F(3, 124) = 14.96$, $p < .001$, $R^2 = .25$. Standardized beta coefficients for the significant predictor variables are presented in Table 10. Participants were more likely to engage in the study when they were relatively less stressed (PSS-10), relatively high in motivation to quit smoking (SOC), and non-white. An independent samples *t*-test showed non-white participants ($M = 2970.1$, $SD = 1585.3$) completed significantly more intentional minutes than white participants ($M = 1867.9$, $SD = 1093.4$) over the four-week study period, $t(66) = -3.10$, $p = .02$. Spearman's rho correlations between intentional minutes and the subsidiary measures at post-treatment were found to be the following: PSS-10 (-.26, $p < .01$), SWLS (.24, $p < .01$), and STI (-.19, *ns*). Altogether these additional analyses show that engagement in the study was related to post-treatment motivation to quit smoking (SOC, Contemplation Ladder) and psychological well-being (SWLS, PSS-10).

Additionally, analyses were completed to test the primary hypotheses in the current study with the subsidiary measures. Seven 2 (treatment, comparison) x 2 (pre-treatment, post-treatment) repeated measures ANOVAs with a between-subjects factor of group and a within-subjects factor of time were performed on additional measures of psychological well-being, that is, the CES-D, SWLS, and PSS-10, and an additional measure of motivation to quit smoking, that is, the STI. The STI has three subscales including Positive/Social, Negative/Affective, and Habit/Addictive and these subscale scores were also tested. Significant effects of time were found for the SWLS and the STI, $F(1, 66) = 6.13$, $p = .02$ and $F(1, 66) = 6.9$, $p = .01$, respectively. Interestingly, significant effects of time were found for the STI-Positive/Social, $F(1, 66) = 12.0$, $p < .001$, and the STI-Negative/Affective subscales, $F(1, 66) = 4.5$, $p = .04$, but

not for the STI-Habit subscale, $p > .05$. Effects of time for the CES-D and PSS-10 were non-significant, all p-values < .05. Similar to the results with the primary measures, all effects of group and interaction effects with group were non-significant, all p-values < .05 (see Table 11).

Ad hoc analyses with atypical smokers or smokers who reportedly quit smoking at pre-treatment. The nature of the inclusionary criterion for smoker in the current study resulted in identifying three groups of smokers who did not identify as current smokers according to the SOC algorithm: atypical smokers, smokers who reportedly quit over six months ago (maintenance SOC), and smokers who reportedly quit within the last six months (action SOC). In the current study, 14.1% of the sample ($n = 18$) were in the action SOC, 4.6% ($n = 6$) were in the maintenance SOC, and 5.5% ($n = 7$) were considered atypical smokers. The remaining participants were in the precontemplation SOC (25%; $n = 32$), contemplation, (31.3%; $n = 40$) and preparation SOCs (19.5%; $n = 25$). Among the quitters and atypical smokers in the current study, the modal numbers of cigarettes smoked within the last month and within the last six months were 3 and 10, respectively. Modes are presented instead of means and standard deviations because many data appeared unreliable likely due to the timeframe for recall at six months in the past; for example, number of cigarettes smoked within the last six months was sometimes lower than the number of cigarettes smoked within the last month. Other data produced similar results, for example, while only 51 participants (28.3%) endorsed smoking daily, 57 (31.7%) had a cigarette yesterday. The impact of these sorts of apparent inconsistencies in the self-reported data will be considered in the discussion section to follow.

All response choices on the Contemplation Ladder contain thoughts of quitting; thus, atypical smokers, and smokers in the action or maintenance SOC may not reliably respond to the Contemplation Ladder. For example, these smokers are not likely to be thinking about quitting

smoking because they believe they have already quit smoking or they may deny being a smoker altogether. Therefore, Spearman's rho correlations with the Contemplation Ladder and other measures were repeated for the subset of participants who endorsed being a current smoker (precontemplation, contemplation, preparation SOC). The correlations with the Contemplation Ladder were found to be following for the CES-D (-.16, *ns*), FS (.36, $p < .01$), SOC (.68, $p < .01$) and Cigarettes (.24, $p < .05$).

In general, the results from the primary analyses were repeated with this subset of participants. Changes over time on the SOC and the Contemplation Ladder (post-treatment minus pre-treatment) were not found to differ between participants in the treatment group and participants in the comparison group, $U = 289.00$, *ns*, $r = .02$ and $U = 236.50$, *ns*, $r = .09$, respectively. In these analyses with a subset of participants, there were significant changes in SOC scores over time for the comparison group when examined separately, $T = 50.50$, $p < .05$, $r = .36$ and the treatment group when examined separately, $T = 85.00$, $p < .05$, $r = .29$when examined separately; both groups had significantly higher levels of SOC at post-treatment than pre-treatment. Also, when participants in the treatment and comparison groups were examined together, SOC scores were significantly higher at post-treatment, $T = 255.00$, $p < .01$, $r = .32$.

Chapter 5

Discussion

The purpose of this study was to examine the effects of a happiness intervention, that is, the WELLWVU chillPACK, on psychological well-being and motivation to quit smoking among smokers with depressive symptoms. It was hypothesized that levels of psychological well-being, as measured by the Flourishing Scale, and levels of motivation to quit smoking, as measured by the Transtheoretical Model Stages of Change and the Contemplation Ladder, would increase following the completion of the chillPACK among smokers with levels of depression that have been shown to predict difficulty with smoking cessation. Effects were hypothesized to be greater in the treatment group with the chillPACK compared to the comparison group. The comparison group was asked to wait to use the chillPACK. All participants received brief psychoeducation about completing intentional positive activities for increasing happiness and were asked to report weekly the amount of time they spent completing intentional positive activities.

Major findings. The hypotheses regarding the potential benefits of a happiness intervention for smokers with depressive symptoms were not supported in this study, at least not when those using the chillPACK intervention were compared with those who did not. However, participants in both groups improved levels of psychological well-being and motivation to quit smoking over the course of the study. Importantly, the more time participants spent completing intentional positive activities during the study, the lower their levels of stress and the higher their levels of satisfaction with life and motivation to quit smoking after the study. Given these findings, an important question was to determine the characteristics of the sample at pre-treatment that predicted time completing intentional positive activities. Results showed participants with relatively low levels of stress and relatively high levels of motivation to quit smoking were most engaged in the study; this was especially true for non-white participants with

these qualities. These results support the continued investigation and dissemination of happiness interventions in order to improve psychological well-being and motivation to quit smoking, particularly among smokers with depressive symptoms. Results of this study also underscore the important early steps to increase motivation to quit smoking and stress management when the ultimate goal is smoking cessation.

Effects of time in expected direction. Participants in both the treatment and comparison groups showed improvements over time on two of three of the primary measures of psychological well-being and motivation to quit smoking, the Flourishing Scale (FS) and the Transtheoretical Model Stages of Change (SOC), and other subsidiary measures, that is, the Satisfaction with Life Scale (SWLS) and the Transtheoretical Model Situational Temptations Inventory (STI). There were no changes over time for number of cigarettes smoked, or for levels of stress, depression, or motivation to quit smoking according to the Contemplation Ladder. The analyses with the subscale of the STI indicated that participants' temptations to smoke in both positive and negative emotional situations decreased over time, although their temptations to smoke in habitual situations did not change. These discriminating differences uphold the theoretical rationale for the study. For example, smokers with depressive symptoms may become more motivated to quit smoking because they may feel freer to manage secondary dependence motives (Piasecki et al., 2010) as a result of developing a happier, broadened mind with more awareness of resources to cope with difficult situations or to inhibit poor choices in positive situations. Although the statistically significant changes in some outcome measures may not be large enough to be clinically meaningful on their own, all of the changes were in the expected direction.

Also, although the current study was not intended to be a smoking cessation study, some participants were successful in quitting smoking. Definitions of success vary in the literature (American Cancer Society, 2014) and definitions of quitting varied within the current study; thus, results should be interpreted accordingly. An increase in motivation to quit smoking is what is considered to be successful here. Significantly more participants identified themselves as having quit smoking according to the SOC algorithm after the study period (27.9%) than at baseline (41.2%), and 13.2% of participants reportedly quit smoking (progression to action SOC at post-treatment) during the four-week study period. According to the American Cancer Society, only about 4% to 7% of smokers are able to quit on any given attempt without any type of intervention (American Cancer Society, 2014). Almost all participants in the current study reportedly read the brief summary of smoking cessation tools that was provided on the pre-treatment survey, but the extent to which they used the materials from smokefree.gov is unknown as no data regarding this factor were collected. Among the participants who quit smoking during the course the study, only about half were prepared to quit smoking at pre-treatment and the other half were in the precontemplation and contemplation SOC. It is possible that the intervention in the current study, including the materials from smokefree.gov, raised the consciousness of these smokers enough to advance their SOC in a substantial way. When smokers are in a positive mood, research suggests they may be more perceptive to the negative health consequences of smoking (Das & Fennis, 2008). Alternatively, the intervention in this study may have prompted participants to re-evaluate what is meaningful to them, such as their health and taking the time to engage in intentional activities. Having meaning in life has been shown to be related to smoking cessation success (Konkoly, Thege, et al., 2009).

Effects of time due to unanticipated intervention experienced by comparison group.

Results from the current study suggest the brief psychoeducation and assessments that were provided to both the treatment and comparison groups served as an intervention for improving outcomes. The psychoeducation was a brief summary of the primary factors known to influence happiness and the implication that 40% of levels of happiness are within our control (Lyubomirsky et al., 2005). The participants were also provided with a link to smokefree.gov and a list of smoking cessation tools and services. The weekly assessments were one simple question. The question read, *Think about how you spent your time over the last week. How much time (in minutes) did you intentionally engage in activities to improve your level of psychological well-being? Things you might have done to improve your well-being include: exercising, socializing with friends, reading a book, appreciating nature, or anything else that made you feel better. How many minutes did you spend doing these things this past week?* The psychoeducation and weekly assessments were intended to increase participants' engagement and adherence to the study. The effects on outcomes for the comparison group were not anticipated. Participants in the comparison group may have increased their intentional activities because they had new knowledge about the benefits of intentional activities and/or because they knew they would be asked about their behavior from week to week. Additionally, or alternatively, participants may have developed a new, positive perspective on their intentional activities that influenced outcomes. In the end, the number of minutes provided to the question above, or for the treatment group, this number of minutes plus the number of minutes spent on the chillPACK, were positively correlated with higher levels of satisfaction with life and motivation to quit smoking after the study.

The relation between intentional minutes and satisfaction with life can be understood in light of other proposals and findings within the happiness literature, for example, the focusing hypothesis (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004; Schkade & Kahneman, 1998), the person-activity model (Lyubomirsky & Layous, 2013), the value of taking in the good (Hanson, 2013), and the importance in doing what matters (Hayes & Smith, 2005). According to the focusing hypothesis (Schkade & Kahneman, 1998), when people are focused on a particular determinant of life satisfaction, such as a sunny climate, the effects of this determinant on life satisfaction become exaggerated. In the current study, participants were asked to focus on the activities they did over the last week that made them feel better when they completed the weekly survey and had to determine the number of minutes they spent on each activity. Some activities, such as exercising and being social, were provided as examples. Thus, participants' focusing on these self-identified or common determinants of happiness may have increased the impact of these activities on their evaluation of their life satisfaction. Alternatively, participants may have savored these experiences or appreciated their ability to have these experiences; evidence shows the benefits of savoring and gratitude on psychological well-being (Jose, Lim, & Bryant, 2012, Wood et al., 2010). Participants may have been implicitly encouraged by the question to evaluate how fortunate they are for being in a position to dedicate time to their happiness. Taking the time during the weekly assessment to estimate intentional minutes may have been a way of turning moments of hedonic well-being into eudaimonic well-being because participants recognized their intentional minutes were meaningful to them (Hanson, 2013). Finally, an underlying premise of some forms of psychotherapy is to help clients recognize what is meaningful to them and do more of it (Hayes & Smith, 2005).

According to the person-activity model, people become happier when they engage in positive activities that increase positive emotions, positive thoughts, positive behaviors, and satisfy needs; and, when features of the person and the activities overlap, well-being is most likely to increase (Lyubomirsky & Layous, 2013). Features of the person include, but are not limited to, motivation and effort, efficacy beliefs, and baseline affective state, such as level of depression or positive affect (as cited in Lyubomirsky & Layous). Features of the activity include, but are not limited to, dosage and variety. Depending on features of the person, some activities are better than others. Importantly, research shows that the amount of happiness derived from positive activities and how often positive activities are completed are both predicted by how much the activities are enjoyed (as cited in Lyubomirsky & Layous).

In the current study, the comparison group may have enjoyed their intervention more than the treatment group and/or may have experienced a better person-activity fit than the treatment group as suggested by the following findings. When the amount of time spent on chillPACK activities is not included in the assessment of group differences, participants in the comparison group completed significantly more intentional minutes than participants in the treatment group. This difference in intentional minutes may reflect more enjoyment, motivation, and effort for positive activities among the participants in the comparison group compared to the participants in the treatment group. Alternatively, the difference could mean that people, especially students, only have a certain amount of time per day to dedicate to intentional positive activities because when chillPACK minutes were included in the assessment of group differences, no differences in intentional minutes were found. However, although participants in the treatment and comparison groups completed an equal number of overall intentional minutes (including chillPACK minutes), and all participants were similarly engaged with the time they spent on intentional

activities while they remained in the study, significantly more participants in the treatment group than in the comparison group dropped out of the study. As more participants dropped out of the treatment group than the comparison group, the intervention in the treatment group could be evaluated as one that generated less enjoyment, motivation, and effort than the unanticipated intervention in the comparison group. Overall, participants seemed to be more invested in completing positive intentional activities when they had the freedom to choose the activities. Perhaps they felt more intrinsically motivated to complete them. The hypothesized benefits of the happiness intervention, which included evidenced-based interventions such as gratitude exercises, may have been offset by the greater person-activity fit of the comparison group. Although the person-activity fit influenced the methodological design to give participants choices among 30 suggested activities, the treatment intervention may not have been potent enough to increase psychological well-being in ways similar to other happiness interventions and more than the comparison group.

Predictors of engagement in positive activities. Results showed participants were more likely to engage in intentional minutes when they were relatively less stressed and more motivated to quit smoking from the outset. These findings further demonstrate the importance of recognizing smoking cessation as a journey rather than an event. Smokers with depressive symptoms, like other clients entering treatments, will be less likely to benefit from treatment if they are preoccupied with stress. Even when smokers in the current study were completing an intrinsically motivated happiness activity, or at least one they freely chose, they were less likely to do it when they were stressed. The results with stress should be interpreted with caution based on the PSS-10 measure having low internal consistency with the current sample. Interestingly, although the current study was not a smoking cessation study, participants' level of motivation to

quit smoking predicted their engagement in the intervention of the study. Motivation to quit smoking is likely related to motivation to change any behavior. Practitioners providing specialized treatments to smokers with depression will benefit from being sensitive to their stage of change for the target of the adjunct treatment in addition to their stage of change for smoking cessation.

An interesting finding in the current study was that non-White participants were more likely to engage in treatment, as evidenced by their higher levels of intentional minutes. The non-White participants were Black (14.3%), Native American (7.1%), Asian (21.4%), multi-racial (28.6%), and White Hispanic (28.6%). No similar findings were found within the happiness literature; however, research with school children has found minority children to be more intrinsically motivated about school than White school children (Gillen-O'Neil & Ruble, 2011). Intrinsic motivation for school was defined in part by higher self-reported levels of interest in school and higher self-reported tendencies to do homework because they like to learn new things. Research with senior college students has shown ethnic minority adults demonstrate higher levels of intrinsic and extrinsic work values compared to their white peers (Ng & Sears, 2010).

High overall level of engagement. Importantly, participants truly engaged in completing the chillPACK and activities they selected to influence their level of happiness. On average, participants in the treatment group completed almost 40 chillPACK activities per week and participants in both groups spent approximately nine hours per week on happiness-promoting activities. It appears it is possible to increase psychological well-being and motivation to quit smoking with fewer than 1.5 hours per day over the course of four weeks. Unfortunately, the frequency with which participants completed intentional positive activities prior to treatment is

unknown. Also, the features of the positive activities that participants chose to do on their own are unknown. It is possible that participants in the comparison group did not change the frequency, novelty, or variety of their positive activities, and instead, developed a different, more positive perspective on their activities. In any case, researchers, practitioners, and public health educators will benefit from recognizing the high level of motivation for happiness interventions among smokers with depression.

Implications for college campuses. In light of the participants' level of engagement with the chillPACK and the current findings, happiness interventions should be strongly promoted on college campuses. More and more college campuses are becoming smoke-free and while smoke-free campuses are undeniable progress for the health of college communities, many students and staff who may smoke to regulate negative affect are being forced to find alternatives ways to cope. Under these conditions, it is particularly important for college counseling center counselors and wellness and health promotion educators to recognize how to best help smokers, especially smokers with depression who often smoke to regulate their affect. For one, these professionals will benefit from knowing that smokers with depression appear enthusiastic about completing intentional positive activities, at least once they commit to doing them. Second, these professionals will benefit from knowing that smokers with depression will be most likely to commit to completing positive activities when they are relatively less stressed. Thus, prioritizing stress management programs will be important. Notably, college smokers who use cognitive coping skills such as distraction (versus rumination) are more likely to engage in pleasurable activities (Cohen et al., 2007); thus, stress management programming that enhances cognitive coping skills may be particularly important for this population. Third, these professionals will benefit from knowing that positive activities will help smokers along the journey toward quitting

because smokers will become happier and more motivated to quit by completing them. Psychologists in counseling centers can introduce positive activity scheduling to clients for targeting more than their clients' depression. These and other data suggest that increasing positive activities corresponds to improvements in smoking behaviors (Cohen et al.; Kahler et al., 2013).

Implications for future research. As more is understood about the nature of psychological well-being, the continued examination of positive states-of-mind, as opposed to negative states-of-mind, will be important in the area of smoking cessation for smokers with depression. Smoking cessation interventions for smokers with depressive symptoms have more commonly addressed patients' levels of depression, but increasing evidence suggests happiness variables may play a stronger role in influencing positive outcomes (Cook et al., 2010; Kahler et al., 2013; Leventhal et al., 2014). In the current study, the measures of happiness completed by smokers with depression had slightly stronger relations with motivation to quit smoking than did the measure of depression. Results showed levels of motivation to quit smoking increased with levels of flourishing, an overall measure of psychological well-being that is positive and growth-oriented, but there was no significant correlation between depression and motivation to quit smoking. Also, participants had increased levels of flourishing and satisfaction with life over time, but no changes in levels of depression.

More research on the effects of relatively unguided intentional activities on psychological well-being and smoking variables will be important. Of particular research interest will be the important features of the person-activity model, including features of positive activities, features of the person, and features of the person-activity fit (Lyubomirsky & Layous, 2013). For example, while research supports the effects of positive psychology interventions for smokers

with low positive affect on smoking cessation (Kahler et al., 2013), it is not yet understood whether these same effects would be found for smokers with high overall levels of depression, including those who may not have low positive affect. Another important feature of the person to examine is the use of e-cigarettes and marijuana.

Limitations

Although a broad, clearly defined population of smokers with depressive symptoms was better understood as a result of this study, results should be interpreted with caution because of biases stemming from a convenience sample and related efforts to secure a sufficient sample size in a limited amount of time. The target population for this study was smokers who have depressive symptoms that may put them at risk for having problems with smoking cessation (Leventhal et al., 2008). The inclusionary criteria for smoking status and depressive symptoms were based on research. For example, participants were included in this study if they had smoked at least one cigarette in the last six months because it was believed most of these smokers would also meet criteria for a commonly used definition of current smoker (Diemert et al., 2008). It was also believed that anyone who admits to having a cigarette within the last six months may benefit from gaining motivation to quit smoking because former smokers are at risk for relapse and atypical smokers are at risk for being unhealthy (DiClemente et al., 1991; Schane, Ling, & Glantz, 2010). Research has shown that the more young smokers smoke to regulate affect, the more likely they are to progress to daily smoking (as cited in Cohen et al., 2007). Certain groups within the target population of current smokers were not systematically favored, for example, the study was not limited to daily smokers for the above-stated reasons; however, the convenience sampling limited the statistical conclusion validity and the external validity of the study.

Most, but not all, of the sample were White, female, college students attending a southeast regional university, were recruited through email, met common definitions of current smoker, and met criteria for being mildly depressed. The proportion of the sample who met criteria for mild levels of depression was relatively higher than those randomly selected from college samples, but participants' scores on the Flourishing Scale were similar to other college campuses (Diener et al., 2010; Low, 2011). The advertisement was effective with inviting participants who were interested in their happiness, but it may be the participants were more interested in decreasing their unhappiness as opposed to increasing their happiness. Importantly, almost a third of the sample did not endorse smoking at least some days and may represent atypical smokers.

With many of the participants in this study being atypical or occasional smokers, the primary measures used to assess motivation to quit smoking were limited in terms of their psychometric soundness. For example, any smoker who had reported quitting over the last six months, who quit over six months ago, or who did not identify as being a smoker may have provided invalid responses to the Contemplation Ladder. The Contemplation Ladder has rungs with qualifiers about thoughts of quitting. Smokers who smoke occasionally and identify as a "non-smoker" or who identify as a former smoker, are not likely to be thinking about quitting smoking. Even though they may still be smoking ten cigarettes per month, they may believe they have already quit or they may believe they have never truly started smoking. Similarly, the reliability of the Contemplation Ladder may not be adequate for occasional smokers. Consider a smoker who smokes an average of five cigarettes per month, arguably an unhealthy amount of smoking. When he or she completes the assessment on a day following significant social smoking, he or she may be particularly inclined to endorse having thoughts of quitting on the

Contemplation Ladder, that is, any score above zero. If that same smoker had not smoked for weeks for some reason, but he or she still continues to smoke an average of five cigarettes per month, he or she may be more likely to endorse having no thoughts of quitting on a different day of assessment. Thus, the use of the Contemplation Ladder over time for occasional or atypical smokers is likely to have relatively low psychometric soundness as compared to its use with heavy smokers. In this study, it was determined there were benefits associated with including atypical or occasional smokers, such as efficiently securing a sufficient sample size; therefore, analyses with the Contemplation Ladder were conducted twice, once with all participants including atypical smokers, and then again without participants who did not endorse being a current smoker according to the SOC algorithm. No differences in results emerged.

Similar problems emerged with the psychometric properties of the SOC for atypical smokers. For example, consider the same smoker as above who smokes an average of five cigarettes per month. At the beginning of the study, he or she may have identified him or herself as a non-smoker, which would have been assigned the ordinal value of 6. At the end of the study, while continuing to smoke an average of five cigarettes per month, he or she may have identified as being in the preparation SOC, which would have been assigned the ordinal value of a 3. A difference score of 3 minus 6 would suggest this individual did not improve his or her smoking status and became less motivated to quit smoking. However, it could be argued that this person is no longer denying the fact that he or she is a smoker and is now taking action to quit.

Efforts made to reduce sampling bias among the southeast regional universities that had been approved by the West Virginia University's Office of Research Integrity and Compliance for recruitment purposes; however, sampling biases were inherent from the outset due to the incentive that was offered and the online nature of the study, and sampling biases developed due

to extending the sample from college students to non-student adults after initial recruitment was slow. Non-student adult participants were mostly recruited through social media and through word-of-mouth from friends of the researcher; thus, sampling bias was increased in these cases. Notably, there were few participants who were recruited in this way. Furthermore, no participant was solicited, and every participant, where possible, was introduced to the study with the same advertisement. In other words, emails and Facebook messages sent to friends included the advertisement that started with the following question, "Interested in your happiness? Be part of an online study…" However, it was not possible to control the methods of recruitment used by friends or others who had learned about the study and were interested in sharing it.

Although other recruitment methods were used, the sampling method of email and social media resulted in a biased sample of individuals who have access to email and/or to the internet. The method of recruitment most effective for recruitment was email. There were differential email recruitment methods within university settings, which depended on the guidelines set by each of the university's Institutional Review Boards; however, all students, faculty, and staff from the various universities were either sent an email from the researchers to their inbox, sent an email from a campus organization that included the advertisement for the study among other campus announcements, or given access to the advertisement where they access their email on a campus email server. In some cases, students were randomly selected from public email directories to receive emails.

Other limitations of the study included threats to internal validity and threats to construct validity. Threats to internal validity may have resulted from attrition; however, differential attrition across groups was ruled out to the extent possible. Attrition may have been reduced with face-to-face interaction and/or ongoing online feedback, such as feedback following participants'

entries into the online chillPACK. Online correspondence between the researchers and participants may have also helped to increase the reliability of the treatment implementation. Some interested individuals may have avoided participation in the study out of concern for their anonymity. Individuals had to be comfortable with the potential for being identified because names and emails were provided in order to send the gift cards that were used as incentives. Threats to construct validity included a mono-method bias of using only self-report questionnaires, reactive self-report changes because participants knew from the consent form that depression was an inclusionary criterion, reactivity to the experimental situation, and compensatory rivalry of the comparison group.

Conclusions

In spite of the limitations of the study, results support the growing body of literature on the value of increasing happiness for smokers with depression when the ultimate goal is psychological well-being and smoking cessation. For one, participants' levels of psychological well-being and motivation to quit smoking improved over time after they completed positive activities intended to enhance their levels of happiness. Second, levels of psychological well-being and motivation to quit smoking after the study period were related to the amount of time participants spent completing intentional positive activities during the study period.

This study included a group of smokers who may not be ready to begin smoking cessation treatment; therefore, the results of the current study uniquely add to improving treatments for smokers along their journey of quitting smoking. Importantly, the results showed that smokers with depression who are most likely to complete intentional positive activities are those who are relatively less stressed and more motivated to quit smoking; therefore, treatments targeting the early journey of smoking cessation will improve when approaches to treatment

include stress management and a sensitivity to stages of change. In the end, although the hypotheses of the current study were not supported, the results support the growing body of literature showing the relation between positive affect and smoking cessation success for smokers with depressive symptoms (Kahler et al., 2013; MacPherson et al., 2014).

Finally, in a small way, the results of this study highlight a pivotal force for human growth and well-being, that is, human agency, or having the ability to influence one's functioning and life circumstances (Bandura, 2006). That so many individuals in the current study were interested in engaging in intentional activities to help themselves is encouraging for the field of psychology. As psychologists aim to improve lives, and develop interventions to do so, they will benefit from seeking to enhance and promote the human sense of agency that includes choosing and planning ways to improve one's own well-being and then motivating oneself to follow through with those plans. Following on the work of others (Bandura, 2006; Rice, 2014; Ryan & Deci, 2010), it could be imagined that psychological theory and models developed from this perspective could improve society worldwide.

References

Abrams, D. B., & Biener, L. (1992). Motivational characteristics of smokers at the workplace: A public health challenge. *Preventive Medicine, 21,* 679-687.

Abrams, D. B., Herzog, T. A., Emmons, K. M., & Linnan, L. (2000). Stages of change versus addiction: a replication and extension. *Nicotine and Tobacco Research, 2,* 223-229.

Acton, G. S., Prochaska, J. J., Kaplan, A. S., Small, T., & Hall, S. M. (2001). Depression and stages of change for smoking in psychiatric outpatients. *Addictive Behaviors, 26,* 621-631.

American Cancer Society (2014). *A word about success rates for quitting smoking.* Retrieved from http://www.cancer.org/healthy/stayawayfromtobacco/guidetoquittingsmoking/guide-to-quitting-smoking-success-rates.

Armitage, C. J. (2009). Is there utility in the transtheoretical model? *British Journal of Health Psychology, 14,* 195-210.

Ayuso-Mateos, J. L., Nuevo, R., Verdes, E., Naidoo, N., & Chatterji, S. (2011). From depressive symptoms to depressive disorders: The relevance of thresholds. *The British Journal of Psychiatry, 196*, 365-371.

Bailey, K. A., Goldfine, M. E., Branstetter, S. A., Kamien, J., & Amass, L. (2006, November). *Symptoms of depression discriminate between light versus heavy smokers.* Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, Chicago.

Balmford, J., & Borland, R. (2008). What does it mean to want to quit? *Drug and Alcohol Review, 27,* 21-27.

Bandura, A. (2006). Toward a psychology of human agency. *Perspectives on Psychological Science, 1,* 164 -180.

Beck, R. A., Steer, M. G., & Garbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8,* 77-100.

Berlin, I., & Covey, L. S. (2006). Pre-cessation depressive mood predicts failure to quit smoking: The role of coping and personality traits. *Addiction, 101,* 1814-1821.

Biener, L., & Abrams, D. B. (1991). The contemplation ladder: Validation of a measure of readiness to consider smoking cessation. *Health Psychology, 10,* 360-365.

Blalock, J. A., Robinson, J. D., Wetter, D. W., Schreindorfer, L. S., & Cinciripini, P. M. (2008). Nicotine withdrawal in smokers with current depressive disorders undergoing intensive smoking cessation treatment. *Psychology of Addictive Behaviors, 22,* 122-128.

Bolier, L., Haverman, M., Westerhof, G. J., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: A meta-analysis of randomized controlled studies. *BioMed Central Public Health, 13*. Retrieved from http://www.biomedcentral.com/1471-2458/13/119

Borrelli, B. (2010). Smoking cessation: Next steps for special populations research and innovative treatments. *Journal of Consulting and Clinical Psychology, 78,* 1-12.

Branstrom, R., Penilla, C. Perez-Stable, E. J., & Munoz, R. F. (2010). Positive affect and mood management in successful smoking cessation. *American Journal of Health Behavior, 34,* 553-562.

Breitling, L. P., Twardella, D., Raum, E., & Brenner, H. (2009). Situational temptation scores and smoking cessation in general care. *Psychology of Addictive Behaviors, 23,* 362-367.

Breslau, N., Novak, S. P., & Kessler, R. C. (2004). Psychiatric disorders and stages of smoking. *Biological Psychiatry, 55,* 69-76.

Breslau, N., Peterson, E. L., Schultz, L. R., Chilcoat, H. D., & Andreski, P. (1998). Major depression and stages of smoking: A longitudinal investigation. *Archives of General Psychiatry, 55,* 161-166.

Brown, R. A., Kahler, C. W., Niaura, R., Abrams, D. B., Sales, S. D., Ramsey, S. E., … Miller, I. W. (2001). Cognitive-behavioral treatment for depression in smoking cessation. *Journal of Consulting and Clinical Psychology, 69,* 471-480.

Brown, R. A., Niaura, R., Lloyd-Richardson, E. E., Strong, D. R., Kahler, C. W., Abrantes, A. M., Abrams, D., & Miller, I. W. (2007). Bupropion and cognitive-behavioral treatment for depression in smoking cessation. *Nicotine and Tobacco Research, 9,* 721-730.

Burgess, E. S., Brown, R. A., Kahler, C. W., Niaura, R., Abrams, D. B., Goldstein, M. G., & Miller, I. W. (2002). Patterns of change in depressive symptoms during smoking cessation: Who's at risk for relapse? *Journal of Consulting and Clinical Psychology, 70,* 356-361.

Burgdorf, J., & Panksepp, J (2006). The neurobiology of positive emotions. *Neuroscience and Biobehavioral Reviews,* 30, 173-187.

Butler, A. C., Chapman, J. E., Forman, E. M., & Beck, A. T. (2006). The empirical status of cognitive-behavioral therapy : A review of meta-analyses. *Clinical Psychology Review, 26,* 17-31.

Cargill, B. R., Emmons, K. M., Kahler, C. W., & Brown, R. A. (2001). Relationship among alcohol use, depression, smoking behavior, and motivation to quit smoking with hospitalized patients. *Psychology of Addictive Behaviors, 15,* 272-275.

Carter, B. L., Lam, C. Y., Robinson, J. D., Paris, M. M., Waters, A. J., Wetter, D. W., & Cinciripini, P. M. (2008). Real-time craving and mood assessments before and after smoking. *Nicotine and Tobacco Research, 10,* 1165-1169.

Carton, S., Jouvent, R., & Widlocher, D. (1994). Nicotine dependence and motives for smoking in depression. *Journal of Substance Abuse, 6,* 67-76.

Centers for Disease Control. (2010). Vital signs: Current cigarette smoking among adults >= 18 years – United States, 2009. *Morbidity and Mortality Weekly Report, 59,* 1135-1140.

Cinciripini, P. M., Blalock, J. A., Minnix, J. A., Robinson, J. D., Brown, V. L., Wetter, D. W., et al. (2010). Effects of an intensive depression-focused intervention for smoking cessation in pregnancy. *Journal of Consulting and Clinical Psychology, 78,* 44-54.

Cinciripini, P. M., Wetter, D. W., Fouladi, R. T., Blalock, J. A., Carter, B. L., Cinciripini, L. G. et al. (2003). The effects of depressed mood on smoking cessation: Mediation by postcessation self-efficacy. *Journal of Consulting and Clinical Psychology, 71,* 292-301.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112,* 155-159.

Cohen, L. M., McCarthy, D. M., Brown, S. A., & Myers, M. G. (2002). Negative affect combines with smoking outcome expectations to predict smoking behavior over time. *Psychology of Addictive Behaviors, 16,* 91-97.

Cohen, L. M., McChargue, D. E., & Morrell, H. E. R. (2007). Negative mood regulation mediates the relationship between distraction and engagement in pleasurable activities among college smokers. *Personality and Individual Differences, 43,* 1969-1979.

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapam & S. Oskamp (Eds.), *The social psychology of health: Claremont Symposium on applied social psychology.* Newbury Park, CA: Sage.

Cohn, A. M., Strong, D. R., Abrantes, A. M., & Brown, R. A. (2010). History of single episode and recurrent major depressive disorder among smokers in cessation treatment: Associations with depressive symptomatology and early cessation failure. *Addictive Disorders and Their Treatment, 9,* 41-52.

Cohn, M. A., Fredrickson, B. L., Brown, S. L., Mikels, J. A., & Conway, A. M. (2009). Happiness unpacked: Positive emotions increase life satisfaction by building resilience. *Emotion, 9,* 361-368.

Cook, J. W., Spring, B., & McChargue, D. (2007). Influence of nicotine on positive affect in anhendonic smokers. *Psychopharmacology, 192,* 87-95.

Cook, J. W., Spring, B., & McChargue, D., Borrelli, B., et al. (2004). Influence of fluoxetine on positive and negative affect in a clinic-based smoking cessation trial. *Psychopharmacology*, 173(1/2), 153-159.

Cook, J. W., Spring, B., & McChargue, D., & Doran, N. (2010). Effects of anhedonia on days to relapse among smokers with a history of depression: A brief report. *Nicotine and Tobacco Research, 12,* 978-982.

Cook, J. W., Spring, B., McChargue, D., & Hedeker, D. (2004). Hedonic capacity, cigarette craving, and diminished positive mood. *Nicotine and Tobacco Research, 6,* 39-47.

Covey, L. S. (2004). Comments on "History of depression and smoking cessation outcome: A meta-analysis." *Nicotine and Tobacco Research, 6,* 743-745.

Covey, L. S., Bomback, A., & Yan, G. W. Y. (2006). History of depression and smoking cessation: A rejoinder. *Nicotine and Tobacco Research, 8,* 315-319.

Cranford, J. A., Eisenberg, D., & Serras, A. M. (2009). Substance use behaviors, mental health problems, and use of mental health services in a probability sample of college students. *Addictive Behaviors, 34,* 134-145.

Curtin, L., Brown, R. A., & Sales, S. D. (2000). Determinants of attrition from cessation treatment in smokers with a history of major depressive disorder. *Psychology of Addictive Behaviors, 14,* 134-142.

Das, E., & Fennis, B. M. (2008). In the mood to face the facts: When a positive mood promotes systematic processing of self-threatening information. *Motivation and Emotion, 32,* 221-230.

DiClemente, C. C., Prochaska, J. O., Fairhurst, S. K., Velicer, W. F., Velasquez, M. M., & Rossi, J. S. (1991). The process of smoking cessation: An analysis of precontemplation, contemplation, and preparation stages of change. *Journal of Consulting and Clinical Psychology, 59,* 295-304.

Diemert, L. M., Bondy, S. J., Victor, C., Cohen, J. E., Brown, K. S., Ferrence, R. et al. (2008). Efficient screening of current smoking status in recruitment of smokers for population-based research. *Nicotine and Tobacco Research, 11,* 1663 -1667.

Diener, E., & Chan, M. Y. (2011). Happy people live longer: Subjective well-being contributes to health and longevity. *Applied Psychology: Health and Well-being, 3,* 1-43.

Diener, E., Emons, R. A., Larsen, R. J., & Griffen, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49,* 71–75.

Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, E., Oishi, S., & Biswas-Diener, R. (2010). New measures of well-being: Flourishing and positive and negative feelings. *Social Indicators Research, 39,* 247-266.

Donohue, J. M., & Pincus, H. A. (2007). Reducing the societal burden of depression: A review of economic costs, quality of care and effects of treatment. *Pharmacoeconomics, 25,* 7-24.

Doran, N., Spring, B., Borrelli, B., McChargue, D., Hitsman, B., Niaura, R., & Hedeker, D. (2006). Elevated positive mood: A mixed blessing for abstinence. *Psychology of Addictive Behaviors, 20,* 36-43.

D'Souza, M. S., & Markone, A. (2011). Neuronal mechanisms underlying development of nicotine dependence: Implications for novel smoking-cessation treatments. *Addiction Science and Clinical Practice, 6,* 4-16.

Emmons, R. A., & McCullough, M. E. (2003). Counting blessings versus burdens: Experimental studies of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology, 84,* 377-389.

Emmons, R. A., & Mishra, A. (2011). Why gratitude enhances well-being: What we know, what we need to know. In Sheldon, K., Dashdan, T., & Steger, M. F. (Eds.). *Designing the future of positive psychology: Taking stock and moving forward.* New York: Oxford University Press.

Falkenstern, M., Schiffrin, H. H., Nelson, S. K., Ford, L., & Keyser, C. (2009). Mood over matter: Can happiness be your undoing? *The Journal of Positive Psychology: Dedicated to Furthering Research and Promoting Good Practice, 4,* 365-371.

Farrell, M., Howes, S., Bebbington, P., Brugha, T, Jenkins, R., Lewis, G., Marsden, J., Taylor, C., & Meltzer, H. (2001). Nicotine, alcohol and drug dependence, and psychiatric comorbidity. *British Journal of Psychiatry, 179,* 432-437.

Faul, F., Erdfelder, E., Lang, A.G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175-191.

Fava, J. L., Velicer, W. F., & Prochaska, J. O. (1995). Applying the transtheoretical model to a representative sample of smokers. *Addictive Behaviors, 20,* 189–203.

Fiore, M. C., Jaen, C. R., Baker, T. B., et al. (2009). *Treating tobacco use and dependence: 2008 update. Quick reference guide for clinicians.* Rockville, MD: U. S. Department of Health and Human Services, Public Health Service, April 2009.

Fitzpatrick, M. R., & Stalikas, A. (2008). Positive emotions as generators of therapeutic change. *Journal of Psychotherapy Integration, 18,* 137-154.

Flensborg-Madsen, T. Bay von Scholten, M., Flachs, E. M., Mortensen, E. L., Prescott, E., & Tolstrup, J. S. (2011). Tobacco smoking as a risk factor for depression: A 26-year population-based follow-up study. *Journal of Psychiatric Research, 45,* 143-149.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56,* 218-226.

Fredrickson, B. L. (2004). Gratitude, like other positive emotions, broadens and builds. In R. A. Emmons & M. E. McCullough (Eds.) *The Psychology of Gratitude* (pp. 145-166). New York: Oxford University Press.

Frie, R. (2014). *Psychological Agency: Theory, Practice, Culture.* Cambridge, MA: MIT Press.

Geisser, M. E., Roth, R. S., & Robinson, M. E. (1997). Assessing depression among persons with chronic pain using the Center for Epidemiological Studies-Depression Scale and the Beck Depression Inventory: A comparative analysis. *The Clinical Journal of Pain, 13,* 163-170.

Geraghty, A. W., Wood, A. M., & Hyland, M. E. (2010). Attrition from self-directed interventions: Investigating the relationship between psychological predictors, intervention content and dropout from a body dissatisfaction intervention. *Social Science and Medicine, 71,* 30-37.

Gillen-O'Neil, C., & Ruble, D. N. (2011). Ethnic stigma, academic anxiety, an intrinsic motivation in middle childhood. *Child Development, 82,* 1470–1485.

Gorber, C. S., Schofield-Hurwitz, S., Hardt, I., Levasseur, G. & Tremblay, M. (2009). The accuracy of self-reported smoking: A systematic review of the relationship between self-reported and cotinine-assessed smoking status. *Nicotine and Tobacco Research, 11,* 12 - 24.

Gilbody, S., Bower, P., Fletcher, J., Richards, D., & Sutton, A. J. (2006). Collaborative care for depression: A cumulative meta-analysis and review of longer-term outcomes. *Archives of Internal Medicine, 166,* 2314-2321.

Haaga, D. A. F., Thorndike, F. P., Friedman-Wheeler, D. G., Pearlman, M. Y., & Wernicke, R. A. (2004). Cognitive coping skills and depression vulnerability among cigarette smokers. *Addictive Behaviors, 29,* 1109-1122.

Haas, A. L., Munoz, R. F., Humfleet, G. L., Reus, V. I., & Hall, S. M. (2004). Influences of mood, depression history, and treatment modality on outcomes in smoking cessation. *Journal of Consulting and Clinical Psychology, 72,* 563-570.

Halperin, A. C., Smith, S. S., Heiligenstein, E., Brown, D., & Fleming, M. F. (2010). Cigarette smoking and associated health risks among students at five universities. *Nicotine and Tobacco Research, 12,* 96-104.

Hanson, R. (2013). *Hardwiring happiness: The new brain science of contentment, calm, and confidence.* New York: Harmony.

Haug, N. A., Hall, S. M., Prochaska, J. J., Rosen, A. B., Tsoh, J. Y., et al. (2005). Acceptance of nicotine dependence treatment among currently depressed smokers. *Nicotine and Tobacco Research, 7,* 217-224.

Haukkala, A., Uutela, A., Vartainen, E., McAlister, A., & Knekt, P. (2000). Depression and smoking cessation: The role of motivation and self-efficacy. *Addictive Behaviors, 25,* 311-316.

Hayes, S. C., & Smith, S. (2005). *Get out of your mind and into your life: The new Acceptance and Commitment Therapy*. Oakland, CA: New Harbinger.

Heckman, C. J., Egleston, B. L., & Hofmann, M. T. (2010). Efficacy of motivational interviewing for smoking cessation: A systematic review and meta-analysis. *Tobacco Control*, *19*(5), 410-416. Retrieved from http://www.jstor.org/stable/20788903?origin=JSTOR-pdf

Heinz, A. J., Kassel, J. D., Berbaum, M., & Mermelstein, R. (2010). Adolescents' expectations for smoking to regulate affect predict smoking behavior and nicotine dependence over time. *Drug and Alcohol Dependence, 111,* 128-135.

Herzog, T. A. (2007). Are the stages of change for smokers qualitatively distinct? An analysis using an adolescent sample. *Psychology of Addictive Behaviors, 21,* 120-125.

Herzog, T. A., Abrams D. B., Emmons, K. M., & Linnan L. (2000). Predicting increases in readiness to quit smoking: A prospective analysis using the contemplation ladder. *Psychology and Health, 15,* 369-381.

Herzog, T. A., & Blagg, C. O. (2007). Are most precontemplators contemplating smoking cessation? Assessing the validity of the stages of change. *Health Psychology, 26,* 222-231.

Hitsman, B., Borrelli, B., McChargue, D. E., Spring, B., & Niaura, R. (2003). History of depression and smoking cessation outcome: A meta-analysis. *Journal of Consulting and Clinical Psychology, 71,* 657-663.

Huta, V., & Waterman, A. S. (2013). Eudaimonia and its distinction from hedonia: Developing a classification and terminology for understanding conceptual and operational definitions. *Journal of Happiness Studies*, 15, 1425-1456.

Jameson, J. P., & Blank, M. B. (2010). Diagnosis and treatment of depression and anxiety in rural and nonrural primary care: National survey results. *Psychiatric Services, 61*, 624-627.

Japuntich, S. J., Smith, S. S., Jorenby, D. E., Piper, M. E., Fiore, M. C., & Baker, T. B. (2007). Depression predicts smoking early but not late in a quit attempt. *Nicotine and Tobacco Research, 9,* 677-686.

Jose, P. E., Lim, B. T., & Bryant, F. B. (2012). Does savoring increase happiness? A daily diary study. *The Journal of Positive Psychology: Dedicated to Furthering Research and Promoting Good Practice, 7,* 176-187.

Kahler, C. W., Spillane, N. S., Day, A., Clerkin, E. M., Parks, A., Leventhal, a. M., & Brown, R. A. (2013). Positive psychotherapy for smoking cessation: Treatment development,

feasibility, and preliminary results. *The Journal of Positive Psychology: Dedicated to Furthering Research and Promoting Good Practice, 9,* 1-11.

Kahler, C. W., Brown, R. A., Ramsey, S. E. Niaura, R., Abrams, D. B., Goldstein, M. G., et al. (2002). Negative mood, depressive symptoms, and major depression after smoking cessation treatment in smokers with a history of major depressive disorder. *Journal of Abnormal Psychology, 111,* 670-675.

Kahneman, D. Krueger, A. B., Schkade, D. A., Schwarz, N. & Stone, A. A. (2004). A Survey Method for Characterizing Daily Life Experience: The Day Reconstruction Method. *Science, 306,* 1776-1780.

Kapson, H. S., & Haaga, D. A. F. (2010). Depression vulnerability moderates the effects of cognitive behavior therapy in a randomized controlled trial for smoking cessation. *Behavior Therapy, 41,* 447-460.

Kenney, B.A., Holahan, C. J., Holahan, C. K., Brennan, P. L., Schutte, K. K., & Moos, R. H. (2009). Depressive symptoms, drinking problems, and smoking cessation in older smokers. *Addictive Behaviors, 34,* 548-553.

Khaled, S. M., Bulloch, A., Exner, D., & Patten, S. B. (2009). Cigarette smoking, stages of change, and major depression in the Canadian population. *Canadian Journal of Psychiatry, 54,* 204-208.

Klinkhammer, M. D., Patten, C. A., Sadosty, A. T., Stevens, S. R., & Ebbert, J. O. (2005). Motivation for stopping tobacco use among emergency department patients. *Academic Emergency Medicine, 12,* 568-571.

Konkoly Thege, B., Bachner, Y. G., Kushnir, T., & Kopp, M. S. (2009). Relationship between meaning in life and smoking status: Results of a national representative survey. *Addictive Behaviors, 34,* 117-120.

Konkoly Thege, B., Bachner, Y. G., Martos, T., & Kushnir, T. (2009). Meaning in life: Does it play a role in smoking? *Substance Use and Misuse, 44,* 1566-1577.

Lambert, N. M., Fincham, F. D., & Stillman, T. F. (2012). Gratitude and depressive symptoms: The role of positive reframing and positive emotion. *Cognition and Emotion, 26,* 615-633.

Lasser, K., Boyd, J. W., Woolhandler, S., Himmelstein, D. U., McCormick, D., & Bor, D. H. (2000). Smoking and mental illness: A population-based prevalence study. *Journal of the American Medical Association, 284,* 2606-2010.

Lee, C., & Kahende, J. (2007). Factors associated with successful smoking cessation in the United States, 2000. *American Journal of Public Health, 97,* 1503-1509.

Lerman, C., Audrain, J., Orleans, C. T., Boyd, R., Gold, K., Main, D., & Caporaso, N. (1996). Investigation of mechanisms linking depressed mood to nicotine dependence. *Addictive Behaviors, 21,* 9-19.

Leventhal, A. M. (2010). Do individual differences in reinforcement smoking moderate the relationship between affect and urge to smoke. *Behavioral Medicine, 36,* 1-6.

Leventhal, A. M., Kahler, C. W., Ray, L. A., & Zimmerman, M. (2009). Refining the depression-nicotine dependence link: Patterns of depressive symptoms in psychiatric outpatients with current, past, and no history of nicotine dependence. *Addictive Behaviors, 34,* 297-303.

Leventhal, A. M., Piper, M. E., Japuntich, S. J., Baker, T. B., & Cook, J. W. (2014). Anhedonia, depressed mood, and smoking cessation outcome. *Journal of Consulting and Clinical Psychology, 82,* 122-129.

Leventhal, A. M., Ramsey, S. E., Brown, R. A., LaChance, H. R., & Kahler, C. W. (2008). Dimensions of depressive symptoms and smoking cessation. *Nicotine and Tobacco Research, 10,* 507-517.

Leventhal, A. M., Waters, A. J., Kahler, C. W., Ray, L. A., & Sussman, S. (2009). Relations between anhedonia and smoking motivation. *Nicotine and Tobacco Research, 11,* 1047-1054.

Levine, M. D., Marcus, M. D., & Perkins, K., A. (2003). A history of depression and smoking cessation outcomes among women concerned about post-cessation weight gain. *Nicotine and Tobacco Research, 5,* 69-76.

Lima, A. F. B. S., & Fleck, M. P. A. (2007). Subsyndromal depression: An impact on quality of life? *Journal of Affective Disorders, 100,* 163-169.

Low, K. G. (2011). Flourishing, substance use, and engagement in students entering college: A preliminary study. *Journal of American College Health, 59,* 555-561.

Luger, T. M., Suls, J., & Vander Weg, M. W. (2014). How robust is the association between smoking and depression in adults? A meta-analysis using linear mixed-effects models. *Addictive Behaviors, 39,* 1418-1429.

Lyubomirsky, S., Dickerhoof, R., Boehm, J. K., & Sheldon, K. M. (2011). Becoming happier takes both a will and a proper way: An experimental longitudinal intervention to boost well-being. *Emotion, 11,* 391-402.

Lyubomirsky, S., & Layous, K. (2013). How do simple positive activities increase well-being? *Current Directions in Psychological Science, 22,* 57-62.

Lyubomirsky, S., Sheldon, K. M., & Schkade, D. (2005). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology, 9,* 111-131.

MacPherson, L., Tull, M. T., Matusiewicz, A. K., Rodman, S., Strong, D. R., Kahler, C. W., et al. (2010). Randomized control trial of behavioral activation smoking cessation treatment for smokers with elevated depressive symptoms. *Journal of Consulting and Clinical Psychology, 78,* 55-61.

Malpass, D., & Higgs, S. (2009). How is cigarette smoking maintained in depression: Experiences of cigarette smoking in people diagnosed with depression. *Addiction Research and Theory, 17,* 64-79.

Mathers, C. D., & Loncar, D. (2006). Projections of global mortality and burden of disease from 2002 to 2030. *Public Library of Science Medicine, 3,* 2011- 2030.

McChargue, D. E., & Cook, J. W. (2007). Depression vulnerability within smoking research: How accurate are one-item screening items? *Addictive Behaviors, 32,* 404-409.

McClave, A. K., Dube, S. R., Strine, T. W., Kroenke, K. Caraballo, R. S., & Mokdad, A. H. (2009). Associations between smoking cessation and anxiety and depression among U.S. adults. *Addictive Behaviors, 34,* 491-497.

McEwen, A., West, R., & McRobbie, H. (2008). Motives for smoking and their correlates in clients attending Stop Smoking treatment services. *Nicotine and Tobacco Research, 10,* 843-850.

Mineur, Y. S., & Picciotto, M. R. (2010). Nicotine receptors and depression: Revisiting and revising the cholinergic hypothesis. *Trends in Pharmacological Sciences, 31,* 580-586.

Mitchell, A. J., Rao, S., & Vaze, A. (2011). Can general practitioners identify people with distress and mild depression? A meta-analysis of clinical accuracy. *Journal of Affective Disorders, 130,* 26-36.

Murphy, J., Horton, N. J., Monson, R. R., Laird, N. M., Sobol, A. M., & Leighton, A. H. (2003). Cigarette smoking in relation to depression: Historical trends from the Stirling County Study. *American Journal of Psychiatry, 160,* 1663-1669.

National Cancer Institute. (2008, October). Clearing the air: Quit smoking today. Retrieved from http://smokefree.gov/sites/default/files/pdf/clearing-the-air-accessible.pdf

Nezami, E., Sussman, S., & Pentz, M. A. (2003). Motivation in tobacco use cessation research. *Substance Use and Misuse, 38,* 25-49.

Niaura, R., Britt, D. M., Shadel, W. G., Goldstein, M., Abrams, D., & Brown, R. (2001). Symptoms of depression and survival experience among three samples of smokers trying to quit. *Psychology of Addictive Behaviors, 15,* 13-17.

Niemiec, C. P., Ryan, R. M., Patrick, H., Deci, E. L., & Williams, G. C. (2010). The energization of health-behavior change: Examining the associations among autonomous self-regulation, subjective vitality, depressive symptoms, and tobacco abstinence. *The Journal of Positive Psychology: Dedicated to Furthering Research and Promoting Good Practice, 5,* 122-138.

Ng, E. S. W. & Sears, G. J. (2010). What women and ethnic minorities want. Work values and labor market confidence: A self-determination perspective. *The International Journal of Human Resource Management, 21,* 676-698.

Nylenna, A. (2013). Occasional smoking: a new campaign target in Norway. *The Lancet, 381,* 708-709.

O'Connor, E. A., Whitlock, E. P., Gaynes, B., & Beil, T. L. (2009). Screening for depression in adults and older adults in primary care: An updated systematic review. *AHRQ Publication No. 10-05143-EF-1.* Rockville, MD: Agency for Health Care Research and Quality.

Olson, T. R., Presniak, M. D., & MacGregor, M. W. (2010). Reevaluating positive affect in the Center for Epidemiologic Studies-Depression scale. *Psychiatry Research, 178,* 545-549.

Parks-Sheiner, A.C. (2009). *Positive psychotherapy: Building a model of empirically supported self-help.* (Doctoral dissertation). Retrieved from ProQuest, UMI Dissertations Publishing (3363580)

Pavot, W., & Diener, E. (2008). The Satisfaction With Life Scale and the emerging construct of life satisfaction. J*ournal of Positive Psychology*, *3*, 137–152

Piasecki, T. M., Piper, M. E., & Baker, T. B. (2010). Refining the tobacco dependence phenotype using the Wisconsin Inventory of Smoking Dependence Motives: II. Evidence from a laboratory self-administration assay. *Journal of Abnormal Psychology, 119,* 513-523.

Piper, M. E., Piasecki, T. M., Federman, E. B., Bolt, D. M., Smith, S. S., Fiore, M. C., et al. (2004). A multiple motives approach to tobacco dependence: The Wisconsin Inventory of Smoking Dependence Motives (WISDM-68). *Journal of Consulting and Clinical Psychology, 72,* 139-154.

Piper, M. E., Smith, S. S., Bittrich, A. A., Brown, J. L., Letzke, C. J., Zehner, M. E., et al. (2010). Psychiatric disorders in smokers seeking treatment for tobacco dependence: Relations with tobacco dependence and cessation. *Journal of Consulting and Clinical Psychology, 78,* 13-23.

Pratt, L. A., & Brody, D. J. (2010, April). Depression and smoking in the U.S. household population aged 20 and over, 2005-2008. *National Center for Health Statistics Data Brief, 34,* 1-8.

Presson, C. C., Chassin, L., & Sherman, S. J. (2002). Psychological antecedents of tobacco chipping. *Health Psychology, 21,* 384-392.

Prochaska, J. O. (1979). *Systems of psychotherapy: A transtheoretical analysis.* Homewood. Illinois, Dorsey Press.

Prochaska, J. O., & DiClemente, C. C., (1983). Stages and processes of self-change in smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology, 51,* 390-395.

Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist, 47,* 1102-1114.

Prochaska, J.O., Hall, S. M., Tsoh, J. Y., Eisendrath, S., Rossi, J. S., Redding, C. A., …Gorecki, J. A. (2008). Treating tobacco dependence in clinically depressed smokers: Effect of smoking cessation on mental health functioning. *American Journal of Public Health, 98,* 446-448.

Prochaska, J. O., Rossi, J. S., Redding, C. A., Rosen, A. B., Tsoh, J. Y., Humfleet, G. L., …Hall, S. M. (2004). Depressed smokers and stage of change: Implications for treatment interventions. *Drug and Alcohol Dependence, 76,* 143-151.

Prochaska, J.O., Velicer, W.F., DiClemente, C.C., & Fava, J.L. (1988). Measuring the processes of change: Applications to the cessation of smoking. *Journal of Consulting and Clinical Psychology, 56,* 520-528.

Rabois, D., & Haaga, D. A. F. (2003). The influence of cognitive coping and mood on smokers' self-efficacy and temptation. *Addictive Behaviors, 28,* 561-573.

Radloff, L. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1,* 385-401.

Richards, S. C., Cohen, L. M., Morrell, H. E. R., Watson, N. L., & Low, B. E. (2013). Treating depressed and anxious smokers in smoking cessation programs. *Journal of Consulting and Clinical Psychology, 81,* 263-273.

Richardson, T. (2007). *The differences in progress through stages of change in exercise behavior between college students with and without peer mentors* (Doctoral dissertation). Retrieved from ProQuest, UMI Dissertations Publishing (3304181)

Roberti, J. W., Harrington, L. N., & Storch, E. A. (2011). Further psychometric support for the 10-item version of the Perceived Stress Scale. *Journal of College Counseling, 9,* 135-147.

Rose, J. S., Chassin, L., Presson, C., Sherman, S. J., Stein, M. D., & Col, N. (2007). A latent class typology of young women smokers. *Addiction, 102,* 1310-1319.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55,* 68-78.

Ryan, R. M., Lynch, M. F., Vansteenkiste, M., & Deci, E. L. (2011). Motivation and autonomy in counseling, psychotherapy, and behavior change: A look at theory and practice. *The Counseling Psychologist, 39,* 193-260.

Santor, D. A., & Coyne, J. C. (2001). Evaluating the continuity of symptomatology between depressed and nondepressed individuals. *Journal of Abnormal Psychology, 110,* 216-225.

Schane, R. E., Ling, P. M., & Glantz, S. A. (2010). Health Effects of Light and Intermittent Smoking: A Review. *Circulation, 121,* 1518-1522.

Schkade, D. A. & Kahneman, D. (1998). Does living in California make people happy? A focusing illusion in judgments of life satisfaction. *Psychological Science,* **9**, 340–346.

Schnoll, R. A., Rukstalis, M., Wileyto, E. P., & Shields, A. E. (2006). Smoking cessation treatment by primary care physicians: An update and call for training. *American Journal of Preventive Medicine, 31,* 233-239.

Schorr, G., Ulbricht, S., Baumeister, S. E., Ruge, J., Grothues, J., Rumpf, H.J., et al. (2009). Mental health and readiness to change smoking behavior in daily smoking primary care patients. *International Journal of Behavioral Medicine, 16,* 347-354.

Schumann, A., Meyer, C., Rumpf, H.J., Hannover, W., Hapke, U. & John, U. (2005). Stage of change transitions and processes of change, decisional balance, and self-efficacy in smokers: A transtheoretical model validation using longitudinal data. *Psychology of Addictive Behaviors, 19,* 3-9.

Segan, C. J., Borland, R., & Greenwood, K. (2002). Do transtheoretical model measures predict the transition from preparation to action in smoking cessation? *Psychology and Health*, *17*, 417–435.

Seligman, M. E. P., & Rashid, T., & Parks, A. C. (2006). Positive psychotherapy. *American Psychologist, 61,* 774-788.

Seligman, M. E. P., Steen, T. A., & Park, N. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist, 60,* 410-421.

Shafer, A. B. (2006). Meta-analysis of the factor structures of four depression questionnaires: Beck, CES-D, Hamilton, and Zung. *Journal of Clinical Psychology, 62,* 123–146.

Shah, L. M., King, A. C., Basu, A., Krishnan, J. A., Borden, W. B., Meltzer, D., & Arora, V. (2010). Effect of clinician advice and patient preparedness to quit on subsequent quit attempts in hospitalized smokers. *Journal of Hospital Medicine, 5,* 26-32.

Schueller, S. M., & Parks, A. C. (2012). Disseminating self-help: Positive psychology exercises in an online trial. *Journal of Medical Internet Research, 14,* e63.

Shean, G., & Baldwin, G. (2008). Sensitivity and specificity of depression questionnaires in a college-age sample. *The Journal of Genetic Psychology, 169,* 281-288.

Shiffman, S. (1993). Assessing smoking patterns and motives. *Journal of Consulting and Clinical Psychology, 61,* 732-742.

Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology, 5,* 467-487.

Siru, R., Hulse, G. K., & Tait, R. J. (2009). Assessing motivation to quit smoking in people with mental illness: A review. *Addiction, 104,* 719-733.

Smith, S. S., Piper, M. E., Bolt, D. M., Fiore, M. C. Wetter, D. W., & Cinciripini, P. M. (2010). Development of the brief Wisconsin Inventory of Smoking Dependence Motives. *Nicotine and Tobacco Research, 12,* 489-499.

Spielmans, G. I., Berman, M. I., & Usitalo, A. N. (2011). Psychotherapy versus second-generation antidepressants in the treatment of depression: A meta-analysis. *Journal of Nervous and Mental Disease, 3,* 142-149.

Spring, B., Doran, N., Pagoto, S., McChargue, D., Cook, J. W., Bailey, K., Crayton, J., & Hedeker, D. (2007). Fluoxetine, smoking, and history of major depression: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 75,* 85-94.

Steptoe, A., Dockray, S., & Wardle, J. (2009). Positive affect and psychobiological processes relevant to health. *Journal of Personality, 77,* 1748-1776.

Strong, D. R., Cameron, A., Feuer, S., Cohn, A., Abrantes, A. M., & Brown, R. A. (2010). Single versus recurrent depression history: Differentiating risk factors among current US smokers. *Drug and Alcohol Dependence, 109,* 90-95.

Strong, D. R., Kahler, C. W., Leventhal, A. M., Abrantes, A. M., Lloyd-Richardson, E., Niaura, R., & Brown, R. A. (2009) Impact of bupropion and cognitive–behavioral treatment for depression on positive affect, negative affect, and urges to smoke during cessation treatment. *Nicotine and Tobacco Research, 11,* 11-42-1153.

Tsoh, J. Y., & Hall, S. M. (2004). Depression and smoking: From the transtheoretical model of change perspective. *Addictive Behaviors, 29,* 801-805.

USDHHS United States Department of Health and Human Services. (2011, May 2). Healthy People.gov. Retrieved from http://www.healthypeople.gov/2020/default.aspx

Van der Meer, R. M., Willemsen, M. C., Smit, F., & Cuijpers, P. (2013). Smoking cessation interventions for smokers with current or past depression (review). *The Cochrane Library,* 8, 1-134.

Vangeli, E., Stapleton, J., Smit, E. S., Borland, R., & West, R. (2011). Predictors of attempts to stop smoking and their success in adult general population samples: A systematic review. *Addiction, 12,* 2110-2121.

Velicer, W. F., DiClemente, C. C., Prochaska, J. O., & Brandenburg, N. (1985). Decisional balance measure for assessing and predicting smoking status. *Journal of Personality and Social Psychology, 48,* 1279-1289.

Velicer, W. F., DiClemente, C. C., Rossi, J. S., & Prochaska, J. O. (1990). Relapse situations and self-efficacy: An integrative model. *Addictive Behaviors, 15,* 271-283.

Velicer, W. F., Fava, J. L., Prochaska, J. O., Abrams, D. B., Emmons, K. M., & Pierce, J. (1995). Distribution of smokers by stage in three representative samples. *Preventive Medicine, 24,* 401-411.

Velicer, W. F, Prochaska, J. O., Fava, J. L., Norman, G. J., & Redding, C. A. (1998). Smoking cessation and stress management: Applications of the transtheoretical model of behavior change. *Homeostasis, 38,* 216-233.

Warner, R. M., & Vroman, K. G. (2011). Happiness inducing behaviors in everyday life: An empirical assessment of "The How of Happiness." *Journal of Happiness Studies, 12,* 1063-1082.

West Virginia University's WELLWVU. (2011). *chillPACK*. Retrieved from *http://well.wvu.edu/chillpack*

Wood, A. M., Froh, J. J., & Geraghty, A. W. A. (2010). Gratitude and well-being: A review and theoretical integration. *Clinical Psychology Review, 30,* 890-905.

Wood, A. M., Joseph, S., Lloyd, J., & Atkins, S. (2009). Gratitude influences sleep through the mechanism of pre-sleep cognitions. *Journal of Psychosomatic Research, 66,* 43-48.

Woods, S. S., & Jaén, C. R. (2010). Increasing consumer demand for tobacco treatments: Ten design recommendations for clinicians and healthcare systems. *American Journal of Preventive Medicine, 38,* S385-S392.

Wong, Y. I. (2000). Measurement properties of the Center for Epidemiologic Studies-Depression Scale in a homeless population. *Psychological Assessment, 12,* 69-76.

Zhou, X., Nonnemaker, J., Sherrill, B., Gilsenan, A. W., Coste, F., & West, R. (2008). Attempts to quit smoking and relapse: Factors associated with success or failure from the ATTEMPT cohort study. *Addictive Behaviors, 34,* 365–373.

Zich, J. M., Attkisson, C. C., & Greenfield, T. K. (1990). Screening for depression in primary clinics: The CES-D and the BDI. *International Journal of Psychiatry in Medicine, 20,* 259-277.

Footnotes to the Appendices

[1] From "New measures of well-being: Flourishing and positive and negative feelings," by E. Diener, D. Wirtz, W. Tov, C. Kim-Prieto, D. Choi, S. Oishi, & R. Biswas-Diener, *Social Indicators Research, 39,* 247-266. Copyright 2008 by E. Diener, D. Wirtz, W. Tov, C. Kim-Prieto, D. Choi, S. Oishi, & R. Biswas-Diener. Reprinted with permission.

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[3] From "The CES-D scale: A self-report depression scale for research in the general population," by L. S. Radloff. Radloff, 1977, *Applied Psychological Measurement, 1977, 1*, 385–401. Copyright by the Copyright Clearance Center. Reprinted with permission.

[4] From *Cancer Prevention Research Measures,* Retrieved from www.uri.edu/research/cprc/measures.htm. Copyright 1991 by Cancer Prevention Research Center. Reprinted with permission.

Table 1

Daily chillPACK Activities Offered as the Happiness Intervention

	chillPACK Activity
Day 1*	List 3 things you are grateful for.
Day 2	Email someone to thank them for a recent or good deed, kind word, or action...Or just for being a good friend, coworker, or family member.
Day 3*	Journaling about one positive experience in the past 24 hours allows your brain to re-live it. Journal a positive experience that occurred within the past 24 hours.
Day 4	Start your day by re-reading your positive experience from yesterday, re-live it as if you were inthe moment, and enjoy the health benefits. Your brain is 31% more productive, and you'll see increases in intelligence, creativity, resiliency, motivation, and energy.
Day 5*	Homemade “Thank You” note to print off and put on someone’s desk, workspace, or in their room. Note: Do a print screen of copy and paste your thank you note into a word document before you click "submit".
Day 6	Buy a pack of "Thank You" cards or create a homemade thank you note to give to someone.
Day 7	With your cellphone or camera, take a picture of something around you that you are grateful for. Share your gratitude with someone else by forwarding the picture or by posting it! facebook.com/wellwvu twitter: @wellwvu
Day 8	Passion Meditation Pause, find a comfortable seat and notice your breath. Think about a time you felt inspired or passionate about something in your life. Select one time and remember the feeling you had in that moment. With a remembrance of that sensation, notice the breath again. Take your back teeth, and with lips lightly apart, let the breath flow steadily in and out through your nose. Take several natural breaths this way. Bring your awareness to your heart space, the center of your chest. Imagine a spark in the center of your chest. Let it symbolize your aliveness or your passion. As you inhale, watch the spark begin to grow into a steady flame, increasing the sensation of aliveness in your heart. As you exhale, feel the sensations of the flame-warmth, aliveness, and the remembrance of your feeling of passion-spreading throughout your body. sit with this image, sensations and breath for several minutes. Before closing, set an intention for yourself to connect with your passion each day.
Day 9	Exercising teaches your brain that *your behavior matters*. Perform your favorite form of exercise today, and be grateful for your ability to move, interact, or take a break from the school work.
Day 10	Appreciation Meditation: Try this. Put your hand on your heart, in the center of your chest, and find a sincere feeling of appreciation for someone or something in your life (a person, place, or pet, for example). Choose something that's easy to appreciate, with no negative emotional history to color your appreciation. Feel that appreciation from your heart for several minutes. Notice any changes in your feeling worlds or perceptions compared to before this exercise? This is the grateful heart in action.

	chillPACK Activity
Day 11	Reflect on your favorite childhood activity and the happiness associated with it. Think Play-Doh, jumping into a pile of leaves, throwing a snowball, riding a bike, your favorite toy, etc. re-enter this positive association and engage in this activity!
Day 12*	"SENSE"sational! Show gratitude for something that appeals to each of your 5 senses... something you're grateful for that . . . Smelled Wonderful; Looked Beautiful; Felt Amazing; Tasted Delicious; Sounded Awesome
Day 13*	Ride the wave of gratitude… Send ripples of positivity. List 3 things you're grateful for.
Day 14*	Journaling about one positive experience in the past 24 hours allows your brain to re-live it. Journal a positive experience that occurred within the past 24 hours.
Day 15	Shine Meditation: Take a comfortable seat. Ask your mind to let go of any thoughts, ask your body to be steady, ask your heart to be open. (It's okay if it doesn't feel like this happens-just setting the intention for it to happen helps). Sitting tall, notice the foundation of your seat beneath you. Notice an upward lift of your spine that extends through the center crown of your head. Connect the inhalation of your breath to the upward lift of your spine. Connect the exhalation of your breath with a sense of steadiness in your seat. Accept each inhalation of the breath as an opportunity to know your true self. We are all much more than we believe ourselves to be, know that with each inhalation of your breath. Accept each exhalation of the breath as an opportunity to express the essence the essence of who you are back out into the world. Smile with each exhalation of the breath, imagine yourself shining out and sharing your light with the world.
Day 16	You've done a great job recognizing gratitude, now let's move into DOING gratitude. Today, open the door for someone, smile at a stranger, make eye contact with your check-out clerk, pop a quarter into someone's expired meter, or another random act of kindness. PASS IT ON, Send ripples of positivity into the world!
Day 17	Go outside, and find a small rock. Put this rock in your pocket. Every time your hand touches the rock throughout the day, mentally note something that you are grateful for. At the end of the day, take out the rock, and try to recollect all of the things you were grateful for.
Day 18	Use the opportunity of waiting in traffic, at a red light, for the PRT or the bus to reflect on something you are grateful for, look for the good and it will be there.
Day 19*	What are you grateful for today? 1. 2. 3.
Day 20	Find an image online or in your files that helps you shift toward being positive. It might be one of nature, friends, or inspiring people. Check out our Pinterest Board of chillWELL images and suggest some more! Save it as your screensaver or share it with us on Facebook at facebook.com/wellwvu.
Day 21	Shift your heart, mind and body into gratitude. Set an alarm or stopwatch for 2 minutes, and think positively on what you are grateful for. Think positively on what you are grateful for. Eliminate any distractions or negative thoughts. Feel free to think positively for a longer period of time!
Day 22	Perform a random act of kindness today. *PASS IT ON*, Share the gratitude!
Day 23*	Your brain is 31% more productive on positive than negative, neutral or stressed! Take a moment to write about what you're grateful for- in your journal or list form

	chillPACK Activity
Day 24	First thing in the morning, read the following out loud, slowly, and reflect on the words' meanings. "Good morning, World! Thank you for this new day to live my life. I am so grateful for my family, friends, neighbors, business associates, and everyone else in my life. I am grateful to have a place to live, food to eat, my health, and the work that I do. I am grateful to be me, to have another day to be of service in any way I can, and to spread love an joy to everyone I meet."
Day 25*	Your OWN Wake-Up Call! Your own unique “wake-up call” is a meaningful and enriching gesture of true thanks for your existence, the sincere, deep, and grateful thought or prayer that will assist you in beginning your day in the right frame of mind and heart, to your best advantage. Create your own wake-up call below, tape it to your bathroom mirror, refrigerator, coffee pot, alarm clock, or type it into your cellphone as a daily morning reminder to coincide with your alarm clock. Read it each morning to start the day in a positive way! Your Wake-Up Call:
Day 26*	Homemade “Thank You” note to print off and put on someone’s desk, workspace, or in their room. Note: Print it off before you click "submit".
Day 27	With your cellphone or camera, take a picture of something around you that you are grateful for. Share your gratitude with someone else by forwarding the picture or by posting it! facebook.com/wellwvu twitter: @wellwvu
Day 28	Sunshine meditation: Sit or lie in a relaxed position. Close your eyes and focus on your breathing. Feel each part grow as it relaxes and grows heavy. With each exhalation of the breath, feel the body becoming heavier. Keep breathing, slowly and deeply, while maintaining your relaxed state of body and mind. Visualize the sun in the distance. It's a bright yellow and white light but not distressing on your eyes. As you relax, your body begins to feel very light and then begins to lift from your position and float above you. You are still keeping your focus on the sun. You begin to drift slowly closer and closer, the heat never intensifies but the warmth remains like a soft blanket wrapped around you on a chilly night. The sun continues to grow larger and larger as you get closer.
Day 29*	Notice if it has become easier for you to see the positive. List 5 things you are grateful for.
Day 30	Give someone else the gift of gratitude. Share your own experience of using the chillPACK to explore your own personal gratitude with someone else. Or refer them to WELLWVU for their own chillPACK to give the gift of gratitude.

Note. * = The online chillPACK included a field to enter responses for this activity.

Table 2

Hypotheses and Related Statistical Tests that were Initially Proposed

Hypotheses	Procedure	IVs	DVs
It was hypothesized that levels of psychological well-being , as measured by the Flourishing Scale (FS), would increase following the completion of a self-administered happiness intervention. It was hypothesized effects would be greater in the treatment group compared to the comparison group.	Repeated Measures ANOVA, Within-Between Interaction	Between variable: chillPACK vs. comparison Within variable: time (pre-treatment, post-treatment)	FS: pre-treatment and post-treatment
It was hypothesized that levels of motivation to quit smoking, as measured by the Transtheoretical Model Stages of Change (SOC) and the Contemplation Ladder, would increase following the completion of a self-administered happiness intervention. It was hypothesized effects would be greater in the treatment group compared to the comparison group.	Two Mann-Whitney tests	chillPACK vs. comparison	SOC and Contemplation Ladder: post minus pre

Note. The proposed statistical tests were replaced with the Mann-Whitney tests and the Related Samples Wilcoxon Signed Rank test because the FS was non-normal.

Table 3

Demographic characteristics of the sample according to study completion status and group assignment

	Excluded	Non-completers		Completers	
	n = 96	Comparison n = 10	Treatment n = 50	Comparison n = 34	Treatment n = 34
Age, *M (SD)*	24.9 (7.2)	21.1 (2.7)	23.2 (6.5)	25.4 (8.3)	25.2 (8.5)
Gender					
Female	63%	60%	70%	74%	71%
Male	37%	30%	24%	26%	29%
Other	0%	10%	6%	0%	0%
Race					
White	72%	70%	92%	76%	79%
College year					
Freshman	12%	20%	18%	10%	10%
Sophomore	16%	30%	13%	10%	19%
Junior	21%	20%	24%	31%	16%
Senior	33%	30%	29%	35%	36%
Graduate	19%	0%	16%	14%	19%
Location					
Southeast	80%	90%	84%	76%	82%
Other	10%	10%	6%	9%	12%
Not enroll.	10%	0%	10%	15%	6%
Recruitment					
Email	57%	60%	50%	56%	50%
Camp.ann.	17%	10%	26%	15%	18%
Social Media	8%	0%	4%	6%	15%
Flyer	3%	10%	10%	9%	3%
Other	15%	20%	10%	14%	14%

Note. Study completion included the completion of the post-treatment survey four weeks after the pre-treatment survey and at least two of four weekly surveys. Gender Other included text provided by participants: gender fluid and non-binary. Social media included Facebook and Twitter. $N = 224$.

Table 4

Descriptive statistics for primary measures according to length in study and group assignment

	Excluded	Non-completers		Completers	
	n = 96	Comparison n = 10	Treatment n = 50	Comparison n = 34	Treatment n = 34
CES-D	9.0 (7.5)[a]	23.8 (10.1)[b]	24.6 (10.4)[b]	20.7 (9.1)[b]	22.3 (10.1)[b]
FS	49.2 (6.8)[c]	39.6 (8.6)[d]	44.2 (5.7)[d]	41.9 (9.5)[d]	42.3 (8.0)[d]
Ladder	6.1 (3.9)	5.1 (2.6)	5.4 (3.6)	6.7 (3.7)	5.6 (3.6)
SOC	3.6 (2.0)	2.7 (1.4)	2.4 (1.5)	2.9 (1.5)	2.6 (1.1)
cigarettes	3.5 (5.9)	5.9 (5.5)	4.1 (5.4)	3.2 (4.8)	3.9 (5.8)
Weeks in study		1.1 (1.0)[e] Range = 0 - 3	0.6 (0.9)[e] Range = 0 - 3	3.9 (0.4)[f] Range = 2* - 4	3.9 (0.3)[f] Range = 3 - 4
Week 1 minutes[g]		505.4 (185.4) n = 5	371.2 (356.5) n = 19	455.0 (258.1) n = 31	508.1 (407.1) n = 32
Week 2 minutes[h]		537.5 (162.2) n = 4	281.0 (174.6) n = 10	544.4 (266.0) n = 34	606.0 (174.6) n = 33
Week 3 minutes		420.0 (72.1) n = 2	199.3 (146.8) n = 3	491.0 (277.6) n = 33	615.4 (409.9) n = 32
Week 4 minutes		----------	----------	526.9 (280.3) n = 34	613.7 (446.2) n = 34

Note. Participants were excluded from study when they did not meet inclusionary criteria. CES-D = Center for Epidemiologic Studies Depression Scale, FS = Flourishing Scale, Ladder = Contemplation Ladder, SOC = Transtheoretical Model Stages of Change for Smoking Behavior, Cigarettes = Number of Cigarettes Smoked Yesterday.

[a, b, c, d, e, f] : Different subscripts in each row represent significant differences, $p < .05$.

* All but one participant completed at least 3 of 4 weeks in the study. $N = 224$.

Table 5

Reported Number of Weekly Activities and Minutes Dedicated to chillPACK or Other Happiness-Promoting Activities

	Week 1	Week 2	Week 3	Week 4	Average
Treatment group					
Activities	29.17 (35.46) Mode = 3	38.38 (45.31) Mode = 2	42.61 (43.98) Mode = 5	37.14 (43.15) Mode = 0	37.03 (39.21)
Unique Activities	10.26 (9.55)	11.74 (10.05)	13.88 (12.14)	12.18 (12.14)	12.26 (10.41)
Minutes	177.91 (198.33)	239.09 (239.09)	243.53 (224.98)	257.21 (227.33)	227.83 (206.99)
Intentional Minutes	300.18 (244.26)	349.06 (230.96)	370.94 (229.99)	356.53 (254.06)	341.94 (209.71)
Comparison group					
Intentional Minutes	455.00 (258.09)	544.44 (266.03)	491.03 (277.03)	526.91 (280.33)	511.69 (238.37)

Note. Activities are chillPACK activities participants completed each week. Unique activities are chillPACK days completed each week because participants could have completed each daily chillPACK activity as often as desired. Minutes are minutes spent on chillPACK activities. Intentional minutes are minutes spent on activities other than chillPACK that were intended to increase well-being. $N = 68$

Table 6

chillPACK Days Reportedly Completed over Four Weeks for Participants Completing the Study Compared to Participants' Online Entries for chillPACK Activity

Day or chillPACK Activity	Mean Frequency for Participants	Frequency of Activities Reported	Frequency of Activity Entered Online
Day 1*	5.9	199	23 (11.6%)
Day 2	9.5	322	
Day 3*	4.1	140	25 (17.9%)
Day 4	5.9	119	
Day 5*	3.9	134	4 (2.9%)
Day 6	4.1	138	
Day 7	7.3	248	
Day 8	3.6	121	
Day 9	3.4	243	
Day 10	3.4	117	
Day 11	5.3	181	
Day 12*	3.8	128	6 (4.6%)
Day 13*	4.3	149	1 (0.7%)
Day 14*	4.2	142	3 (2.1%)
Day 15	3.6	122	
Day 16	4.0	137	
Day 17	3.5	118	
Day 18	4.5	154	
Day 19*	4.1	140	4 (2.9%)
Day 20	6.3	214	
Day 21	5.5	188	
Day 22	7.5	255	
Day 23*	4.0	137	2 (1.4%)
Day 24	4.1	138	
Day 25*	4.0	134	1 (0.1%)
Day 26*	5.2	177	0 (0.0%)
Day 27	6.9	236	
Day 28	3.7	125	
Day 29*	3.9	132	1 (0.1%)
Day 30	4.2	144	
Average	4.8		

Note. * = The online chillPACK included a field to enter responses for this activity. Frequency of activities reported was over four weeks. Participants were asked to enter their chillPACK activity online, but many did not. *N = 68*

Table 7

Spearman's rho correlations for pre-treatment measures of interest

	CES-D	FS	Ladder	SOC	Cigarettes	Minutes
Psychological Well-Being						
FS	-.47**					
Motivation to Quit Smoking						
Ladder	-.16	.26**				
SOC	-.12	.25**	.52**			
Cigarettes	.01	-.10	-.02	-.24**		
Engagement in Study						
Minutes	-.14	.01	.16	.20*	.09	
Activities	-.03	-.18	-.05	.06	.10	.57**

Note. CES-D = Center for Epidemiologic Studies Depression Scale, FS = Flourishing Scale, Ladder = Contemplation Ladder, SOC = Transtheoretical Model Stages of Change for Smoking Behavior, Cigarettes = Number of Cigarettes Smoked Yesterday. * = correlation is significant at $p < .05$ level, (two-tailed test). ** correlation is significant at $p < .01$ level (two-tailed test). $N = 128$.

Table 8

Spearman's rho correlations for post-treatment measures of interest

	CES-D	FS	Ladder	SOC	Cigarettes	Minutes
Psychological Well-Being						
FS	-.44**					
Motivation to Quit Smoking						
Ladder	-.00	.27*				
SOC	.07	.10	.55**			
Cigarettes	-.15	-.07	-.24	-.34**		
Engagement in Study						
Minutes	.08	.17	.31*	.33*	-.04	
Activities	.21	-.17	-.00	.25	.17	.59**

Note. CES-D = Center for Epidemiologic Studies Depression Scale, FS = Flourishing Scale, Ladder = Contemplation Ladder, SOC = Transtheoretical Model Stages of Change for Smoking Behavior, Cigarettes = Number of Cigarettes Smoked Yesterday. * = correlation is significant at $p < .05$ level, (two-tailed test). ** correlation is significant at $p < .01$ level (two-tailed test). $N = 68$.

Table 9

Descriptive Statistics for Pre- and Post-Treatment Measures

Measure	Pre-treatment			Post-treatment		
	Comparison	Treatment	Total Sample	Comparison	Treatment	Total Sample
FS	41.85 (9.54)	42.32 (8.03)	42. 09[a] (8.75)	43.41 (8.39)	43.56 (8.17)	43.48[b] (8.21)
Ladder	6.73 (3.70)	5.59 (3.61)	6.16 (3.7)	6.38 (3.96)	6.58 (3.59)	6.48 (3.76)
SOC	2.85 (1.52)	2.56 (1.13)	2.71[c] (1.34)	3.15 (1.16)	2.91 (1.22)	3.03[d] (1.34)
Precontemplation	n = 6 (17.6)	n = 7 (20.6)	n = 13 (19.1)	n = 6 (17.6)	n = 4 (11.8)	n = 10 (14.7)
Contemplation	n = 12 (35.3)	n = 10 (29.4)	n = 22 (32.4)	n = 6 (17.6)	n = 10 (29.4)	n = 16 (23.5)
Preparation	n = 5 (14.7)	n = 9 (26.5)	n = 14 (20.6)	n = 6 (17.6)	n = 8 (23.5)	n = 14 (20.6)
Action	n = 6 (17.6)	n = 7 (20.6)	n = 13 (19.1)	n = 11 (32.4)	n = 10 (29.4)	n = 21 (30.9)
Maintenance	n = 2 (5.9)	n = 1 (2.9)	n = 3 (4.4)	n = 3 (8.8)	n = 1 (2.9)	n = 4 (5.9)
Atypical smoker	n = 3 (8.8)	-------	n = 3 (4.4)	n = 2 (5.9)	n = 1 (2.9)	n = 3 (4.4)

Note. FS = Flourishing Scale, Ladder = Contemplation Ladder, SOC = Transtheoretical Model Stages of Change for Smoking Behavior. SOC is reported with *M* (*SD*) because every participant was assigned an value between 1 to 6 for each SOC, with atypical smoker equaling 6. For each SOC, *n*s and percentages are provided to show frequencies within each SOC.
[a, b, c, d] : Different subscripts in each row represent significant differences, $p < .05$.
$N = 68$.

Table 10

Linear regression predicting time participants spent completing activities to enhance happiness

Predictors in Model	Standardized Beta Coefficients	*t*	Significance
PSS-10	-.395	-4.95	< .01
Race	.185	2.31	< .05
SOC	.160	2.07	< .05

Note. PSS-10 = Perceived Stress Scale, Race = White/Non-White, SOC = Stages of Change.

Table 11

Descriptive Statistics for Pre- and Post-Treatment Subsidiary Measures

Measure	Pre-treatment			Post-treatment		
	Comparison	Treatment	Total Sample	Comparison	Treatment	Total Sample
CES-D	20.7 (9.1)	22.3 (10.1)	21.5 (9.6)	18.6 (9.7)	22.1 (12.2)	20.3 (11.1)
SWLS	22.1 (7.7)	21.9 (4.9)	22.0[a] (6.4)	23.7 (7.7)	22.8 (6.2)	23.3[b] (7.0)
PSS-10	22.4 (3.7)	21.6 (4.2)	22.0 (3.9)	20.1 (4.6)	21.2 (4.6)	21.0 (4.5)
STI	57.0 (18.2)	58.3 (20.0)	57.6[c] (19.0)	51.5 (17.7)	55.4 (16.4)	53.4[d] (17.1)
STI-Positive	18.2 (5.8)	18.9 (6.1)	18.5[e] (7.5)	16.0 (5.7)	17.4 (6.3)	16.1[f] (6.0)
STI-Negative	18.4 (6.7)	19.1 (8.3)	18.8[g] (7.5)	17.0 (6.4)	17.8 (5.2)	17.4[h] (5.8)
STI-Habit	11.4 (5.6)	11.3 (5.3)	11.4 (5.4)	10.6 (4.8)	11.6 (5.0)	11.1 (4.9)

Note. CES-D = Center for Epidemiologic Studies Depression Scale, SWLS = Satisfaction with Life Scale, PSS-10 = Perceived Stress Scale, STI = Transtheoretical Model Situational Temptation Inventory.

[a, b, c, d, e, f, g, h] : Different subscripts in each row represent significant differences, $p < .05$.

Appendices

Appendix A

Consent Form

Consent Information Form
Principal Investigator: James Bartee, Ph.D.
Co-Principal Investigator: Kelly A. Bailey, M.A.
Department: Counseling, Rehabilitation Counseling, and Counseling Psychology
Protocol Number: 1310101473
Study Title: Effects of a Happiness Intervention on Smoking Behavior

Contact Persons
If you have any questions, concerns, or complaints about this research, you can contact James Bartee, PhD, 304-293-2227, james.bartee@mail.wvu.edu.

For information regarding your rights as a research subject, to discuss problems, concerns, or suggestions related to the research, to obtain information or offer input about the research, contact the Office of Research Integrity and Compliance at 304-293-7073.

In addition, if you would like to discuss problems, concerns, have suggestions related to research, or would like to offer input about the research, contact the Office of Research Integrity and Compliance at 304-293-7073.

Introduction
You are being asked to participate in this research study, which involves completing a self-administered program called chillPACK, and several brief online surveys. This study is being conducted by Kelly Bailey, MA, in the Department of Counseling, Rehabilitation Counseling, and Counseling Psychology at West Virginia University with funding provided by the Robert E. Stitzel Graduate Student Support Endowment.This project is being completed as a doctoral dissertation under the supervision of James Bartee, PhD.

Purpose of the Study
The purpose of this study is to understand how using the WELLWVU chillPACK affects psychological well-being and motivation to quit smoking.

You are eligible to participate in this study if you are at least 18-years-old and have smoked cigarettes, at least occasionally, over the last six months.

Description of Procedures
This study involves completing a self-administered program called chillPACK and five brief online surveys. These surveys include an initial survey, which will take approximately 20-30 minutes to complete, three weekly surveys, which will take less than 5 minutes each, and a final survey, which will be a replication of the questions from the initial survey and the weekly survey. The chillPACK is a self-administered program that was created by staff at the West Virginia University Office of Wellness and Health Promotion to help students chill and retrain

their brains to look for the positives in their lives. The chillPACK includes easy activities that are similar to those shown to improve psychological well-being. These include activities like writing a journal, thinking about good things in life, offering kindness, meditation, and offering gratitude. For example, one activity is simply listing three things for which you are grateful. You can complete the entire study in 2-3 hours over the next four weeks.

You will first complete an online survey that asks about your psychological well-being and motivation to quit smoking; this will take 20-30 minutes. Then, you will be randomly assigned to one of two study groups. You will be notified of your group by an email from Kelly Bailey, MA. In this email, everyone will also receive information about smoking cessation, including tools and services from smokefree.gov.

If you are assigned to Group 1, you will be asked to complete the WELLWVU chillPACK over the next four weeks. You will be asked to complete at least two chillPACK activities per week over the next four weeks, and complete an online questionnaire, which will take less than five minutes, at the end of each week. The amount of time you decide to spend doing the chillPACK activities is really up to you; some activities only take a minute and other activities can take up to thirty minutes.

If you are assigned to Group 2, you will only be asked to complete an online survey at the end of each of the next four weeks. After four weeks, you can use the chillPACK if you still want to; you are being asked to wait until then to do so.

Regardless of the group to which you are assigned, you will get a weekly email that will remind you to complete the surveys at the link that will be provided. As previously stated, at the end of four weeks, you will complete a final, online survey similar to the survey completed at the beginning of the study.

Regardless of the group to which you are assigned, the various activities can be completed in as few as two to three hours of your time over four weeks. We expect to enroll from 200 to 400 participants in this study in order to insure the data required for statistical analyses. Enrollment may end when as few as 60 participants with levels of depression that are known to affect smoking behavior have completed the study.

Discomforts
There are no known or expected risks from participating in this study, except for the possibility of mild frustration or discomfort associated with answering the questions.

Benefits
You may not receive any direct benefit from this study. The knowledge gained from this study may eventually benefit others who are trying to quit smoking.

Financial Considerations
There is no cost for participating in this research study.

Regardless of the group to which you are assigned, you will be given a $10.00 gift card for your

participation if you complete all questionnaires and activities. If you complete the full study, you will also be entered into a drawing for a $100 gift card (the odds of winning a gift card depends on how many people complete the study, which could be from 1:200 to 1:400).

If you stop participating in the study you will not be eligible for the gift card and raffle. If you are assigned to Group 1, you will need to complete at least two of the suggested chillPACK activities each week in order to be eligible for the gift card and raffle.

Confidentiality
When you complete this consent form, you will receive a code number. Please write down that number and keep it in a secure place. You will also receive an email with that number when you receive your group assignment. All surveys that you complete will be linked only to that code number and not to your name or address.

A separate file with names and code numbers will be kept until the study is over and then it will be deleted; this will make all your answers to the surveys anonymous and not linked to you in any way. Until that file is deleted, any information about you that is obtained as a result of your participation in this research will be kept as confidential as legally possible. Research records and test results, just like hospital records, may be subpoenaed by court order or may be inspected by federal regulatory authorities without your additional consent.

In addition, there are certain instances where the researcher is legally required to give information to the appropriate authorities. These would include mandatory reporting of infectious diseases, mandatory reporting of information about behavior that is imminently dangerous to your child or to others, such as suicide, child abuse, etc.

In any publications that result from this research, neither your name nor any information from which you might be identified will ever be published.

Voluntary Participation
Participation in this study is voluntary. You are free to withdraw your consent to participate in this study at any time. You do not have to answer all the questions.

Deciding not to participate now or at any point during the study will not affect your standing as a student at your university and will not result in any penalties to you.

In the event new information becomes available that may affect your willingness to continue to participate in this study, this information will be given to you so that you can make an informed decision about whether or not to continue.

If you have questions about this research, you can contact Kelly Bailey, MA (304-288-4503), and she will answer any questions that you have. If you would like to see the questionnaires before you decide to participate, you can contact Kelly Bailey.

Do you agree to be in this study?

Appendix B

Email Advertisement

Interested in your happiness? Be part of an online study investigating the effects of a happiness program on psychological well-being and smoking behavior.

You must be a student, at least 18-years-old, and someone who smokes cigarettes, even on occasion, in order to participate.

You will be asked to answer questions about yourself and to do some brief wellness activities at your own convenience, which will take no more than 2-3 hours over the next month.

You will receive a $10 gift card and a chance to win an additional $100 gift card if you complete the study.

To learn more this study (Effects of a Happiness Intervention on Smoking Behavior), go to: www.FINDHAPPINESS.INFO

Principal Investigator: James Bartee, PhD (304) 293-2227, James.bartee@mail.wvu.edu; Co-Principal
Investigator, Kelly Bailey, MA (304) 288-4503, kbailey8@mix.wvu.edu, WVU Department of Counseling,
Rehabilitation Counseling, and Counseling Psychology. This study has been approved by the West
Virginia University Institutional Review Board (IRB).

Appendix C

Demographic Questionnaire

Enter your Date of Birth
mm/dd/yyyy

1. What is your gender?

    a) Male
    b) Female
    c) Other _____

2. Are you of Hispanic, Latino, or Spanish origin?

    a) Yes
    b) No

3. What is your race? Check all that apply.

    a) White
    b) Black/African American
    c) American Indian/Alaska Native
    d) Asian
    e) Native Hawaiian or Pacific Islander
    f) Other _____

4. What is the highest degree or level of school you have completed?

    a) Some high school or less
    b) High school graduate or GED or alternative credential
    c) Some college credit
    d) Associate's degree (e.g., AA, AS)
    e) Bachelor's degree (e.g., BA, BS)
    f) Master's degree (e.g., MA, MS, MBA)
    g) Professional degree beyond Bachelor's (e.g., MD, DDS)
    h) Doctorate degree (e.g., PhD, EdD)

5. Where do you attend school?

    a) West Virginia University
    b) Frostburg State University
    c) Washington and Jefferson College
    d) Waynesburg University
    e) Another college or university
    f) Not currently enrolled in school

6. What is your year in school?

    a) Freshman
    b) Sophomore
    c) Junior
    d) Senior
    e) Graduate

7. Is your campus smoke free?

    a) Yes
    b) No
    c) Not sure

8. How did you learn about this study?

    a) Flyer on wall/bulletin board
    b) Flyer in waiting room
    c) Email
    d) Announcement made in classroom or meeting setting
    e) Social Media, e.g., Facebook
    f) Campus-wide online announcement, e.g., WVU's Personal Announcements
    g) Newspaper
    h) WELLWVU's website
    i) Word-of-mouth
    j) Other

9. When was the last time you smoked a cigarette? Choose one option.

    a) Today
    b) Yesterday
    c) Within the last week
    d) Within the last month
    e) Within the last three months
    f) Within the last six months
    g) Within the last year
    h) Within the last two years
    i) Within the last five years
    j) Within the last ten years

10. Have you smoked at least 100 cigarettes in your entire life?

    a) Yes
    b) No
    c) Not Sure

11. Do you now smoke cigarettes every day, some days or not at all?

    a) Every day
    b) Some days
    c) Not at all
    d) Not sure

12. Use the slider below to indicate the number of cigarettes you had yesterday.

13. Use the slider below to indicate the number of cigarettes you had over the last week.

14. How many cigarettes have you had over the last month?

15. How many cigarettes have you had over the last six months?

16. How many days over the last week did you exercise?

    a) 0
    b) 1
    c) 2
    d) 3
    e) 4
    f) 5
    g) 6
    h) 7

17. How many days over the last week did you drink alcohol?

    a) 0
    b) 1
    c) 2
    d) 3
    e) 4
    f) 5
    g) 6
    h) 7

18. Are you currently participating in therapy, for example, with a counselor, psychotherapist, or other mental health professional?

    a) Yes
    b) No

19. Are you currently participating in a smoking cessation intervention?

    a) Yes
    b) No

Appendix D

Flourishing Scale[1]

Below are eight statements with which you may agree or disagree. Using the 1–7 scale below, indicate your agreement with each item by indicating that response for each statement.

7. Strongly agree
6. Agree
5. Slightly agree
4. Mixed or neither agree nor disagree
3. Slightly disagree
2. Disagree
1. Strongly disagree

I lead a purposeful and meaningful life
My social relationships are supportive and rewarding
I am engaged and interested in my daily activities
I actively contribute to the happiness and well-being of others
I am competent and capable in the activities that are important to me
I am a good person and live a good life
I am optimistic about my future
People respect me

Appendix E

Satisfaction with Life Scale[2]

Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

- 7 - Strongly agree
- 6 - Agree
- 5 - Slightly agree
- 4 - Neither agree nor disagree
- 3 - Slightly disagree
- 2 - Disagree
- 1 - Strongly disagree

____ In most ways my life is close to my ideal.

____ The conditions of my life are excellent.

____ I am satisfied with my life.

____ So far I have gotten the important things I want in life.

____ If I could live my life over, I would change almost nothing.

Appendix F

Center for Epidemiologic Studies-Depression Scale (CES-D)[3]

Circle the number of each statement which best describes how often you felt or behaved this way - DURING THE PAST WEEK.

	Rarely or none of the time (less than 1 day)	**Some or a little of the time (1-2 days)**	**Occasionally or a moderate amount of the time (3-4 days)**	**Most or all of the time (5-7 days)**
During the past week:	0	1	2	3
1) I was bothered by things that usually don't bother me	0	1	2	3
2) I did not feel like eating; my appetite was poor	0	1	2	3
3) I felt that I could not shake off the blues even with help from my family and friends	0	1	2	3
4) I felt that I was just as good as other people	0	1	2	3
5) I had trouble keeping my mind on what I was doing	0	1	2	3
6) I felt depressed	0	1	2	3
7) I felt that everything I did was an effort	0	1	2	3
8) I felt hopeful about the future	0	1	2	3
9) I thought my life had been a failure	0	1	2	3
10) I felt fearful	0	1	2	3
11) My sleep was restless	0	1	2	3
12) I was happy	0	1	2	3
13) I talked less than usual	0	1	2	3
14) I felt lonely	0	1	2	3
15) People were unfriendly	0	1	2	3
16) I enjoyed life	0	1	2	3
17) I had crying spells	0	1	2	3
18) I felt sad	0	1	2	3
19) I felt that people disliked me	0	1	2	3
20) I could not get "going"	0	1	2	3

Appendix G

TTM Stages of Change Questionnaire[4]

Are you currently a smoker?

- Yes, I currently smoke
- No, I quit within the last 6 months (ACTION STAGE)
- No, I quit more than 6 months ago (MAINTENANCE STAGE)
- No, I have never smoked (NONSMOKER)

(For smokers only) In the last year, how many times have you quit smoking for at least 24 hours?

(For smokers only) Are you seriously thinking of quitting smoking?

- Yes, within the next 30 days (PREPARATION STAGE if they have one 24-hour quit attempt in the past year - refer to previous question... if no quit attempt then CONTEMPLATION STAGE)
- Yes, within the next 6 months (CONTEMPLATION STAGE)
- No, not thinking of quitting (PRECONTEMPLATION STAGE)

Appendix H

TTM Motivation to Quit Smoking: Self-Efficacy[4]

Listed below are situations that lead some people to smoke. We would like to know HOW TEMPTED you may be to smoke in each situation. Please answer the following questions using the following five point scale.

1 = Not at all tempted
2 = Not very tempted
3 = Moderately tempted
4 = Very tempted
5 = Extremely tempted

1. At a bar or cocktail lounge having a drink. ☐

2. When I am desiring a cigarette. ☐

3. When things are not going the way I want and I am frustrated. ☐

4. With my spouse or close friend who is smoking. ☐

5. When there are arguments and conflicts with my family. ☐

6. When I am happy and celebrating. ☐

7. When I am very angry about something or someone. ☐

8. When I would experience an emotional crisis, such as an accident or death in the family. ☐

9. When I see someone smoking and enjoying it. ☐

10. Over coffee while talking and relaxing. ☐

11. When I realize that quitting smoking is an extremely difficult task for me. ☐

12. When I am craving a cigarette. ☐

13. When I first get up in the morning. ☐

14. When I feel I need a lift. ☐

15. When I begin to let down on my concern about my health and am less physically active. ☐

16. With friends at a party. ☐

17. When I wake up in the morning and face a tough day. ☐

18. When I am extremely depressed. ☐

19. When I am extremely anxious and stressed. ☐

20. When I realize I haven't smoked for a while. ☐