A STEPPED-CARE APPROACH to SMOKING CESSATION and HARM REDUCTION

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Abstract

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Smoking is the most preventable cause of death in the US (American Cancer Society, 2004). Despite a significant public health need for effective cessation interventions, the efficacy of smoking cessation interventions has declined over the past 15 years (Piasecki & Baker, 2001; Irvin and Brandon, 2000). The purpose of this study was to examine a stepped-care approach to smoking cessation and harm reduction. Stepped-care has been proposed as a promising, yet relatively unexplored approach to smoking cessation (Piasecki & Baker, 2001). In a stepped-care program, participants who are not responding therapeutically to the current level of treatment (i.e. experience significant difficulties or failure) are stepped-up to a more intensive form of treatment. In this study, individual problem solving therapy (PST) was used as the stepped-care component. The participants in this study were 40 smokers from the community. While all participants were engaged in an 8-session cognitive-behavioral group smoking cessation program, half of the participants were eligible to be stepped-up to individual PST when they experienced difficulties meeting their smoking reduction goals. Alternative measures of success (i.e., harm reduction) included progression along the stages of change model as measured by the Stages of Change Algorithm, Processes of Change Inventory, Decisional Balance Inventory, Self-Efficacy/Temptation Inventory, and the Self-Efficacy Questionnaire (SEQ-12), as well as reductions in nicotine exposure and the ability to achieve a 24-hour quit attempt.

Results revealed that 56% of all participants were able to quit by the end of the intervention and participants made significant progress along the stages of change as measured by the processes of change and self-efficacy. Participants were also able to achieve significant reductions in nicotine exposure and an increase in 24-hour quit attempts. No significant differences were found between the treatment and control groups or the treatment group participants who received PST (Treatment + PST) and those matched on stepped-care eligibility in the control group (Control + PST eligible). Despite the lack of significant findings, effect size estimates revealed a moderate to large effect size for self-efficacy/temptation, achieving a 24-hour quit attempt, and abstinence in favor of the treatment group. Implications and future directions are discussed.

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Introduction

Health Risks of Smoking

The use of tobacco is the leading cause of preventable morbidity and mortality and the leading health expense in the United States (American Cancer Society, 2004; CDC, 1994b). Approximately 46.2 million American adults smoke (American Cancer Society, 2004). Each year, in the United States alone, 450,000 lives could be saved by the elimination of tobacco use (CDC, 1994a). It is estimated that half of all Americans who continue to smoke will die from cigarette smoking (Peto, Lopez, Boreham, Thun, & Heath, 1994). By the year 2020, it is projected that tobacco products will be the *world's* leading cause of death and disability, far surpassing deaths from any single disease, most major wars, diarrheal syndromes, HIV-AIDS, substance abuse, suicides, homicides, and accidents (Murray & Lopez, 1996). Tobacco use has been referred to as the human-created "bubonic plague" of the 20th and 21st centuries (Peto et al.). Researchers fear that this analogy will continue to hold unless aggressive action is taken worldwide (Peto et al.).

Smoking rates among adults in the US have decreased from 42% in 1965 to 22% in 2000 (American Cancer Society, 2004). The United States witnessed an average decrease of 0.5% annually in the prevalence of smoking from 1965 to 1990. This decrease is being translated into actual lives saved (Abrams et al., 2003). For example, the increasing rate of male lung cancer that peaked in 1990 has now reversed (Cole & Rodu, 1996). Also, in California, due to the implementation in 1989 of the California Tobacco Control Program, an aggressive anti-tobacco program that was funded by a voter-enacted cigarette surtax, incidence of cardiovascular disease has declined (Fichtenberg & Glantz, 2000). However, during the 1990s, the 0.5% annual decrease in the prevalence of smoking leveled-off.

This stagnation in the decline in prevalence is particularly worrisome for female smokers. Women, as a group, adopted the habit of smoking in the 1960s. Although their smoking rates have decreased from 33.9% in 1965 to 20.7% in 2001, most of that decline was observed between 1974 and 1990. Since 1990, the prevalence of women smokers has remained fairly stable. Furthermore, due to their increase in smoking during the 1960s, the 1990s have witnessed an epidemic rise in female lung cancer cases (Abrams et al., 2003). The estimated new cases of lung and bronchus cancer in women in the United States increased from 74,600 in 2000 to 79,200 in 2002 to 80,660 in 2004 (American Cancer Society 2000, 2002, 2004). In 1997, The American Cancer Society reported that more women were dying of lung cancer than breast cancer, and over the last 8 years this trend has continued (American Cancer Society, 1997, 2000, 2004).

Efficacy of Smoking Cessation Interventions

There is a 15% likelihood of surviving lung cancer five years after diagnosis (Abrams et al., 2003). Due to the poor prognosis, the best treatments available to prevent the onset of lung cancer are smoking prevention and cessation (Abrams et al.). Despite a strong public health need for effective cessation interventions, and the significant resources allocated to develop them, the efficacy of smoking cessation interventions has been low (Piasecki & Baker, 2001). No single or multi-component treatment has produced long-term abstinence rates that consistently approach 50% (Piasecki & Baker, 2001). In fact, Irvin & Brandon (2000) suggest that the efficacy of multi-component treatments appears to have declined over the last 15 years. Holding type of treatment constant, Irvin and Brandon conducted an analysis of 23 smoking cessation studies published between 1977 and 1996 and found robust negative correlations between year of publication and end-of-treatment abstinence rates. Several factors may account for the decline in

efficacy. Treatment components (e.g., skills training) have been so widely disseminated that their effects have diminished because of repeated exposure (Smith et al., 2001). Additionally, the current population of smokers may be more difficult to treat than they were in the past. Over the last three decades millions of people have quit smoking. There is evidence showing that lighter, less addicted smokers are more than twice as likely to quit on their own or with a low intensity treatment (Cohen et al., 1989). Abrams et al. speculate that those adults who were able to quit may have already done so, leaving the older, more heavily addicted smokers. These smokers are more likely to have comorbidities (e.g., alcohol abuse, depression) that interfere with their ability to respond effectively to treatment.

Stepped-care

Given the diminishing efficacy rates of smoking cessation programs, innovative, cost-effective approaches are needed to reverse the decline in current smoking cessation rates. In a review of recent progress in the area of smoking cessation, Piasecki and Baker (2001) suggest that the concept of stepped-care in the field of smoking cessation has not been fully explored. In a stepped-care program, clients who are not responding to a current level of treatment (i.e., experience significant difficulties or failure) are stepped-up to a more intensive form of treatment. Despite its intuitive appeal, little empirical support for its efficacy exists. Therefore, there is a need for stepped-care, smoking cessation treatment outcome research.

Stepped-care programs have interested researchers and clinicians for over a decade (Piasecki & Baker, 2001). The ultimate goal of a stepped-care model is to provide individuals the least intensive (and generally least expensive) treatment that is effective in meeting treatment goals. Individuals who are successful with less intensive treatments are spared being subjected to more intensive and expensive treatments. Individuals who do not successfully respond to a less

intensive treatment progress to a higher level of care (i.e., greater intensity) until ideally the individual achieves success (Piasecki & Baker).

Sobell and Sobell (2000) suggest that a stepped-care approach should be: a) individualized in terms of presenting problem as well as client's beliefs, resources, and available treatment resources (i.e., the client's history, current experiences, belief system, and financial and personal resources are used in the development of treatment), b) consistent with "best available methods" based on contemporary treatment outcome research and supported by clinical judgment (i.e., clinician should be familiar with state-of-the-art approaches and have the knowledge to adapt this information appropriately to each client), and c) physically least restrictive to the client as well as least restrictive to the client's lifestyle and resources, but still likely to result in cessation (e.g., the cost to the client, both financially and personally, is taken into account; the client is not given a treatment that would pose unnecessary burdens in any way). Stepped-care approaches allow for flexibility in treatment. For example, the decision to continue treatment, terminate treatment, or change treatment is based on the individual's progress. This is an improvement over standardized treatment programs that deliver services based on a protocol rather than an individual's changing needs and progress. Under non-stepped care conditions an individual struggling in a treatment program is not likely to receive any different or additional care than would an individual who was experiencing success in the same program.

A potential problem with stepped-care is that it theoretically involves high-risk smokers failing at lower intensity treatments prior to being stepped-up to greater intensity treatment. It has been argued that this could expose the patient to repeated failure that could undermine their self-efficacy. Therefore, it has been suggested that treatment difficulties or failure need to be

identified early and triaged to a more intensive treatment as soon as the need is recognized (Piasecki & Baker, 2001). Alternatively, some high-risk patients may be started at a more intensive level of treatment (forgoing a less intensive treatment where failure would be likely).

Stepped-care interventions have been examined with numerous health and psychological problems including hypertension, alcoholism, obesity, and smoking (Sobell & Sobell, 2000; Haaga, 2000). However, due to the small number of studies and the wide range of approaches taken, the overall efficacy of stepped-care approaches remains unknown. Stepped-care treatment outcome research has not been uniformly successful.

Stepped-Care in the Health Field

In their 1997 report, the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of Hypertension recommended a multi-level stepped-care approach for the treatment of hypertension. The sequence begins with lifestyle modifications, such as reducing sodium intake and increasing aerobic activity. If this is ineffective, the client is stepped-up to drug treatment. If the client's blood pressure is not sufficiently reduced with these two steps, the client is then stepped-up to alternative drugs. If none of the previous steps are effective, the client is referred to a hypertension specialist. For individuals at high-risk for a coronary event or stroke, it is recommended that they skip the previous steps and begin medication immediately. In these circumstances, once sufficient blood pressure reductions are achieved, a "stepped-down" treatment is recommended to determine the minimal intervention level or lifestyle modification sufficient to maintain normal blood pressure.

Similar to the treatment of hypertension, the National Cholesterol Education Program of the National Heart, Lung, Blood Institute (2001) recommended a stepped-care plan, called Therapeutic Lifestyle Change (TLC), to lower low-density lipoprotein (LDL). The first step of

the lifestyle therapy involves reducing intake of saturated fats and cholesterol and engaging in moderate physical activity. If after six weeks the LDL goal is not achieved, the therapy is intensified by adding plant stanols and sterols and increasing fiber intake. If LDL goals are not met in another six weeks, drug therapy is considered, weight management and physical activity is intensified, and therapy for metabolic syndrome is initiated. (Metabolic syndrome represents a group of lipid and non-lipid risk factors of metabolic origin, such as abdominal obesity, raised blood pressure, and insulin resistance.) At this step in the model, adherence to TLC is monitored every four to six months.

A stepped-care approach in the field of weight loss was examined using problem-solving therapy (PST) as the stepped-care component for participants who were experiencing difficulty losing weight (Black & Threlfall, 1986). All participants took part in the minimal intervention program that consisted of a few guidelines about how to lose weight and self-monitoring of calorie intake and expenditure. Participants who evidenced no weight loss over a period of three consecutive weeks or reported they could no longer lose weight without additional assistance were stepped up to a bibliotherapy problem-solving program in which they received 10 bibliotherapy packets aimed at teaching problem-solving skills. Twenty-two of the 26 participants were stepped-up to the additional treatment. The results showed that participants lost an average of 22.1 pounds by the 3-month follow-up. The study is limited by the lack of control group comparison. However, an examination of compliance with the stepped-care component indicated that participants with greater compliance lost significantly more weight than those with poor compliance.

Another weight management study utilizing PST as the stepped-care component was conducted by Carels, et al. (2005). In this study, all participants completed a behavioral weight

loss group intervention. Half of the participants were placed in a stepped-care group in which they received individual PST if they had difficulty meeting their weight loss goals. Results revealed that individuals in the stepped-care group lost significantly more weight and body fat, reported greater physical activity and greater improvements in diet, and were more likely to achieve their within-treatment weight loss goals than participants in the standard weight management group. Also, participants in the stepped-care group who had difficulty meeting their goals and therefore received PST also outperformed participants in the standard weight loss group matched on stepped-care eligibility on such measures as body fat, physical activity, dietary changes and weight loss maintenance.

Finally, another stepped-care weight management study was conducted with a similar design but used motivational interviewing in place of PST (Carels, et al. in press). The results of this study revealed that participants who were stepped-up to motivational interviewing lost more weight and exercised more than matched participants who did not receive stepped-care.

Smoking Cessation Stepped-Care Interventions

Despite the interest in stepped-care, few studies have examined a stepped-care approach to smoking cessation. One study stepped-up (increased) nicotine patch dose contingent on cessation (Russell et al., 1993). The results suggested that increasing nicotine patch dose for those participants who continued to smoke after quit day was helpful in initial quitting, but had no effect on long-term cessation.

Another study examined whether “high risk” smokers (those who engaged in smoking during the first week after their quit date) would benefit from additional cognitive-behavioral skills training therapy (CBT) or motivational interviewing/supportive therapy (MIS; Smith et al., 2001). CBT treatment focused on development of smoking cessation skills such as coping with

withdrawal, managing negative mood states, and increasing positive moods. In MIS, the therapist served as a consultant to foster intrinsic motivation to help participants resolve their ambivalence about quitting. Strategies used by the consultant-therapist included identifying goals, assessing progress, expressing empathy, and promoting self-efficacy. All participants received eight weeks of nicotine patch therapy and three brief individual cessation counseling sessions. Eligible CBT and MIS participants received six group counseling sessions. Neither CBT nor MIS increased long-term cessation rates. Smith et al. speculated that the stepped-care component, which was offered one week after the quit date, may have occurred too late following smoking cessation failure. The first few days following a quit attempt are extremely important and predictive of future lapse. For example, Kenford et al. (1994) found that 80% of all relapses begin with smoking that occurs one to two weeks after their attempt to quit and other research suggests that smoking on quit day is highly predictive of long-term relapse (Westman, Behn, Simel, & Rose, 1997). Therefore, it appears crucial that a stepped-care program that can identify difficulties prior to relapse (e.g., inability to decrease number of daily cigarettes) and incorporate appropriate intensifications of treatment (e.g., individual treatment to target difficulties) at critical times during the program (e.g., immediately following a failed attempt to decrease daily cigarettes or failed cessation attempt) may increase the likelihood of cessation on or shortly after quit day.

In summary, stepped-care is a promising approach to facilitate health behavior change. However, few studies have been conducted using stepped-care in smoking cessation and these studies have been relatively unsuccessful. The prior failure of stepped-care studies does not suggest that a stepped-care approach is ineffective in helping smokers quit smoking. Rather, future studies need to determine the most effective method of delivering stepped-care programs

as well as identify the particular components of a stepped-care program that will provide the greatest improvements in smoking cessation outcomes.

The Clinical Practice Guideline

In 1996, Fiore et al. developed The Clinical Practice Guideline for Treating Tobacco Use and Dependence. This guideline, which was updated in 2000, is empirically-based and relies heavily on meta-analyses of published research studies. One of the meta-analyses examined psychosocial format types of 58 smoking cessation studies. The meta-analysis revealed individual counseling to be superior in its effects to other formats (e.g., self-help). Telephone counseling and group counseling were also found to be efficacious.

Another meta-analysis, involving 62 studies, was conducted to examine the effectiveness of interventions using various types of content. Estimated odds ratios were calculated for 10 types of content in comparison to untreated control conditions. Many content categories were not associated with cessation, such as relaxation/breathing exercises, contingency contracting, and weight/diet issues. General problem-solving, on the other hand, was found to be 1.5 times more effective than control conditions (95% CI = 1.3-1.8). Of the 10 types of content evaluated, the efficacy of problem-solving was only lower than that of aversive smoking.

Problem-Solving Therapy

Problem-solving therapy is a cognitive-behavioral approach aimed at teaching clients problem-solving skills that will help them to overcome problems associated with making lifestyle changes. A number of research studies have shown that PST is an effective intervention for a wide range of clinical populations and problems. Specifically, PST has been shown to be effective with depression (Arean et al., 1993; Nezu & Perri, 1989), phobias (DiGiuseppe, Simon, McGowan, & Gardner, 1990; Jannoun, Munby, Catalan, & Gelder, 1980), schizophrenia

(Bradshaw, 1993), and suicide (McLeavey, Daly, Ludgate, & Murray, 1994). In addition, research has also shown PST to be an effective intervention for treating health related problems, such as obesity (Carels, et al., 2005; Black & Threlfall, 1986; Perri, Nezu, & Viegener, 1992), HIV risk behavior (Magura, Kang, & Shapiro, 1994), drug abuse (Intagliatia, 1978), and alcoholism (Chaney, O'Leary, & Marlatt, 1978).

Problem-Solving Therapy Within a Health Behavior Context

In the field of obesity research, the efficacy of problem-solving therapy has been investigated in several studies (Carels, et al., 2005; Black, 1987; Black & Sherba, 1983; Black & Threlfall, 1986; Perri et al., 1987). For example, Black and Sherba (1983) conducted a 7-week weight loss intervention with 3, 6, and 12-month follow-up sessions. Half of the participants were required to practice behavioral weight control skills, such as self-reinforcement and stimulus control throughout the 7-week intervention and follow-up period. The remaining participants were required to complete problem-solving forms pertaining to a seven-step problem-solving procedure. Results of the study revealed that participants who utilized problem-solving skills lost significantly more weight from post-treatment to 6-month follow-up than participants who practiced behavioral skills.

Alcoholism and drug abuse have been studied using a problem-solving approach. Chaney, O'Leary, and Marlatt (1978) conducted an intervention with men in a VA inpatient alcoholism program. PST was compared to either a group intervention aimed at discussing feelings and reactions to various problematic situations involving alcohol or the standard VA alcoholism program. During the 1-year period following treatment, the participants in the PST group were found to be significantly more improved than the other two treatment groups in regards to number of days drunk, total number of drinks, and mean length of a drinking period.

Platt, Husband, Hermalin, Cater, and Metzger (1993) employed PST with individuals with opioid-related disorders. The PST was focused on job training to help methadone patients resolve their vocational difficulties. Individuals who received standard treatment plus PST had a significant increase in employment at 6-month follow-up (13.5% increase). The employment rate of the control group who received only standard methadone treatment did not improve.

PST has also been used with adolescent drug users as a means of reducing HIV risk behaviors. Magura, Kang, and Shapiro (1994) conducted an intervention with 110 incarcerated adolescent males. Patients attended four group sessions using PST techniques. The discussions revolved around health education, with an emphasis on HIV and AIDS. Compared to a wait-list control group, the adolescents in the problem-solving AIDS education group reported a higher rate of condom use in general and specifically with vaginal and oral/anal sex at post-treatment. They also reported more favorable attitudes towards condoms.

Problem-Solving Therapy and Smoking Cessation

Despite PST being useful in treating a wide range of clinical issues, there is little research examining the effects of PST on smoking cessation. While many studies on smoking cessation employ general problem-solving skills training, there is only one documented study of PST in the context of smoking cessation. Karol and Richards (1978) conducted a smoking cessation intervention utilizing PST in addition to behavioral and no treatment control groups. Participants were randomly assigned to one of three groups: behavioral treatment, behavioral treatment plus a PST maintenance phase, or control wait-list. At the end of the five-session behavioral treatment phase both treated groups significantly outperformed the control group, as defined by reduction of smoking. Specifically, at 8-month follow-up, the group that received the PST maintenance treatment showed very little relapse (smoked an average of 1.1 cigarettes above post-treatment

level), whereas the relapse rate of the other two groups was significantly higher (smoked an average of 14.8 cigarettes above post-treatment level). It has been suggested that PST may help the client cope with difficulties directly related to quitting smoking, such as finding ways to effectively avoid the temptation to smoke. In addition, the skills learned in PST may help the client to cope with difficulties indirectly related to quitting smoking (e.g., loneliness experienced after detaching oneself from one's social circle of smokers).

Alternative Measures of Success

Harm Reduction

Smoking cessation treatment success is commonly defined as the percentage of participants who abstain from smoking while in a treatment program and maintain abstinence through a predetermined follow-up. Amongst smokers who attempt to quit in formal treatment clinics, over 50% will relapse within three months to a year of quitting. In addition, between 80-95% of smokers who try to quit with self-help or brief interventions will relapse (Abrams, 1993). Many smokers continue to smoke despite numerous attempts at a variety of smoking cessation interventions (Abrams et al., 2003), and it is estimated that as many as 50% of smokers will never quit (Hughes, Cummings, & Hyland, 1999).

The concept of harm reduction or harm minimization involves decreasing one's exposure to tobacco toxins (e.g., decreasing the daily number of cigarettes smoked, achieving periods of temporary abstinence; Niaura & Abrams, 2002). Harm reduction provides a flexible rather than an "all or nothing" approach to cessation (Abrams et al, 2003). Research has demonstrated health benefits associated with a reduction in the number of cigarettes that people smoke. For example, in a study examining cardiovascular risk factors, a 50% or more reduction in smoking resulted in clinically significant health benefits (Bolliger, 2000). There is a strong positive dose-dependent

relationship between exposure to tobacco toxins and subsequent morbidity and mortality (Burns, 1997 as cited in Niaura & Abrams, 2002). Given the increasing health risks associated with an increase in tobacco exposure, harm reduction may be an important intermediate step in an individual's progression toward abstinence. Additionally, it has been suggested that once an individual has undertaken reduction, it may increase motivation to quit and shorten the time taken to attempt cessation (Bolliger). Few studies have tested the effectiveness of a harm reduction approach. One such study examined the effectiveness of a controlled smoking program (CSP) in maintaining smoking reductions long-term. The CSP was focused on assisting participants make reductions in their smoking level. At 2 ½ year follow-up, participants were still smoking less than at pretest, nine percent of participants became totally abstinent between posttest and follow-up, and an additional 9-36% of participants showed further reductions on measures of nicotine content, number of cigarettes, percentage of each cigarette smoked, and carbon monoxide levels (Glasgow, Klesges, Klesges, Vasey, & Gunnarson, 1985). Another study found that nicotine replacement therapy was effective at helping smokers reduce their cigarette consumption and maintain this reduction over 6 months. However, nicotine treatment for smoking reduction did not increase the likelihood of quitting (Etter, Laszlo, Zellweger, Perrot, & Perneger, 2002).

Although these studies show that smoking reductions can be achieved and maintained, the utility of harm reduction approaches in smoking has been debated. For example, tobacco companies offer filtered, low-tar, and low-nicotine cigarettes. However, smokers sometimes compensate for the reduced nicotine level by smoking more cigarettes and inhaling more deeply to obtain the same amount of nicotine. Research has shown that this type of compensation can actually *increase* risk (Augustine, Harris, & Wynder, 1989). Specifically, the increasing

occurrence of adenocarcinomas (malignant tumors) of the lung have been attributed to increased smoking intensity of low-nicotine cigarettes, deeper inhalation, and the significant increase of tobacco specific toxins in the smoke of low-yield cigarettes (National Cancer Institute, 2002; Hoffman & Hoffman, 1997). Therefore, when using nicotine fading procedures, such as brand fading (i.e., changing cigarette brand to one with lower nicotine level) in a smoking cessation intervention, it is important for the intervention leaders to caution participants not to compensate for the reduced nicotine levels by changing their smoking behavior (Abrams et al, 2003). In addition, smokers may delay quitting because they believe they have a method that reduces harm (Shields, 2002). Despite the potential benefits of harm reduction, smoking at any level possesses risks and cessation should remain the ultimate goal. Harm reduction functions best as a means of temporary risk reduction and as an intermediate step, until the individual is ready to quit. Harm reduction is not an acceptable long-term alternative to quitting. In summary, harm reduction may be an important step for individuals who are currently unable to quit but whose ultimate goal is cessation.

Readiness for Change

Despite a desire to quit smoking, many individuals are not adequately prepared for a quit attempt. Assessing readiness for change is another non-traditional way of measuring success in smoking cessation research. The Transtheoretical Model of Behavior Change encompasses several constructs that articulate the process through which behavior change occurs. The key constructs are Stages of Change, Processes of Change, Decisional Balance, and Self-Efficacy/Temptations. Perhaps the most widely known and studied construct in this model is the Stages of Change. Stages of Change is based on the premise that change occurs in distinct stages. Five different stages have been identified: precontemplation, contemplation, preparation, action,

and maintenance (see Appendix A). Applied to the context of smoking, individuals in the precontemplation stage are those who are not interested in quitting smoking and do not plan on quitting in the next six months. Individuals in the contemplation stage are considering quitting smoking within the next 30 days to six months, but have not had a 24-hour quit attempt. Those in the preparation stage are planning to quit within the next 30 days, have made at least one 24-hour quit attempt in the past year, and may have already taken some action towards quitting (e.g., decreased number of daily cigarettes smoked). Individuals in the action stage are those who have recently quit smoking within the past six months and are focused on relapse prevention. Finally, individuals in the maintenance stage have quit smoking for more than six months. Research suggests that in addition to abstinence rates, there is considerable utility in measuring success as the forward movement through the stages of change toward smoking cessation (Abrams, 1993; Prochaska & DiClemente, 1983).

It has been argued that a non-abstinent participant may benefit from treatment if they progress to a stage of change that is closer to smoking cessation. Research shows that advancement from precontemplation to contemplation increases likelihood of future cessation in 2 years by 40%, and advancement to preparation increases likelihood of future cessation by 80% (Abrams, Herzog, Emmons, & Linnan, 2000). For example, an individual in the contemplation stage (i.e., considering quitting in the next six months, but not the next 30 days) may not be able to move to the action stage (i.e., quit smoking) during the course of treatment; however, this individual may be able to move to the preparation stage (i.e., planning to quit in the next 30 days and made one 24-hour quit attempt). Research suggests that it may take a smoker up to ten years to move through the stages of change before he or she is ready to quit (Prochaska, Velicer,

DiClemente, & Fava, 1988). A program that assists progress towards a successful quit attempt would be beneficial even if cessation was not reached during the program.

By formal definition of the stages of change model, it could be argued that all individuals who volunteer to participate in a smoking cessation intervention are in the contemplation or preparation stage. However, participants may sign-up for a smoking cessation intervention because they want to quit smoking, but they may be unsure that they can actually quit within the next 30 days. In fact, despite their desire to quit, they may have taken no concrete steps towards quitting (i.e., preparation stage). While statistics show that 70% of smokers want to quit (Centers for Disease Control and Prevention, 1997), it is unlikely that all 70% are prepared to quit. Population surveys show that only 14-28% of smokers are highly motivated to quit in the next 30 days (Abrams & Biener, 1992; Velicer et al., 1995). Another 30-40% of smokers say they intend to quit in the following six months. Therefore, individuals who take advantage of an opportunity to join a cessation program (i.e., sign up for a cessation program) may come to realize that they are not *prepared* to quit. These individuals are likely to experience difficulties quitting.

Another key construct of the transtheoretical model is the ten processes of change. The processes describe overt and covert activities that individuals use to modify problem behavior. The ten processes can be broken down into two groups: experiential and behavioral. The behavioral processes of change are described as: helping relationship (i.e., having a positive, supportive relationship that facilitates change), self-liberation (i.e., increasing commitment and creating new alternatives for self), counterconditioning (i.e., changing one's reactions to stimuli), reinforcement management (i.e., changing reinforcers and contingencies for a behavior), and stimulus control (i.e., changing environment to minimize occurrence of stimuli). The experiential processes of change are described as: consciousness raising (i.e., increasing awareness of a

problem and its potential solution), environmental reevaluation (i.e., changing appraisals of problem's impact on others), self-reevaluation (i.e., changing appraisals of self and problem), social liberation (i.e., creating new alternatives in the environment, such as smoke-free policies and advocacy), and dramatic relief (i.e., having intense emotional reactions to problem-related events and information). Research has shown that the particular processes of change an individual engages in may map onto their current stage of change. For example, experiential processes are used more extensively earlier in the stage progression, and behavioral processes are used more extensively in later stages of change (Perz, DiClemente, & Carbonari, 1996). Also, in general, individuals tend to use more processes of change as they move from precontemplation to preparation (Fava, Velicer, & Prochaska, 1995). For example, in one cessation study, nonsmokers at three months of cessation endorsed more items in the Reinforcement Management process of change than smokers prior to the start of a smoking cessation program (Carlson, Taenzer, Koopsmans, & Casebeer, 2003). In another study examining smoking related processes of change in cancer patients, quitters used behavioral processes such as counter-conditioning and reinforcement management significantly more and used self-evaluation (an experiential process) significantly less than smokers (Schnoll, et al., 2002).

A third construct in the transtheoretical model of change is decisional balance. Decisional balance reflects the importance of reasons for and against making a behavior change. It is calculated by measuring the pros relative to the cons of smoking that the individual endorses. Similar to the processes of change, decisional balance has been associated with stage of change. In the early stages of change, the pros of smoking tend to outweigh the cons of smoking. However, as an individual progresses through the stages, he/she is likely to endorse more cons and less pros of smoking. Specifically, as the individual reaches the contemplation stage, a

crossover commonly occurs whereby the cons outweigh the pros of smoking (Fava et al., 1995). Carlson et al. (2003) found that nonsmokers at three months endorsed more cons of smoking and had a more negative decisional balance score than smokers prior to beginning a smoking cessation program.

A final construct in the transtheoretical model is self-efficacy. Self-efficacy is an individual's level of confidence in his/her ability to perform a particular behavior (Bandura, 1997). In smoking cessation research using the transtheoretical model, self-efficacy has been measured by level of temptation to smoke in three categories of situations characterized by Positive/Social, Negative/Affective, or Habit/Addictive (Velicer, DiClemente, Rossi, & Prochaska, 1990). Several studies have examined self-efficacy in relation to the stages of change (DiClemente et al., 1991; DiClemente, Prochaska, & Gibertini, 1985; Prochaska, Velicer, Guadagnoli, Rossi, & DiClemente, 1991). Precontemplators generally report increased levels of temptation with the level of temptation decreasing as the individual progresses through the stages. A study examining the self-efficacy subscales separately found individuals in the preparation stage to be least tempted in Positive/Social and Habit/Addictive situations and most tempted in Negative/Affect situations (Fava et al., 1995).

In summary, the transtheoretical model is composed of several constructs, each of which may shed light on an individual's progression through the stages of change. These constructs may be associated with smoking cessation or increased readiness for smoking cessation. Progression through these stages may be a useful measure of success in smoking cessation treatment outcome research.

Summary

Approximately half of all American smokers who continue to smoke will die from their tobacco use (Peto et al., 1994). Unfortunately, the efficacy of smoking cessation interventions has declined over the past decade. This is possibly due to the increased difficulty of treating the current population of smokers and/or the potential diminished effects of certain treatment components through repeated exposure (Irvin & Brandon, 2000). Although preliminary studies applying a stepped-care approach to smoking cessation have not been successful at increasing abstinence, these failures may highlight shortcomings in the design of past stepped-care interventions. Recent reviews suggest that smoking cessation interventions incorporating problem-solving may be more successful in achieving increased rates of smoking cessation (Niaura & Abrams, 2002). Additionally, harm reduction is an important topic that has been somewhat overlooked in smoking cessation interventions. Interventions focused only on abstinence may send a message to participants that cessation is the only way to succeed. This all-or-nothing attitude may overlook the important health related changes an individual can make, such as, progression through the stages of change and decrease in nicotine exposure (via decrease in number of cigarettes smoked daily and/or decrease in nicotine yield of cigarettes smoked).

In light of the previous research, I proposed that a stepped-care intervention employing a standard smoking cessation intervention where individuals who are experiencing difficulties with cessation are provided individual problem-solving therapy will result in higher rates of smoking cessation, greater reductions in nicotine exposure, and greater progress through the stages of change when compared to a standard smoking cessation intervention without stepped-care. All participants received an 8-session group smoking cessation intervention based on The Tobacco

Dependence Treatment Handbook (Abrams et al., 2003). Half of the participants were place in an experimental group where they were eligible to receive individual sessions if they did not make sufficient progress toward smoking cessation. The individual sessions utilized a problem-solving therapy format. (See Appendix B for a design graphic.) Hypotheses for the intervention are outlined below:

Hypotheses

1) Individuals in both Treatment and Treatment plus stepped-care (SC) groups will significantly decrease nicotine exposure, evidence significant progress through stages of change (and its related constructs), and significantly increase number of 24-hour quit attempts.
2) A greater percentage of individuals in the Treatment + SC group will have abstained from cigarettes by the end of treatment than in the Treatment group.
3) A greater reduction in nicotine exposure will occur in the individuals in the Treatment + SC group by the end of treatment than in the Treatment group.
4) Individuals in the Treatment + SC group will make greater progress toward cessation than individuals in the Treatment group.
    a. From pre- to post-treatment, individuals in the Treatment + SC group will make greater progress along the stages of change than individuals in the Treatment group.
    b. From pre- to post-treatment, individuals in the Treatment + SC group will endorse a greater number of processes of change, than individuals in the Treatment group.

c. From pre- to post-treatment, individuals in the Treatment + SC group will evidence a more negative decisional balance score than individuals in the Treatment group.

d. From pre- to post treatment, individuals in the Treatment + SC group will evidence greater decreases in temptation to smoke and greater increases in self-efficacy than individuals in the Treatment group.

5) A greater percentage of individuals in the Treatment + SC group will make a 24-hour quit attempt by the end of treatment than individuals in the Treatment group.

Methods

Participants

A total of 40 participants were enrolled in the intervention (22 Treatment + SC; 18 Treatment) and 27 participants completed the investigation (12 Treatment + SC; 15 Treatment). Participants were recruited through newspaper advertisements and fliers (distributed at hospitals, doctors' offices, grocery stores, department stores, laundromats), email announcements, and a booth at the Student Union advertising and answering questions about the intervention. To reduce attrition, participants were asked to provide a $50 deposit that was returned to them upon completion of the intervention. The inclusion criteria were as follows: smoking at least 10 cigarettes a day, being 18 years of age or older, being willing to accept assignment to either condition, and being able to provide informed consent. Exclusion criteria were as follows: currently using any form of nicotine replacement therapy (e.g., nicotine patch, nicotine nasal spray), having a serious mental disorder such as schizophrenia, bipolar disorder, or substance abuse as defined by the DSM-IV.

Procedure

Interested individuals were screened via telephone to determine their eligibility for the intervention (see Appendix C). Eligible participants were assigned to the smoking cessation or smoking cessation plus stepped-care group depending on which group was starting at the time they were ready to participate. The participants met with the group leader individually prior to the beginning of the intervention to complete an informed consent as well as demographic and baseline questionnaires. Questionnaires were completed again following the intervention. Both groups attended the 8-session smoking cessation intervention. Participants were placed in small groups of 5-12 people. The sessions were 90 minutes in length and were led by two clinical psychology doctoral students.

Stepped-Care Eligibility Criteria

Smoking cessation research suggests that a prompt therapeutic response to unsatisfactory progress during treatment may be necessary to circumvent poor treatment outcomes (Smith et al., 2001). Therefore, eligible participants in the smoking cessation plus stepped care group received individual PST as a brief, intensive, adjunct to the standard smoking cessation intervention. PST was to be delivered on a bi-weekly basis to participants when poor progress becomes evident.

Poor progress was indicated by difficulties with nicotine fading or smoking cessation. Specifically, following the second smoking cessation session, participants began nicotine fading (i.e., decreased number of cigarettes smoked daily by 15% per week and changed cigarette brand to one with a 30% lower nicotine level on a weekly basis). However, smokers were not encouraged to reduce their rate of smoking to below 10 cigarettes a day as this may increase the reinforcement value of those remaining cigarettes creating greater difficulties for quitting. Participants who began the program smoking 10 cigarettes a day were asked to achieve nicotine

fading through brand fading rather than reducing the rate of smoking. After nicotine fading began, participants were contacted within two days following each session to determine (via self-report) whether the participant was experiencing difficulties with their nicotine fading assignment. Difficulties were defined in two ways. The first was an inability to nicotine fade at the assigned level. For example, a participant who smokes 20 Marlboro Red cigarettes per day would be assigned a 3-cigarette reduction as well as a change to a cigarette with 30% lower nicotine level (e.g., Marlboro Lights). Difficulties were indicated if the smoker was unable to decrease from 20 cigarettes daily to no more than 17 cigarettes daily or if the smoker was not able to switch to the lower nicotine cigarette. The second difficulty warranting stepped-care was the participants' report that he/she was experiencing difficulty and would like additional counseling. PST was discontinued when a participant evidenced successful nicotine fading (via self-report) or abstinence (depending upon the participant's stage in the program). If a participant who previously terminated PST began to evidence difficulties later in treatment, PST was resumed. Participants were encouraged to contact group leaders immediately after experiencing difficulties with fading or cessation in order to begin PST. While the Quit Day was scheduled for the fifth session of the intervention, participants who were experiencing difficulty with nicotine fading had the option of having their quit date postponed. Participants had until the final day of the intervention to quit smoking. If a participant quit smoking during the final week of the intervention, the participant was eligible to continue PST for an additional two weeks. Therefore, participants could receive up to 16 sessions of PST (see Appendix D for example).

Intervention

Smoking Cessation Treatment

All participants completed an 8-session smoking cessation intervention adapted from the Tobacco Dependence Treatment Handbook (Abrams et al., 2003), an empirically-supported, cognitive-behavioral approach to smoking cessation. This treatment has been evaluated by Brown et al. (2001) and was found to be comparable to the most efficacious outcomes reported in the Clinical Practice Guidelines (Fiore et al., 2000). The eight sessions were administered over a period of seven weeks (two sessions were held during the week participants quit smoking).

Session 1 includes an introduction of participants and group leaders as well as a discussion of ground rules (e.g., maintaining confidentiality of group members). The cognitive social learning rationale and self-monitoring are discussed. Learning how to identify triggers for smoking and the concept of nicotine fading is also discussed. In *Session 2,* the leaders review material from the first session as well as introduce methods of self-management and a deep breathing relaxation technique. The main topic for *Session 3* is lifestyle change, specifically, identifying potential areas of change that will encourage successful smoking cessation, such as temporarily avoiding friends who smoke. During *Session 4*, participants learn techniques to identify and cope with high-risk situations. A discussion about Abstinence Violation Effects (e.g., feeling guilty after a lapse) and preparation for quit day is also covered in this session. *Session 5* occurs on Quit Day and includes a discussion of quit day experiences, as well as ways of eliciting social support for nonsmoking. In addition to a review of previous materials, *Session 6* focuses on strategies for coping with cravings. *Session 7* focuses on strategies for managing thoughts about resuming smoking. Finally, *Session 8* concludes the intervention with a

discussion of quitting experiences as well as planning for the future. For a more extensive description of the objectives of the smoking cessation intervention see Appendix E.

A Smoking Cessation Workbook had been created for use in this intervention. The workbook includes an abbreviated summary of material covered in the eight sessions as well as space for writing notes and completing exercises presented during the sessions (see Appendix F). In addition to the Smoking Cessation Workbook, participants occasionally received handouts and worksheets from The Tobacco Dependence Treatment Handbook to supplement the material presented in the sessions.

Problem-Solving Therapy

Participants in the Treatment + SC group were eligible to receive PST individual sessions based on their progress in the smoking cessation intervention. The problem-solving therapy was guided by D'Zurilla and Nezu's (1999) Problem-Solving Training (PST) Manual. The original manual consists of eight units designed to be delivered in 14 to 16 sessions, but can be modified based on population needs and severity of presenting problems. The therapist and client work through the PST units at the pace that is most appropriate for the client (i.e., each unit does not represent a separate session).

The first unit, *Initial Structuring*, is aimed at discussing the goals and format of PST, beginning training in problem perception, and discussing the limited capacity of the conscious mind during problem-solving. *Unit 2: Problem Orientation* focuses on increasing sensitivity to problems, maximizing effort and persistence when obstacles are encountered, and focusing attention on positive problem-solving thoughts and activities and away from unproductive thoughts. The main goal of *Unit 3: Use and Control of Emotions in Problem-Solving* is to discuss the role of emotions in social problem-solving. The goal of *Unit 4: Problem Definition*

and Formulation is to gather relevant information about the problem, clarify the nature of the problem, set a realistic problem-solving goal, and re-appraise the significance of the problem for social-personal well-being. *Unit 5: Generation of Alternative Solutions* is based on the idea that often the first ideas that come to mind when attempting to solve a problem are not always the best. Therefore, in this unit the therapist encourages the participant to generate as many options for solutions as he/she can. *Unit 6: Decision Making* is focused on evaluating all possible solutions, including the benefits and disadvantages of each option, and deciding on a solution to implement. *Unit 7: Solution Implementation and Verification* involves carrying out the selected solution and then evaluating its outcome objectively. This process includes solution implementation, self-monitoring, self-evaluation, and self-reinforcement. The final unit: *Maintenance and Generalization* is focused on consolidating training effects and facilitating maintenance and generalization of effective problem-solving.

A Problem-Solving Participant Manual based upon D'Zurilla and Nezu (1999) includes the main points of each unit as well as a smoking cessation problem checklist, decision evaluation chart, and solution evaluation chart (see Appendix G).

Measures

Demographics

Basic demographic information such as age, gender, race, marital status, employment status, annual income, and education, was collected at the beginning of the intervention. In addition to basic demographics, information on number of years as a smoker, brand and number of daily cigarettes smoked during those years, current brand and number of daily cigarettes smoked, number of past quit attempts, length of longest quit attempt, and the smoking status of significant other or housemates was also collected (see Appendix H).

Nicotine Dependence

Individuals who are more highly dependent on nicotine have greater difficultly becoming abstinent (Fagerstrom & Schneider, 1989). Therefore, nicotine dependence was assessed to rule out differences in nicotine dependence between the Treatment + SC and Treatment group. Nicotine dependence was assessed with the Fagerstrom Tolerance Questionnaire (FTQ), a widely used 8-item questionnaire that measures nicotine dependence (Fagerstrom, 1978). Smoker's responses are coded and summed to produce a total score. Scores range from 0 – 11, with higher scores indicating high dependence. Scores of 7 or higher are considered high dependence (Fagerstrom & Schneider). The FTQ correlates with other measures of biochemical dependence (e.g., nicotine, cotinine) and has predicted outcome of cessation attempt in clinical trials (Fagerstrom & Schneider; Fagerstrom; see Appendix I).

Assessment of Movement Through Stages of Change

Stages of Change Algorithm. The Stages of Change Algorithm for assessing readiness to change consists of three "yes or no" questions for smokers and one two-option question for ex-smokers (DiClemente et al., 1991; See Appendix J). Once a smoker answers "no" to a question he/she has completed the questionnaire. The questions for smokers begin with: "Are you seriously thinking about quitting in the next 6 months?" If the participant answers "yes" he/she is to move on to the next question: "Are you planning to quit smoking in the next 30 days?" If the participant answers "yes," he/she is to move on to the last questions: "Have you quit smoking for at least 24 hours in the past year?" The questions for ex-smokers asks "Did you quit: in the last 6 months? More than 6 months ago?" Ex-smokers are to indicate the time frame in which they quit. In an attempt to capture a participant's subtle movements within and between the

contemplation and preparation stages over time, twelve exploratory questions were added to the stages of change algorithm.

There is substantial support for the construct validity of the Stages of Change (DiClemente et al., 1991; Lam et al; 1988). Stage classifications for smoking cessation have been consistently related to the processes of change for smoking cessation (Prochaska et al., 1988), self-efficacy (DiClemente, 1986; DiClemente et al., 1985), and decision-making related to cessation (Velicer, DiClemente, Prochaska, & Brandenburg, 1985). The stages of change is commonly used as a framework to examine the population of US smokers (U.S. Department of Health and Human Services, 1988) and has been shown to predict smoking cessation at one- and two-year follow-ups (Abrams et al., 2000).

Processes of Change Inventory. The Processes of Change Inventory measures five behavioral and five experiential activities that smokers typically employ in the process of quitting (Prochaska et al, 1988). The five behavioral processes of change are: helping relationship (i.e., having positive, supportive relationship that facilitates change), self-liberation (i.e., increasing commitment and creating new alternatives for self), counterconditioning (i.e., changing one's reactions to stimuli), reinforcement management (i.e., changing reinforcers and contingencies for a behavior), and stimulus control (i.e., changing environment to minimize occurrence of stimuli). The five experiential processes of change are: consciousness raising (i.e., increasing awareness of a problem and its potential solution), environmental reevaluation (i.e., changing appraisals of problem's impact on others), self-reevaluation (i.e., changing appraisals of self and problem), social liberation (i.e., creating new alternatives in the environment, such as smoke-free policies and advocacy), and dramatic relief (i.e., having intense emotional reactions to problem-related events and information). The original inventory contained 40 items. In the

current intervention, a 20-item short-form version created and validated by Fava, Rossi, Velicer, and Prochaska (1991) was used. Cronbach's coefficient alpha was calculated for each of the 10 two-item processes. The coefficients range from .67 to .90 with a mean of .80, which is considered good to excellent for two-item measures (Fava et al., 1995). The correlation between the two-item short-form scales and the original four-item scales range from .87 to .96. Responses to items are based on a five-point Likert scale ranging from 1 *(never)* to 5 *(repeatedly)*. The two items from each process are summed to create each process subscale score (see Appendix K).

Decisional Balance Inventory. The Decisional Balance Inventory was initially developed to measure the cognitive and motivational aspects of decision making (Janis & Mann, 1977). Velicer et al. (1985) constructed at 20-item inventory to measure decision making in smoking. The psychometric analyses of this measure revealed two subscales: 10 items measuring the pros of smoking and 10 items measuring the cons of smoking. Cronbach coefficient alpha was .88 for the Pros and .89 for the Cons subscale, indicating good internal consistency. Items are scored on a five-point Likert scale ranging from 1 (not important) to 5 (extremely important). The overall balance score is calculated by subtracting the cons total from the pros total (see Appendix L).

Self-Efficacy/Temptations Scale. The Self-Efficacy/Temptations Scale is a 20-item measure of self-efficacy (Velicer et al, 1990). The scale assesses level of temptation across a variety of situations. The scale can reliably be divided into three broad subscales. The first subscale labeled Negative/Affective involves negative emotional states and inadequate motivation. The second subscale labeled Positive/Social includes environmental stimuli and external contingencies, including social factors. The last subscale, Habit/Addictive corresponds to cravings, urges, and withdrawal. Fava et al. (1991) developed a shortened 9-item version of the Self-Efficacy/Temptations Scale (i.e., three from each subscale). The Cronbach alpha

coefficient was .88 for the Positive Affect/Social Situations items, .93 for the Negative Affect Situations items, and .84 for the Habitual/Craving Situations items. Correlations between the shortened-form three-item scales and the original scales ranged between .91 and .98. Items are scored on a five-point Likert scale ranging from 1 *(Not at all tempted)* to 5 *(extremely tempted).* An overall score is computed by averaging across the items. Subscales are obtained by averaging responses to items within each subscale (see Appendix M).

Smoking Self-Efficacy Questionnaire. The Smoking Self-Efficacy Questionnaire is a 12-item measure of self-efficacy (Etter, Bergman, Humair, & Perenger, 2000). The scale assesses current and former smokers in their ability to abstain from smoking in high-risk situations. The scale can reliably be divided into two subscales. The first subscale labeled Internal Stimuli measures confidence in ability to refrain from smoking when facing internal stimuli (e.g., feeling depressed). The second subscale labeled External Stimuli measures confidence in ability to refrain from smoking when facing external stimuli (e.g., being with smokers). Internal consistency coefficients were found to be high (alpha = 0.95 for internal stimuli and alpha = 0.94 for external stimuli). Test-retest intraclass correlation coefficients were also found to be high (0.95 for internal and 0.93 for external). Items are scored on a five-point Likert scale ranging from 1 *(Not at all sure)* to 5 *(absolutely sure).* An overall score is computed by summing the value of the 12 items. Subscales are obtained by averaging responses to items within each subscale (see Appendix N).

Assessment of Smoking Level

Level of Smoking. Individuals who are not successful at cessation completed a brief self-report measure of what brand and how many cigarettes they smoke daily at the end of the treatment. This measure was verified by the participants' self-monitoring forms (wrap sheets)

that they complete throughout the intervention. The wrap sheets require participants to record each cigarette smoked, cigarette brand, time smoked, emotions experienced, and current activity. From these monitoring forms the participant's average level of nicotine exposure from cigarette smoking can be calculated by multiplying the average number of cigarettes smoked daily by the amount of nicotine per cigarette (for an example, see Appendix O).

24-hour Quit Attempt. During the sessions and follow-up contacts, participants' ability to achieve a 24-quit attempt was recorded. Participants' progress after quit day was monitored during sessions as well as assessed during the two-day follow-up contacts after Session 5, 6, and 7. Therefore, 24-hour quit attempts were assessed via self-report at: (1) follow-up contact after Session 5- Quit Day, (2) Session 6, (3) follow-up contact after Session 6, (4) Session 7, (5) follow-up contact after Session 7, and (6) Session 8. Quit attempts were assessed via cotinine verification (see below).

Smoking Abstinence Verification. Individuals who report abstinence at the end of treatment were asked to submit to cotinine verification. Cotinine is a metabolite of nicotine and is considered one of the most stable measures of recent tobacco smoking (Abrams et al., 2003). In a comparison of three biochemical measures of smoking cessation, Velicer, Prochaska, Rossi and Snow (1992) found cotinine to be the most accurate means of biochemical validation. Cotinine has a half-life of 11-20 hours, may be assessed in the saliva or urine (Abrams et al., 2003), and is commonly used to quantify levels of nicotine intake (Fagerstrom & Schneider, 1989; Hall, Herning, Reese, Benowitz, & Jacob, 1984). In the current study, cotinine was measured with urine samples (salivary cotinine tests require expensive lab analysis) using the Quick Screen One-Step Rapid Nicotine Test from Craig Medical Distribution, Vista, CA. This

test is a lateral flow, one-step immunoassay for the qualitative detection of cotinine in urine at a minimum sensitivity cut-off level of 200 ng/ml.

Assessment of the Acquisition of Problem-Solving Skills

The Social Problem-Solving Inventory is a 70-item scale that was originally developed to assess the major components of D'Zurilla and Nezu's model of problem-solving. The Social Problem-Solving Inventory- Revised (SPSI-R) has been shortened to 52 items that load onto five factors. The five subscales are: Positive Problem Orientation, Negative Problem Orientation, Rational Problem-Solving, Impulsivity/Carelessness Style, and Avoidance Style. All five scales of the SPSI-R and the overall SPSI-R score have demonstrated adequate to high internal consistency with coefficient alphas ranging from .60 to .96 (D'Zurilla, Nezu, & Maydeu-Olivares, 2002; see Appendix P).

End-of-Treatment PST Evaluation.

Participants in the Treatment + SC group were given a post-treatment questionnaire pertaining to their feelings regarding having the option of PST. Participants who received PST were asked about their feelings regarding receiving PST. Feelings regarding the opportunity for PST were assessed using 5 items. Participants were asked whether the potential for counseling made them feel: 1) anxious, 2) supported, or 3) resentful. In addition, participants were asked to what degree did they: 5) work hard to avoid individual counseling, and 6) appreciate the opportunity to receive individual counseling. All questions were rated on a five-point scale (1 = *not at all*; 3 = *somewhat*; 5 = *extremely*). Participants who received PST were asked three additional questions: 1) How effective do you feel the individual sessions were in helping you achieve your non-smoking goals?, 2)

What were the most helpful aspects of individual PST? and 3) What would have made the individual PST more helpful? (Appendix Q).

Results

The current study examined the following hypotheses: individuals in both Treatment + SC and Treatment groups will make significant improvements in the Stages of Change, Processes of Change, Decisional Balance, Self-Efficacy/Temptations, and Self-Efficacy measures, number of 24-hour quit attempts, and significantly decrease nicotine exposure; more individuals in the Treatment + SC group will became abstinent at the end of treatment than in the Treatment group; reductions in nicotine exposure will be greater in individuals in the Treatment + SC group than the Treatment group; individuals in the Treatment + SC group will make more progress along the Stages of Change, Processes of Change, Decisional Balance, Self-Efficacy/Temptations, and Self-Efficacy measures from pre- to post-intervention than individuals in the Treatment group; more individuals in the Treatment + SC group will have made a 24-hour quit attempt by the end of treatment than individuals in the Treatment group; the same group differences are anticipated between the participants in the Treatment + SC group who received PST versus Treatment group participants matched on SC eligibility; i.e., would have received PST if in the Treatment + SC group).

Baseline and Demographic Characteristics

Chi-square analyses were performed to determine whether there were significant differences in the gender, race, marital status, employment, income, and smoking status of housemates between the Treatment + SC and Treatment groups. No significant group differences emerged (see Table 1).

ANOVAs and independent sample t-tests were performed to determine whether there were significant differences in age, years of education, years of smoking, depression level, nicotine level, number of past quit attempts, length of longest quit attempt, and nicotine dependence scores between the Treatment + SC and Treatment groups. The only significant group difference that emerged was level of depression. Participants in the Treatment group were significantly more depressed than members of the Treatment + SC group (see Table 1). Therefore, depression scores were used as a covariate in all analyses. One-tailed significance tests ($p < .05$) were employed on all hypothesized analyses.

The Treatment + SC and Treatment groups did not differ in regards to the number of participants who were eligible for stepped-care (9 Treatment; 7 Treatment + SC). Participants in the Treatment + SC group who were eligible for stepped-care attended an average of 2.3 PST sessions ($SD = 1.1$; range 1-4). Repeated measures ANOVA was performed to determine whether inclusion in PST resulted in improved problem-solving skills. There was no significant difference in change in problem-solving skills from pre- to post-intervention between those who received PST and those who did not $F(1, 24) = 0.56$, $p = 0.23$.

Chi-square analysis revealed a significant difference in attrition between the Treatment + SC and Treatment group with more members of the Treatment + SC group dropping out X^2 (N = 40) = 3.74, $p < 0.05$.

Combined Groups Outcome Measures

When examining both groups together, repeated measures ANOVA revealed that participants made significant progress along the Processes of Change $F(1, 24) = 4.15$, $p < 0.03$ and both the Self-Efficacy measure $F(1, 24) = 11.47$, $p < 0.01$ and the Self-Efficacy/Temptation measure $F(1, 24) = 10.93$, $p < 0.00$ from pre- to post-intervention. Although there was a trend

indicating that participants progressed along the Stages of Change, the results were not statistically significant $F(1, 23) = 2.72$, $p = 0.06$. Also, there was not a significant difference between pre- and post-intervention on Decisional Balance $F(1, 22) = 0.26$, $p = 0.31$. A paired samples t-test revealed that participants significantly increased their number of 24-hour quit attempts $t = -2.7$, $p < 0.01$. Reductions in nicotine exposure were measured two ways. First, to assess relative success, nicotine exposure was expressed as a percentage of baseline nicotine exposure. For example, a smoker who reduced from 20 cigarettes a day with a nicotine content of 1.1mg to 20 cigarettes a day with a nicotine content of 0.4mg would be considered to be smoking at 36% (20 x 1.1 = 22; 20 x 0.4 = 8; 8/22 = 36%). A smoker who reduced from 16 cigarettes a day with a nicotine content of 0.8mg to 8 cigarettes a day with a nicotine content of 0.8mg would be considered to be smoking at 50% (16 x 0.8 = 12.8; 8 x 0.8 = 6.4; 6.4/12.8 = 50%). The mean percentage reduction in nicotine of both groups combined was 89%. Second, to assess risk reduction, overall reduction in nicotine exposure in milligrams of nicotine from baseline to post-treatment was assessed. For example, a participant who reduced nicotine exposure from an average of 22mg of nicotine a day to 4mg of nicotine a day would have reduced his/her nicotine exposure by 18mg. Repeated measures ANOVA revealed that participants significantly decreased nicotine exposure $F(1, 24) = 49.45$, $p = 0.00$.

Between Group Analyses

Abstinence

Binary logistic regression revealed no significant difference in the number of individuals in the Treatment + SC group who were abstinent at the end of treatment compared to the Treatment group $B = 0.255$, $p = 0.38$.

Nicotine Exposure

Linear regression revealed no significant difference in percentage decrease in nicotine levels between Treatment + SC and Treatment groups $B = 3.62$, $p = 0.36$**.** Repeated measures ANOVA revealed no significant differences in reductions in nicotine exposure between individuals in the Treatment + SC group and the Treatment group $F(1, 24) = 0.38$, $p = 0.28$.

Stages of Change

Repeated measures ANOVA revealed no significant difference in progress along the Stages of Change $F(1, 23) = 0.81$, $p = 0.19$, Processes of Change $F(1, 24) = 0.78$, $p = 0.20$, Decisional Balance $F(1, 22) = 0.41$, $p = 0.27$, and both the Self-Efficacy measure $F(1, 24) = 0.157$, $p = 0.35$ and the Self-Efficacy/Temptation measure $F(1, 24) = 1.33$, $p = 0.13$ from pre- to post-intervention between individuals in the Treatment + SC group and individuals in the Treatment group (see Table 2). An examination of effect sizes indicated a moderate to large effect size (Cohen's $d = -0.67$) for Self-efficacy/Temptation favoring the Treatment + SC group (see Table 2). However, an examination of effect sizes also revealed a moderate effect size (Cohen's $d = 0.38$) for Decisional Balance favoring the Treatment group (see Table 2).

24-hr Quit Attempts

Binary logistic regression revealed no significant difference between groups in number of individuals who made a 24-hour quit attempt by the end of treatment $B = 1.36$, $p = 0.09$. However, an examination of effect sizes indicated a moderate to large effect size (Cohen's $d = 0.67$) for 24-hr quit attempts favoring the Treatment + SC group (see Table 2).

Between Treatment+ SC (PST) and Treatment (SC matched) analyses

Abstinence

Binary logistic regression revealed no significant difference in the number of individuals in the Treatment + SC (PST) group who were abstinent at the end of treatment compared to the Treatment (SC matched) group $B = 0.783$, $p = 0.25$. An examination of effect sizes indicated a moderate effect size (Cohen's $d = 0.45$) for abstinence favoring the Treatment + SC (PST) group (see Table 3).

Nicotine Exposure

Linear regression revealed no significant difference in percentage decrease in nicotine levels between Treatment + SC (PST) and Treatment (SC matched) groups $B = 5.91$, $p = 0.36$. Repeated measures ANOVA revealed no significant differences in reductions in nicotine exposure between the Treatment + SC (PST) and Treatment (SC matched) groups $F(1, 13) = 1.91$, $p = 0.10$.

Stages of Change

Repeated measures ANOVA revealed no significant difference in progress along the Stages of Change $F(1, 13) = 0.57$, $p = 0.23$, Processes of Change $F(1, 13) = 0.30$, $p = 0.30$, Decisional Balance $F(1, 13) = 0.64$, $p = 0.22$, and both Self-Efficacy $F(1, 13) = 0.13$, $p = 0.37$ and Self-Efficacy/Temptation $F(1, 13) = 1.07$, $p = 0.16$ measures from pre- to post-intervention between individuals in the Treatment + SC (PST) and Treatment (SC matched) group. An examination of effect sizes indicated a large effect size (Cohen's $d = -.88$) for Self-efficacy/Temptation favoring the Treatment + SC (PST) group. However, an examination of effect sizes also revealed a large effect size (Cohen's $d = -1.03$) for Decisional Balance favoring the Treatment (SC matched) group (see Table 3).

24-hr Quit Attempts

Binary logistic regression revealed no significant difference between groups in number of individuals who made a 24-hour quit attempt by the end of treatment $B = 1.38$, $p = 0.12$. An examination of effect sizes indicated a large effect size (Cohen's $d = 0.82$) for 24-hour quit attempts favoring the Treatment + SC (PST) group (see Table 3).

End-of-Treatment PST Questionnaire

Treatment + SC group participants' feelings toward PST were assessed at the end of treatment. In general, participants reported that they felt supported by ($M = 4$; $SD = 1.2$) and appreciated ($M = 4.3$; $SD = 1.0$) the opportunity for individual PST. They denied that the potential eligibility for individual PST resulted in them feeling anxious ($M = 1.4$; $SD = 1.2$) or resentful ($M = 1.0$; $SD = 0.0$). On average, participants reported that they worked "somewhat" hard to avoid individual PST ($M = 2.3$; $SD = 1.4$). There were no significant differences between individuals who did or did not receive additional PST in their feelings toward individual PST. Participants who received PST reported that they found the individual sessions were "extremely" effective in helping them achieve their non-smoking goals ($M = 4.5$; $SD = 0.6$). Participants endorsed "increased support" and "developing potential solutions to the problem" as the most helpful aspects of individual PST. The item "if I worked on what we discussed more outside of session" was most endorsed as an aspect that would have made PST more helpful.

Table 1: Demographic Characteristics

Demographics	Treatment + SC			Treatment			Total		
	N	%		N	%		N	%	
Gender (male)	13	59.1		8	44.4		21	52.5	
Race (Caucasian)	21	95.5		17	94.4		38	95.0	
Income < $30,000	11	52.4[1]		8	50.0[1]		19	51.4[1]	
Married	11	50.0		8	44.4		19	47.5	
Employed full-time	14	63.6		9	50.0		23	57.5	
Lives with a smoker	8	36.4[2]		7	38.9		15	37.5	
	M	SD	R	M	SD	R	M	SD	R
Age	38.8	13.0	19-45	41.9	15.4	18-68	40.2	14.0	18-68
Nicotine (mg)	16.6	7.7	5.5-24.5	18.4	9.5	4.5-36	17.4	8.5	4.5-36
# of past quit attempts	3.5	2.0	0-7.5	2.8	1.5	1-5	3.2	1.8	0-7.5
Longest attempt (months)	14.1	27.7	1-120	21.4	55.9	0-216	17.5	42.6	0-216
Fagerstrom score	6.5	2.1	2-7	6.3	1.5	4-9	6.4	1.8	2-9
Depression score (BDI)	5.5	4.2	0-13	9.3	5.6	0-17	7.3	5.2	0-17

[1] = Missing 3 Participants
[2] = Missing 2 Participants

Table 2: Treatment + SC Group Versus Treatment Group

	Treatment + SC Group (N = 12)			Treatment Group (N = 15)			Effect Size Cohen's d	
	Pre M (SD)	Post M (SD)	Difference M (SD)	Pre M (SD)	Post M (SD)	Difference M (SD)	WG	BG
Nicotine (mg)	18.1 (7.0)	2.1 (4.0)	16.0 (7.8)	18.4 (9.5)	2.4 (5.4)	16.1 (8.1)	2.36	-0.06
Stage of Change	2.3 (0.5)	3.8 (1.5)	1.6 (1.5)	2.4 (0.5)[1]	3.7 (0.8)	1.2 (1.5)	-1.32	0.08
Processes of Change	51.8 (10.4)	60.7 (12.0)	8.9 (13.5)	60.7 (15.7)	64.9 (12.7)	4.2 (7.6)	-0.48	-0.35
Decisional Balance	-8.1 (8.7)	-5.4 (10.7)	-2.7 (9.7)	-10.2 (12.0)	-10.0 (13.2)[2]	-0.6 (5.2)	0.13	0.38
Self Efficacy/Temptation	3.8 (0.6)	2.8 (0.8)	1.1 (0.7)	4.0 (0.6)	3.3 (0.8)	0.6 (0.8)	1.14	-0.67
Self-Efficacy	31.2 (5.2)	43.3 (12.5)	12.1 (13.3)	33.7 (7.5)	41.3 (9.8)	7.6 (10.9)	-1.06	0.17
% Nicotine Reduction		90.4 (18.1)			87.2 (28.7)			0.14
		N (%)			N (%)			
Abstinent		7 (58%)			8 (53%)			0.10
24-hr quit attempt		10 (83%)			7 (54%[1])			0.67

[1] = Missing 1 Participant

[2] =Missing 2 Participants

WG = Within group (pre- to post-interventions comparisons); BG = Between group (post-intervention comparisons).

Table 3: Treatment + SC (PST) Group Versus Treatment (SC matched) Group

Treatment + SC (PST) Group (N = 7)			Treatment (SC matched) Group (N = 9)			Effect Size Cohen's d	
Pre	Post	Difference	Pre	Post	Difference		
M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	WG	BG
16.9 (7.9)	3.1 (4.9)	13.8 (8.9)	21.9 (10.5)	4.0(6.6)	17.9 (9.4)	2.06	-0.15
2.3 (0.5)	3.3 (1.7)	1.0 (1.4)	2.4 (0.5)	2.9 (1.3)	0.4 (1.3)	-0.64	0.27
52.6 (11.0)	59.1 (14.0)	6.6 (16.8)	60.4 (17.3)	61.8 (12.5)	1.3 (8.5)	-0.26	-0.20
-5.0 (8.9)	-1.3 (9.1)	-3.7 (10.8)	-11.2 (11.1)	-11.1 (10.0)	-0.1 (5.7)	0.16	1.03
3.9 (0.6)	3.0 (0.6)	0.8 (0.6)	4.1 (0.6)	3.6 (0.8)	0.5 (0.7)	0.93	-0.88
30.9 (4.6)	39.3 (12.8)	8.4 (13.5)	35.0 (8.5)	39.1 (9.7)	4.1 (9.8)	-0.65	0.02
80.0 (36.5)			84.0 (21.3)		-0.14		
	N (%)			N (%)			
	3 (43%)			2 (22%)			0.45
	5 (71%)			3 (33%)			0.82

WG = Within group (pre- to post-interventions comparisons); BG = Between group (post-intervention comparisons).

Discussion

The goal of this study was to examine the effectiveness of a stepped-care smoking cessation intervention. First, it was hypothesized that individuals in both groups combined would make significant improvements on the Stages of Change, Processes of Change, Decisional Balance, Self-Efficacy/Temptations, and Self-Efficacy measures, number of 24-hour quit attempts, and significantly decrease nicotine exposure. Next, it was hypothesized that more individuals in the Treatment + SC group would become abstinent at the end of treatment than in the Treatment group. In addition, it was expected that reductions in nicotine exposure including being more likely to report a 24-hour quit attempt would be greater in individuals in the Treatment + SC and that they would make greater progress along the Stages of Change, Processes of Change, Decisional Balance, Self-Efficacy/Temptations, and Self-Efficacy measures from pre- to post-intervention compared to the Treatment group. Finally, the same group differences are anticipated between the participants in the treatment group who received PST (Treatment + SC [PST]) versus Treatment group participants matched on stepped-care eligibility (Treatment [SC matched]; i.e., failed to meet nicotine reduction goals, but did not receive PST because of treatment group status). The following section discusses the results of this study, as well as implications, limitations, and future research.

Stepped-Care

Stepped-care is a cost-effective approach aimed at giving individuals the minimal level of treatment needed to succeed. Although stepped-care approaches have been studied with many health care problems, few studies have examined a stepped-care approach to smoking cessation. The current study utilized PST as the stepped-care

component. Although PST has been shown to be an effective adjunct treatment in a variety of health related behaviors (e.g., weight loss, alcoholism, HIV risk behavior; Carels, et al., 2005; Black & Threlfall, 1986; Perri, Nezu, & Viegener, 1992; Magura, Kang, & Shapiro, 1994; Chaney, O'Leary, & Marlatt, 1978), very little research has examined the effectiveness of PST in smoking cessation interventions (Karol & Richards, 1978). One study utilizing PST in the maintenance phase following behavioral treatment found that at 8-month follow-up the group that received the PST maintenance treatment showed very little relapse compared to the behavioral treatment alone and the control groups (Karol & Richards, 1978). In addition, a meta-analysis examining the effectiveness of interventions using various types of content (Fiore, et al., 1996; 2000) revealed that general problem-solving was found to be 1.5 times more effective than control conditions (95% CI = 1.3-1.8). Despite these promising results, in this investigation the addition of PST generally failed to improve treatment outcomes.

There are several plausible explanations for the failure to improve treatment outcomes. First, participants eligible to receive PST received only 2.3 sessions on average. Although participants in the Treatment + SC group had originally agreed to participate in twice weekly individual sessions until their performance improved, very few participants were able or willing to meet that frequently. It is possible that 2-3 PST sessions is not a sufficient therapeutic dose to meaningfully improve problem-solving ability and thereby improve smoking cessation and harm reduction outcomes. In fact, an examination of pre- to post-intervention problem-solving skills scores revealed that individuals who received PST did not significantly improve in their self-reported problem-solving skills (i.e., SPSI-R). Similarly, the average problem-solving score for

the whole group (pre M =100.3; post M = 99.0), including the subset of participants who received PST (pre M =107.4; post M = 106.3) was in the normal range (86-114). Given that the participants' problem-solving skills appear adequate, it is possible that it was not problem-solving difficulties that prevented them from succeeding in treatment.

It is also possible that PST is not the most effective adjunct therapy for smokers who are experiencing difficulties quitting in response to a conventional treatment. For example, numerous studies have employed motivational interviewing (MI) to counsel individuals with substance abuse problems (Ingersol, Ceperich, Nettleman, Karanda, Brocksen, & Johnson, 2005; Schneider, Casey, & Kohn, 2000). MI is a client-centered, non-confrontational therapeutic approach designed to reduce feelings of ambivalence and increase motivation towards change (Miller & Rollnick, 2002). MI has also been explored in smoking cessation studies with promising results (Colby, Monti, Tevyaw, Barnett, Spirito, Rohsenow, Riggs, & Lewander, 2005; Rohsenow, Monti, Colby, & Martin, 2002).

Finally, attrition may have contributed to the failure to improve treatment outcomes. Thirteen participants dropped out of treatment and, as mentioned above, some participants' appeared unwilling or unable to take part in twice weekly sessions. While the experimenter was very careful to not overemphasize the stepped-care component of treatment during recruitment for fear of potential demoralization and self-handicapping on the part of the Treatment group (i.e., fear that they were receiving an inferior treatment), it is possible that the Treatment + SC group was insufficiently clear about the additional time commitment should they experience difficulties with cessation.

Abstinence

While there was no significant difference in the number of individuals who were abstinent at the end of treatment between the Treatment + SC and Treatment groups or between the Treatment + SC (PST) and the Treatment (SC matched) groups, 56% (N = 14) of all participants were abstinent by the end-of-treatment. An examination of effect size revealed a moderate effect size (Cohen's d = 0.45) when comparing Treatment + SC (PST) group (43% abstinent) and the Treatment (SC matched) group (22% abstinent) in favor of the Treatment + SC (PST) group. The abstinence rates in this investigation are consistent with end-of-treatment abstinence rates for cognitive-behavioral programs not utilizing pharmacotherapy (abstinence 33-72%; Brown et al., 2001; Cinciripini, Lapitsky, Sael, Wallfisch, Kitchens, & Van Vunakus, 1995; Mermelstein, Cohen, Lichtenstein, Baer, & Kamarck, 1986). Six to twelve month follow-up treatment outcomes range from under 10% for minimal self-change programs to 14-20% for brief interventions to over 25-35% for more intensive formal treatments with pharmacotherapy, repeated contacts, social support, and/or cognitive behavioral coping skills training (Abrams, et al., 2003). In this investigation, follow-up analyses are being conducted at 3, 6, 9, and 12 months post-intervention.

Nicotine Exposure

There is a number of health benefits associated with a reduction in the number of cigarettes one smokes. For example, Bolliger (2000) found cardiovascular benefits, such as an increase in high density lipoprotein and a decrease in low density lipoprotein, associated with a 50% or more reduction in smoking. In addition, there is a positive relationship between level of exposure to tobacco related toxins and morbidity and

mortality (Burns, 1997 as cited in Niaura & Abrams, 2002). Also, it has been suggested that once an individual has reduced his/her level of smoking, motivation to quit may be increased and the time taken to attempt cessation shortened (Bolliger, 2000). Participants revealed a significant reduction in nicotine from 18.3 mg to 2.3 mg per day. Only one participant failed to reduce nicotine exposure during treatment. However, there was not a significant difference in percentage decrease in nicotine levels or reductions in nicotine exposure between individuals in the Treatment + SC and Treatment groups or between individuals in the Treatment + SC (PST) and the Treatment (SC matched) groups.

Stages of Change

Abstinence rates are not the only way to identify participants who are making progress toward smoking cessation. Abrams (1993) and Prochaska and DiClemente (1983) suggest that measuring progress along the Stages of Change may be a useful way to gage a smoker's future success at quitting. Research has shown that movement along the Stages of Change significantly increases the likelihood of quitting in the future by up to 80% (Abrams, Herzog, Emmons, & Linnan, 2000). As expected, participants in the current study made progress along the Stages of Change, although not statistically significant ($p = 0.06$). On average, participants progressed approximately one stage from pre- to post-intervention. Thirty-five percent ($N = 9$) of participants moved from the contemplation stage (stage 2) to the action stage (stage 4) and 19% ($N = 5$) of participants moved from the preparation stage (stage 3) to the action stage (stage 4). While the Treatment + SC group progressed further than the Treatment group, there was not a significant difference in progress along the Stages of Change from pre- to post-intervention between the Treatment + SC and Treatment groups (Treatment + SC M =

1.0; Treatment M = 0.7; Cohen's *d* = 0.27) and between the Treatment + SC (PST) and the Treatment (SC matched) groups (Treatment + SC [PST] M = 0.57; Treatment [SC matched] M = 0.22; Cohen's *d* = 0.36). Again, these findings suggest that PST had a modest impact on progression along the Stages of Change. It is possible that a significant difference between groups may have emerged if the individuals who received PST participated in a greater number of sessions. Also, given the small size of the sample, significant results may have emerged with a larger sample.

The Processes of Change is another measure of progress along the stages of change. In general, individuals tend to use more processes of change as they progress along the stage of change (Fava, Velicer, & Prochaska, 1995). For example, Fava, Velicer, and Prochaska (1995) found that individuals in the preparation stage endorsed significantly more processes of change, such as consciousness raising, self-reevaluation, and counterconditioning, than individuals in the contemplation stage. Similarly, individuals in the contemplation stage endorsed more processes of change than individuals in the precontemplation stage. As expected, participants in the current study endorsed significantly more processes of change at post-intervention compared to pre-intervention. However, there was no significant difference in Processes of Change from pre- to post-intervention between the Treatment + SC and Treatment groups and between the Treatment + SC (PST) and the Treatment (SC matched).

A third measure of stages of change is Decisional Balance. Individuals in the early stages of change tend to endorse a more positive balance, while individuals in the later stages of change endorse a more negative balance. Research has shown that as individuals enter the contemplation stage, their balance tends to switch from positive to

negative as the cons begin to outweigh the pros of smoking (Fava et al., 1995). In this investigation, there were no significant changes in Decisional Balance when examining all participants together pre- to post-intervention, or when comparing the Treatment + SC and Treatment groups or the Treatment + SC (PST) and the Treatment (SC matched) groups. However, an examination of effect sizes indicate a small to moderate effect size (Cohen's d = 0.38) when comparing the Treatment + SC and Treatment groups and a large effect size (Cohen's d = 1.03) when comparing Treatment + SC (PST) and the Treatment + (SC matched) groups in favor of the Treatment + SC and Treatment + SC (PST) groups. An examination of means revealed that the Treatment group made very little change from pre- to post-treatment (Treatment group pre M = -10.2 [12.0], post M = -10.0 [13.2]; Treatment [SC matched] pre M = -11.2 [11.1], post M = -11.1 [10.0]); however the change in Treatment + SC group scores indicated participants' decisional balance became more positive (Treatment + SC group pre M = -8.1 [8.7], post M = -5.4 [10.7]; Treatment + SC [PST] pre M = -5.0 [8.9], post M = -1.3 [9.1]). It is unclear why the Treatment + SC group participants' decisional balance became more positive, indicating an increase in endorsement of pros and a decrease in endorsement of cons. Because of the stepped-care component, it is possible that the Treatment + SC group and the individuals receiving PST may have felt more supported throughout treatment and therefore felt less negatively about themselves and their smoking. For example, a majority of the con items have a social component to them (e.g., "People think I'm foolish for ignoring the warning signs about cigarette smoking," "I'm embarrassed to have to smoke," and "Because I continue to smoke, some people I know think I lack the character to quit"). The participants in the Treatment + SC group may have felt more

supported by knowing that someone was ready and willing to spend one-on-one time with them to help them if needed. The post-treatment PST evaluation revealed that Treatment + SC participants endorsed a 4 on a 1-5 point scale (1= not at all, 5 = extremely; *SD* = 1.2) in regards to how supported they felt by the opportunity for individual PST. The opportunity for additional counseling may have helped Treatment + SC participants to feel accepted and cared for and may explain the endorsement of less cons of smoking.

The fourth and final measure of stages of change examined in this study is self-efficacy. Self-efficacy was measured by the Self-Efficacy Questionnaire and the Self-Efficacy/Temptations Scale. Research has shown higher levels of temptation tend to occur in the early stages of change and lower levels of temptation occur in the later stages of change. Participants significantly improved on both self-efficacy measures from pre to post-intervention. There was not a significant difference between the Treatment + SC and the Treatment groups and between the Treatment + SC (PST) and the Treatment (SC matched) groups on either self-efficacy measure from pre- to post-intervention. However, an examination of effect sizes indicated a moderate to large effect size for the Self-efficacy/Temptation Scale (Cohen's d = -0.67 for Treatment + SC vs. Treatment and d = -0.88 for Treatment + SC [PST] vs. Treatment [Sc matched]) favoring the Treatment + SC groups. However, the effect size for both comparison groups on the Self-Efficacy Questionnaire was small (Cohen's $d \leq 0.2$). While the two questionnaires inquire about many of the same triggers (e.g., feeling anxious, being with other smokers, having coffee, etc.), the main difference between the scales is how the questions are framed ("whether you are sure you could refrain" versus "how tempted you would be to smoke"). In terms

of increasing self-efficacy, it is possible that feeling less tempted may precede feeling confident. Perhaps, the PST component while effective at reducing temptation was not as effective at increasing confidence. In general, higher self-efficacy levels (whether measured by temptation or confidence to abstain from smoking) have been found to predict follow-up abstinence and decrease in relapse, therefore the increase in scores found in this study may be seen as an indicator of future success (Baer & Lichtenstein, 1988; Borelli & Mermelstein, 1994).

24-hr Quit Attempts

The ability to achieve a 24-hour quit attempt increases the likelihood of successfully quitting. Westman, Behm, Simel, and Rose (1997) found that remaining abstinent on quit day improved the odds of 6-month abstinence 10-fold. Also, having a 24-hour quit attempt is the single factor that separates some individuals in the preparation stage from those in the contemplation stage. In this study, there were no significant differences from pre- to post-intervention in number of individuals who made a 24-hour quit attempt by the end of treatment when comparing the Treatment + SC and Treatment groups and the Treatment + SC (PST) and the Treatment (SC matched) groups. However, an examination of effect sizes indicated a moderate to large effect size (Cohen's $d = 0.67$ for Treatment + SC vs. Treatment and $d = 0.82$ for Treatment + SC [PST] group vs. Treatment [SC matched]) for 24-hr quit attempts favoring the treatment group. Again this indicates that receiving additional treatment had a positive effect on participants' ability to remain abstinent from smoking for 24-hours.

In sum, participants in this smoking cessation intervention were able to achieve abstinence rates (56%) comparable to larger scale clinical trials (33-72%; Brown et al.,

2001; Cinciripini, Lapitsky, Sael, Wallfisch, Kitchens, & Van Vunakus, 1995; Mermelstein, Cohen, Lichtenstein, Baer, & Kamarck, 1986). They reported progress along the following stages of change measures: Stages of Change, Processes of Change, and both self-efficacy measures. Although not significantly different, effect sizes indicate that the stepped-care approach had a modest impact on the following measures: Self-Efficacy/Temptation, Decisional Balance, Stages of Change, achieving a 24-hr quit attempt, and percentage reduction in nicotine. Finally, examination of effect size also revealed that PST had a modest effect on achieving abstinence by the end of treatment. Had the sample size of this study been larger and the effect sizes remained moderate/large many treatment outcome differences may have been statistically significant, despite the small number of PST sessions eligible stepped-care participants received. The modest effect sizes in the Treatment + SC vs. Treatment comparison are interesting given that many of the treatment participants did not actually receive PST and those who did only received 2.3 sessions. It is possible that the potential for PST influenced individuals in the treatment group in a manner that favored change. For example, because not meeting their nicotine reduction goals had tangible consequences (individual PST sessions), Treatment + SC group participants may have felt greater accountability and increased their focus and effort on the program. Another potential explanation is that having access to one-on-one sessions may have resulted in participants feeling more supported. In the post-treatment evaluation, Treatment + SC group participants reported that they appreciated and felt supported by the opportunity for PST. Therefore, knowing that additional help was available if they experienced difficulties on their own may have enhanced self-efficacy for program success in

Treatment + SC group participants. It is also possible that the potential for one-on-one sessions may have been perceived as punitive and therefore being in the Treatment + SC group may have served as an aversive stimulus negatively reinforcing success. In the post-treatment evaluation, all Treatment + SC group participants denied that the potential for PST resulted in them feeling anxious or resentful. However, they may still have considered it punitive for other reasons (such as perceiving it as an inconvenience or a sign of failure).

Implications

This study suggests that the cognitive-behavioral smoking cessation intervention outlined in the Abrams et al. (2003) Tobacco Dependence Treatment Handbook is effective at helping participants quit smoking and helping participants who don't quit to significantly reduce their nicotine exposure and to progress along the stages of change. In addition, effect sizes indicate that a stepped-care approach utilizing PST generally had a modest positive effect on progress along the stages of change measures and reductions in nicotine levels. Follow-up data are necessary to determine if reductions in nicotine exposure, as well as progression along the stages of change are related to successful future smoking cessation. In addition to looking at abstinence rates over time, follow-up analyses will also examine harm reduction data to determine if those individuals who were not able to quit, but who reduced their nicotine levels, are able to maintain nicotine reduction over time, and/or whether quitters who resumed smoking post-intervention are able to smoke at a level significantly lower than at pre-intervention.

Limitations

One significant limitation of this study was that participants in the Treatment + SC group who were eligible for stepped-care were not willing and/or available to meet for individual PST sessions twice a week. Four of the seven participants eligible for PST were not able to attend sessions as often as indicated by the study design. Two participants missed 1-2 sessions due to vacation. Also, several participants did not monitor their smoking well enough to determine whether they were eligible for PST. In these situations, participants opted to forgo PST. Therefore, the dose effectiveness of the intervention was greatly reduced because of modest participation in PST sessions. Participants who received PST did not have significantly improved self-reported problem-solving skills from pre to post treatment. In fact, their problem-solving skills decreased slightly (pre M = 107.4; post M = 106.3). It could be argued that the PST treatment was not effective at improving problem-solving skills. Only 3 of the 7 participants who received PST were able to quit by the end of treatment and as mentioned earlier, 2.3 sessions of PST may be insufficient to improve problem-solving skills. More PST sessions may have increased the effect size of group differences as well as resulted in an increase in overall problem-solving abilities. It, of course, is also plausible that the measure used to assess problem-solving skills is not sensitive enough to detect subtle improvements in problem-solving skills that can be expected with a small number of PST sessions.

Another significant limitation is the small sample size. Although Northwest Ohio has one of the highest smoking rates in the country, it was difficult to recruit people for the intervention. Although 40 participants were engaged in the program, only 27 actually

completed. With this sample size, the study was only powered to detect a 1.0 effect size (alpha = .05; power = .80). The difficulties with recruitment and attrition are consistent with research showing that while approximately 70% of smokers want to quit, many are not ready to take the first steps necessary to do so (Centers for Disease Control and Prevention, 1997). In addition, once recruited, some participants dropped-out prior to the first session. It is plausible that these smokers wanted to quit, but realized prior to the first session that they simply were not ready to make the changes necessary to do so. A review of smoking cessation treatment research shows attrition in these interventions to range from 10% to 50% (Curry, Thompson, Sexton, & Omenn, 1989; Zelman, Brandon, Jorenby, & Baker, 1992; Curry et al., 1988; Klesges et al., 1988). The attrition level of this study was similar to other studies at 33%. Also, due to limited resources the participants in this study were not randomly assigned to groups. When only one group was starting individuals who wanted to participate at that time were placed in that group. When two groups were starting participants were placed in the group that was convenient for their schedule. Participants with flexible schedules were assigned to groups based on group size (effort was made to make groups equal in size). Even without random assignment, the only baseline group difference that emerged was depression, and it was used as a covariate in the analyses. Along the same lines, limited resources required that the group facilitators also provide the individual PST. Therefore, experimenter bias cannot be ruled out.

Finally, it is also possible that the effect sizes observed in favor of the treatment group may not be due directly to PST, but to other nonspecific therapeutic factors such as increased level of support, accountability, or time with therapist. The Clinical Practice

Guidelines (Fiore et al., 2000) indicate that additional formats of treatment are helpful, therefore adding individual sessions to group sessions may be helpful regardless of the material covered in the individual sessions.

Future Research

Given the difficulty in administering the twice weekly face-to-face stepped-care intervention, it may be worthwhile to examine alterative methods for delivering the stepped-care component, such as via telephone counseling. The Clinical Practice Guideline for Treating Tobacco Use and Dependence (Fiore et al., 1996; 2000) presented a meta-analysis of psychosocial treatment types in 58 smoking cessation studies and revealed that telephone counseling was effective. PST materials can be given to participants via mail, email, or during the group sessions. While it is still possible for the participants to be too busy for telephone sessions, the reduction in driving time and the added level of convenience might increase compliance with the stepped-care component.

While PST has been shown to be effective at increasing smoking cessation rates in other research, it is possible that other therapeutic approaches such as motivational interviewing as the stepped-care component may yield greater levels of cessation. MI has been shown to be effective in treating substance abuse disorder and has also shown promising results in treatment for smoking cessation (Ingersol, Ceperich, Nettleman, Karanda, Brocksen, & Johnson, 2005; Schneider, Casey, & Kohn, 2000; Colby, Monti, Tevyaw, Barnett, Spirito, Rohsenow, Riggs, & Lewander, 2005; Rohsenow, Monti, Colby, & Martin, 2002). Finally, the addition of treatment matching to stepped-care may also increase treatment outcomes. For example, individuals eligible for stepped-care may

be stepped-up to individual PST or MI based on perceived deficits identified through a thorough pretreatment assessment of risk factors.

Summary

The use of tobacco contributes to an astounding 450,000 deaths annually in the United States (CDC, 1994b). While many interventions have been developed for smoking cessation, stepped-care approaches have not been fully explored. Although poorly powered, the present study suggests that a stepped-care approach to smoking cessation may be effective in not only helping participants quit smoking but also in helping participants who are not able to quit to progress along the stages of change as well as decrease their smoking-related health risks by reducing their nicotine exposure. It is not clear from this study whether PST specifically was helpful or if some other additional therapeutic contact, such as MI, may be equally or more helpful. Given the current plateau in smoking rates, the health care costs associated with smoking, and the possible increasing recalcitrance of today's smokers, developing effective interventions that are both cost-effective and minimally burdensome to participants has become crucial. Stepped-care approaches are designed to provide individuals the minimum amount of treatment necessary for success. Stepped-care is an intuitive and promising approach that deserves further exploration in the field of smoking cessation.

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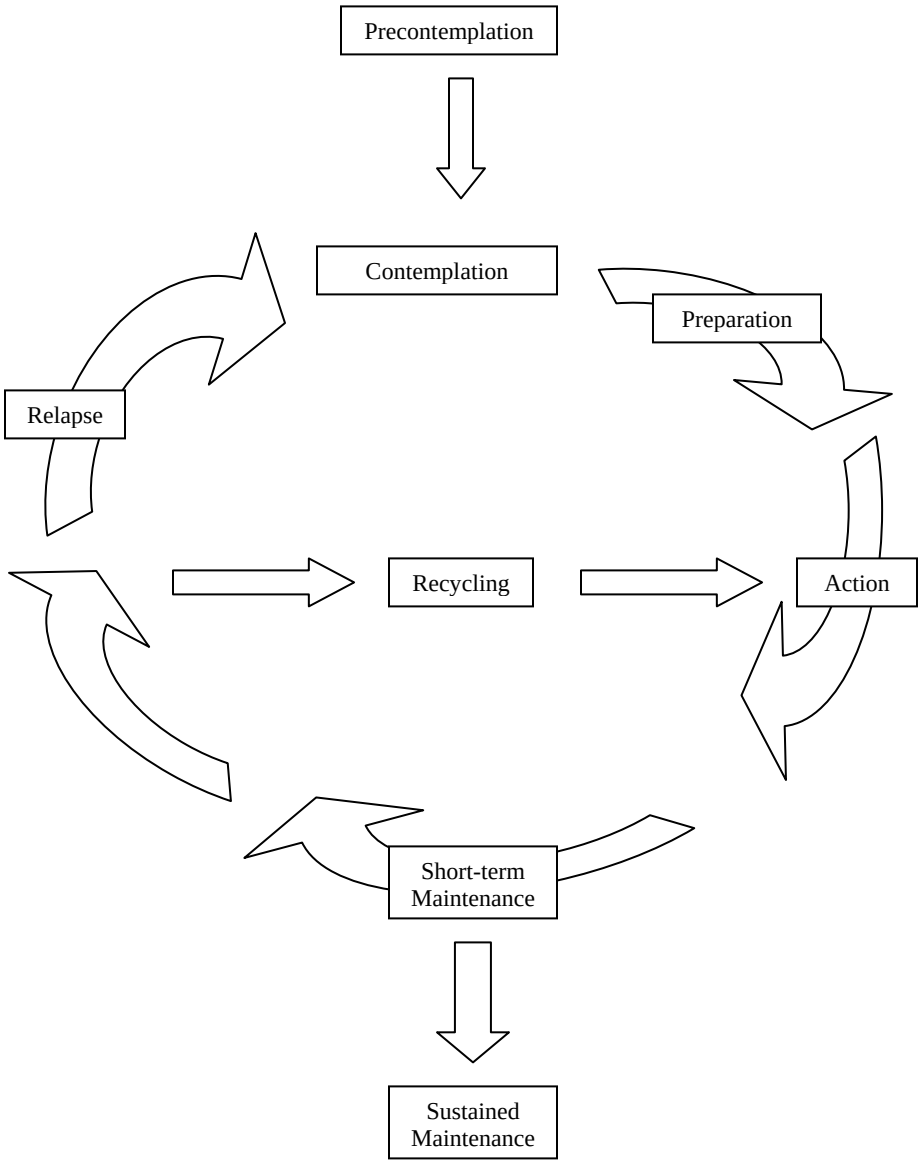
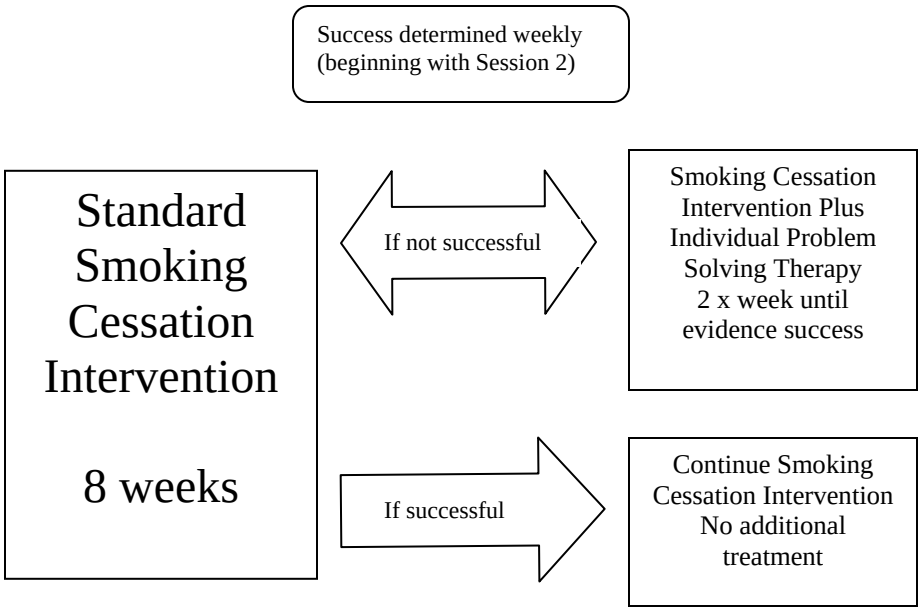
Appendix A: Transtheoretical Stages of Change Model

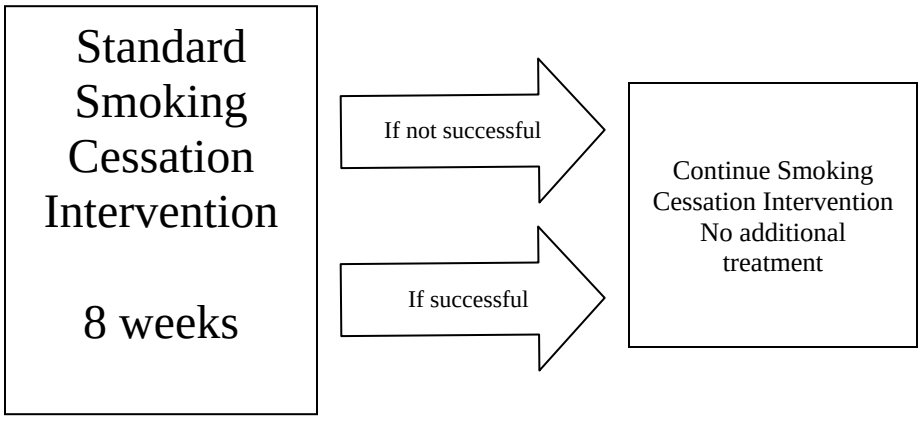


Appendix B: Stepped-Care Model

TREATMENT + SC GROUP



TREATMENT GROUP



Appendix C: Screening Questionnaire

1. How old are you ? _____ (must be at least 18)
2. How many cigarettes do you smoke daily, on average? ____(must be at least 10)
3. Are you currently using a form of nicotine replacement, such as the patch? ____ (must be “no”)
4. Have you been diagnosed with a serious mental illness, such as schizophrenia, bipolar disorder? _____ (must be “no”)
5. Do you drink alcohol or use drugs? _____ (if no, skip next 4 questions)
    a. Has your use repeatedly resulted in a failure to fulfill major obligations at work, home, or school? _____ (must be “no”)
    b. Do you repeatedly use this substance in situations in which it is physically dangerous (such as driving while under the influence)?___ (must be “no”)
    c. Have you repeatedly had substance-related legal problems? _____ (must be “no”)
    d. Have you continued substance use despite having persistent or repeated social or interpersonal problems caused by, or made worse by the effects of the substance? _____ (must be “no”)
6. Are you willing to accept random assignment? _____ (must be “yes”)

Appendix D: Examples of Stepped-Care Protocol

Participant A: Treatment Group

January 1 – Session 1

January 8 – Session 2
January 10 – Follow-up contact--- Successfully reducing

January 15 – Session 3--- Successfully reducing
January 17 – Follow-up contact--- Has not accomplished nicotine fading goal
January 18 – PST session 1
January 21 – PST session 2

January 22 – Session 4--- Still experiencing some difficulty with nicotine fading
January 24 – Follow-up contact --- Successfully reducing

January 29 – Session 5--- Successfully quit
January 31 – Follow-up contact--- Successfully quit

February 1 – Session 6--- Successfully quit
February 3 – Follow-up contact--- Successfully quit

February 5 – Session 7--- Successfully quit
February 7 – Follow-up contact--- Successfully quit

February 12 – Session 8--- Successfully quit

Participant B: Treatment Group

January 1 – Session 1

January 8 – Session 2
January 10 – Follow-up contact--- Successfully reducing

January 15 – Session 3
January 17 – Follow-up contact --- Successfully reducing

January 22 – Session 4 --- Successfully reducing
January 24 – Follow-up contact --- Successfully reducing

January 29 – Session 5--- Successfully quit
January 31 – Follow-up contact--- Resumed smoking
January 31 – PST session 1

February 1 – <u>Session 6</u>--- Smoking at reduced rate
February 3 – Follow-up contact--- Smoking at reduced rate
February 4 – PST session 2

February 5 – <u>Session 7</u>--- Smoking at reduced rate
February 7 – Follow-up contact--- Smoking at reduced rate
February 7 – PST session 3
February 10 – PST session 4

February 12 – <u>Session 8</u>--- Successfully quit
February 14 – PST session 5
February 17 – PST session 6
February 21 – PST session 7
February 24 – PST session 8

Appendix E: Objectives of the Smoking Cessation Intervention

Objectives of Session 1:

- Introduce participants and group leaders, discuss the structural details of the program and generate ground rules
- Conduct a warm-up exercise to help smokers get acquainted with other group members in a way that sets the tone for a supportive and positive group experience
- Present a positive focus and framework for quitting smoking, emphasizing the advantages of learning specific coping skills and having the support of other group members
- Present the cognitive social learning theory rationale for smoking cessation
- Introduce self-monitoring and give out Wrap Sheets for the purpose of self-monitoring between the first and second session
- Introduce and define the concept of triggers for smoking
- Provide a rationale and explanation of the use of nicotine fading
- Preview the homework assignments to be completed prior to Session 2

Objectives of Session 2:

- Review the cognitive social learning theory rationale for smoking cessation
- Review self-monitoring of smoking behavior (Wrap Sheet) assignment
- Review Triggers for Smoking Worksheet
- Introduce the self-management approach to managing trigger situations and the use of three self-control strategies
- Introduce and demonstrate autogenic relaxation
- Review the rationale and explanation of nicotine fading and give individualized nicotine fading assignments
- Preview the homework assignments to be completed prior to Session 3

Objective of Session 3:

- Review the self-management approach and the use of three self-control strategies
- Review the homework assignment to practice managing triggers using self-management strategies
- Review the autogenic relaxation homework assignment
- Review self-monitoring of smoking behavior (Wrap Sheet) assignment
- Introduce the concept of making broader lifestyle changes that support quitting smoking
- Review nicotine fading assignment and give new assignments
- Preview the homework assignments to be completed prior to Session 4

Objectives of Session 4:

- Provide process comments to smokers pertinent to their current experience in the smoking cessation treatment
- Review the homework assignment to practice managing triggers for smoking using self-control strategies

- Review the homework assignment to set goals regarding making broader lifestyle changes that support quitting smoking
- Review the homework assignment to practice autogenic relaxation
- Review self-monitoring of smoking behavior (Wrap Sheet) assignment
- Introduce the relapse-prevention concepts of identifying and coping with high-risk situations and provide an opportunity for smokers to begin practice of these skills during the session
- Introduce the abstinence violation effect concept and how to cope with a possible slip
- Review nicotine fading assignment and give new assignments
- Assist smokers in preparing for the upcoming quit day
- Preview the homework assignments to be completed prior to Session 5

Objectives of Session 5:

- Discuss with smokers their quit day experiences (smokers were to quit smoking as of the morning of today's session)
- Review the homework assignment to identify and develop coping strategies for dealing with high-risk situations for relapse
- Review the concept of the abstinence violation effect and how to cope with a possible slip, should it occur (as well as applying it to any slips that may have already occurred)
- Review the smokers' progress regarding making broader lifestyle changes that support quitting smoking
- Introduce the concept of social support for nonsmoking and assist smokers in maximizing their social support for quitting smoking
- Review smokers' final experiences with nicotine fading prior to quitting
- Assist smokers in making specific plans for maintaining abstinence over the next several days (prior to the next session)
- Preview the homework assignments to be completed prior to Session 6

Objectives of Session 6

- Discuss with smokers their quitting experiences
- Review the concept of the abstinence violation effect and how to cope with a possible slip, should it occur (as well as applying it to any slips that may have already occurred)
- Introduce new strategies for coping with urges to smoke
- Review the homework assignment to identify and develop coping strategies for situations high in risk for relapse
- Review smokers' experience in attempting to maximize social support for quitting smoking
- Review the smokers' progress regarding making broader lifestyle changes that support quitting smoking
- Assist smokers in making specific plans for maintaining abstinence over the next several days (prior to the next session)
- Preview the homework assignments to be completed prior to Session 7

Objectives of Session 7:

- Discuss with smokers their quitting experiences
- Review the concept of the abstinence violation effect and how to cope with a possible slip, should it occur (as well as applying it to any slips that may have already occurred)
- Introduce new strategies for managing thoughts that can encourage relapse
- Review the use of strategies for coping with urges to smoke
- Review the homework assignment to identify and develop coping strategies for dealing with high-risk situations for relapse
- Review smokers' experience in attempting to maximize social support for quitting smoking
- Assist smokers in making specific plans for maintaining abstinence over the next week (prior to the next session)
- Preview the homework assignments to be completed prior to Session 8

Objectives of Session 8:

- Discuss with smokers their quitting experiences
- Review the concept of the abstinence violation effect and how to cope with a possible slip, should it occur (as well as applying it to any slips that may have already occurred)
- Review the use of strategies for managing thoughts that can encourage relapse
- Review the homework assignment to identify and develop coping strategies for dealing with high-risk situations for relapse
- Review smokers' progress regarding making broader lifestyle changes that support quitting smoking
- Offer some final remarks and observations about planning for the future

Appendix F: Smoking Cessation Workbook

Smoking Cessation Workbook

Bowling Green State University

Table of Contents

*Page numbers correspond to actual manual

Schedule

Session 1- Date: _____
Introduction and ground rules
Cognitive social learning rationale
Self-monitoring
Identifying triggers for smoking
Nicotine fading

Session 2- Date: _____
Self-management
Autogenic relaxation

Session 3- Date: _____
Lifestyle changes

Session 4- Date: _____
Identifying and coping with high-risk situations
Abstinence Violation Effect (AVE)
Preparation for quit day

Session 5: Quit Day- Date: _____
Discussion of quit day experiences
Social support for nonsmoking
Plan for maintaining abstinence

Session 6- Date: _____
Discussion of quitting experiences
Strategies for coping with urges
Plan for maintaining abstinence

Session 7- Date: _____
Discussion of quitting experiences
Strategies for managing thoughts
Plan for maintaining abstinence

Session 8- Date: _____
Discussion of quitting experiences
Planning for the future

Session 1

Group Guidelines

1. During any discussion topic within the group, you always have the option to not participate if you do not feel comfortable.
2. Please assist in providing equal time for everyone to speak.
3. Maintaining confidentiality is critical to a successful group experience. Please maintain the confidentiality of group members' identity as well as the content of what is discussed in group. The goal is to provide a comfortable environment in which to share your thoughts, experiences, and feelings without concern of negative consequences.
4. If you cannot make a session please call the group leader in advance: Holly, 419-308-0445.
5. No smoking is allowed during the session.
6. _____
7. _____
8. _____

Getting Acquainted

Notes: _____
_____
_____
_____
_____
_____
_____
_____

Framework for Smoking Cessation Efforts

Quitting is a process that can be learned.

- Quitting is a long-term process of learning what will or will not help you to quit smoking.
- Prior failed quit attempts are learning experiences.
- Quitting smoking is a process that takes place over a period of years and multiple quit attempts are commonly required to achieve lasting abstinence.

Acknowledge mixed feelings about quitting.

- You may feel anxious or fearful and have doubts about your ability or motivation to quit.
- You may feel that you "need" or "want" to quit smoking, yet you may still enjoy smoking and/or be fearful of possible changes (e.g., irritability, weight gain)

Pros and Cons of Quitting

PROS	CONS
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Benefits of participating in a group program.

- Learning and applying specific coping skills in a supportive group atmosphere
    - Coping skills will help you identify critical aspects of your smoking patterns and develop the means to deal with situations and circumstances that previously might have triggered you to smoke.
- You will have the benefit of the group members' collective wisdom and emotional support.

Motivational ups and downs.

- There is no substitute for your own motivation and commitment to quit smoking.

Cognitive Social Learning Theory Rationale

Smoking consists of the following 3 components:

1. *Learned habit:* Cigarette smoking is a behavior pattern (habit) that is overlearned through years of repetition. It is critical to learn about your particular smoking patterns, to identify events, situations, and behaviors that prompt you to smoke, and to learn ways to cope without smoking
2. *Physical addiction:* The physically addicting ingredient in cigarettes is nicotine. Physical addiction is explained in terms of tolerance and withdrawal.
3. *Means of managing negative mood:* For many people smoking serves as a means of helping manage negative moods. People may learn to rely on cigarettes to cope with upsetting situations and to combat negative feelings such as depression, anxiety, anger, and frustration.

This program will help you to:

A. Understand the *learned habit* aspect of your smoking so you can anticipate and develop nonsmoking habits in former smoking situations
B. Gradually reduce your *physical addiction* through a procedure called nicotine fading.
C. Learn skills to *manage negative moods* and cope with negative mood situations more effectively.

Self-monitoring of Smoking Behavior (Wrap sheets)

- Every smoker has his/her own unique learned pattern that has developed over the years.
- The first step to changing a pattern is to understand it.
- Learning about one's habits through self-monitoring (writing down each cigarette smoked) leads to learning effective ways of changing that behavior.
- Wrap sheets.

Triggers for Smoking

A trigger is defined as a situation, event or behavior (may include thoughts or feelings) that is commonly associated with smoking a cigarette, so that the situation brings on the urge to smoke.

Nicotine Fading

Rationale: Cigarette smoking is physically addicting for many smokers; gradually reducing your dependence on nicotine will reduce the intensity of your withdrawal symptoms at quit day, thus making quitting less difficult.

There are two ways to accomplish nicotine fading:

1. *Brand fading* involves changing cigarette brands weekly or biweekly to brands containing lower nicotine content.
2. *Rate fading* involves reducing the number of cigarettes smoked daily. You may wish to set a goal of reducing your number of cigarettes by a minimum of 10-15% per week prior to quit day.

Homework assignments

1. Complete Wrap Sheets daily for each cigarette smoked, while smoking normally.
2. After completing Wrap Sheets for several days, complete Triggers for Smoking Worksheet.

Session 2

Review:

Cognitive Social Learning Rationale
Self-monitoring of smoking behavior

Triggers for smoking

What are your behavioral patterns/triggers?

_____
_____
_____
_____
_____
_____

What are your thought patterns/triggers?

_____
_____
_____
_____
_____
_____

What are your emotional patterns/triggers?

_____
_____
_____
_____
_____
_____

Self-management Approach to Managing Trigger Situations

How can you deal with trigger situations without smoking?

Ideas:_____
_____
_____
_____
_____
_____
_____
_____
_____

Self-control vs. Willpower

Self-control is the development of a systematic and strategic plan to manage trigger situations without smoking.

Willpower involves trying to exert sheer will over quitting, without any particular plan or strategy.

*What might be the consequences of using self-control over willpower?*_____
_____
_____
_____
_____

3 Core Self-Control Strategies

Avoid trigger situations: If an individual does not come in contact with a trigger situation, this situation cannot exert any influence over his/her behavior.

Examples: Forgo morning routine of drinking coffee.
Avoid social situations involving alcohol.
Avoid former smoking hangouts.

Alter trigger situations*:* In instances when a smoker cannot avoid the trigger situation, significantly altering it is a useful strategy.

Behavior Examples: Drink orange juice or a caffienated drink in the morning instead of coffee.
Go for a walk/jog instead of watching TV.
Sit in the non-smoking section of the restaurant instead of the smoking section.
Thought Examples: Telling yourself "a cigarette won't change this difficult situation" or "I don't need a cigarette," instead of "I need a cigarette to cope with this situation."

Use an alternative or a substitute in place of the cigarette: The use of an alternative or a substitute in place of the cigarette is useful either alone or in conjunction with avoiding or altering the trigger situation.

Behavior Examples: Using a relaxation technique instead of smoking in a stressful situation.
Chewing sugarless gum or eating sugarless candy, fruit or vegetables (e.g., carrots or celery sticks).
Calling a friend.
Doing needlework to keep hands busy.
Thought Examples: Telling yourself "I am doing great—I can do without this cigarette," "One cigarette ***can*** *hurt," or This feeling is a signal that I need to use a coping technique now."*

Relaxation Technique

The exercise takes 20 minutes to complete. As you practice the exercise on a daily basis you will become increasingly better at controlling your sympathetic nervous system. With practice you will be able to relax yourself in a matter of seconds.

Nicotine Fading

This program encourages a 3-week-fading schedule in which the regular brand of cigarettes is switched to brands with published nicotine yields that are 30%, 60% and 90% lower than the regular baseline brand cigarettes. It is a good idea to buy your new brand immediately after the session and begin smoking them tomorrow.

Calculating Daily Nicotine Intake

Average # smoked per day **x** Mg. nicotine per cigarette = Average nicotine per day

Example: 18 **x** 0.8 = 14.4

In addition, apply new coping skills to assist you in avoiding smoking in trigger situations. Reduce your smoking rates by a minimum of 10-15% per week prior to quitting.

Homework assignments

1. Continue working on Managing Triggers for Smoking Worksheet, identifying which self-control strategies are applied in specific trigger situations and how effective they are.
2. After reviewing the worksheet, select 2-3 techniques to implement this week.
3. Practice relaxation exercise at least once daily.
4. Accomplish nicotine fading through brand (smoke 30% nicotine-reduction brand) and rate (10-15% rate reduction, if possible) fading strategies.

Continue to:

1. Complete wrap sheets for each cigarette smoked.

Session 3

Review:

Self-management approach
Managing triggers homework
Relaxation exercise
Self-monitoring of smoking behavior (wrap sheets)

Self-management

How did you do at avoiding trigger situations? _____
_____
_____
_____
_____

How did you do at altering trigger situations? In what ways did you alter trigger situations? _____
_____
_____
_____
_____

How successful was the use of alternatives or substitutes in place of a cigarette? What alternative did you find helpful? Which ones were unhelpful? _____
_____
_____
_____
_____

Nicotine Reduction

Goals from last week:

1. Switching to a brand with a lower nicotine level
2. Reducing the number of cigarettes you smoke daily by 10-15%

How well do you feel you accomplished these goals? What contributed to your success or lack thereof? _____
_____
_____
_____
_____
_____
_____

Remember: Today's trigger situations are *tomorrow's* high-risk situations for relapse.

Relaxation Exercise

Notes: _____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Self-monitoring of Smoking Behavior

What new patterns did you observe this week? _____

_____

_____

_____

_____

_____

Lifestyle Change to Support Quitting Smoking

Quitting smoking involves more than just putting down the cigarettes. Successful quit attempts often involve making changes in several areas of one's life.

Possible Lifestyle Change Areas

- Making cigarettes unavailable to you
- Increase time in nonsmoking places or activities
- Develop a way to receive adequate support
- Develop alternative ways to manage stress
- Develop ways to prevent weight gain
- Develop ways to increase physical activity

Further Nicotine Fading

Remember that nicotine fading allows you to gradually withdrawal from nicotine while continuing to smoke before quit day.
Nicotine fading involves:

a. Changing brands to those with progressively lower nicotine content.
b. Reducing the number of cigarettes smoked.
c. Calculate changes in daily nicotine yield of cigarettes smoked to provide feedback on how the procedure is working.

Homework assignments:

1. Complete the Nonsmoking Game Plan: Lifestyle Change Worksheet, specifying lifestyle change goals for each category listed.
2. Continue to complete the Managing Triggers for Smoking Worksheet.
3. Continue to practice relaxation exercise daily.
4. Complete Wrap Sheets.
5. Accomplish nicotine fading by fading both brand (smoke 60% nicotine-reduction brand) and rate (additional 10-15% rate reduction, if possible).

Session 4

Review:

Managing triggers homework
Lifestyle changes homework
Relaxation exercise
Self-monitoring of smoking behavior (wrap sheets)

Managing Triggers: Some Encouraging Points

- Learning ways to manage trigger situations now is critical for successful quitting; therefore this is an incredibly important phase of your treatment.
- Developing effective strategies for managing triggers is a trial-and-error process.
- Even strategies that do not work provide valuable information. Take those opportunities to refine your approaches until you develop strategies that do work.
- The trigger situations you are working on today represent potential high-risk situations for relapse once you've initially quit smoking.
- The efforts that you are putting into devising effective ways of managing trigger situations will be rewarded once you've quit.
- The experience of withdrawal symptoms serves as proof that the fading procedure is working.
- If you're experiencing withdrawal symptoms while smoking, you can expect to experience lower levels of physical withdrawal on quitting, thereby making the quitting process less difficult.

Review of "Nonsmoking Game Plan" worksheet

Other good ideas: _____

_____

_____

_____

_____

_____

_____

_____

_____

Relaxation Exercise

Notes: _____

_____

_____

_____

_____

_____

_____

_____

_____

Self-monitoring of Smoking Behavior

What new patterns did you observe this week? _____

_____

_____

_____

_____

_____

Identifying and Coping with High-Risk Situations

- A high-risk situation for relapse is defined as a situation that could lead to resumption of smoking.

If you were to slip and smoke a cigarette after quit day, in what situation would it be? _____
_____
_____
_____
_____

- Maintaining an awareness of possible high-risk situations and being prepared with specific coping strategies is the most effective way to be successful at maintaining abstinence from smoking.
- The hardest thing to do is to cope with a high-risk situation that was not anticipated or to cope with one that was anticipated but not planned for.

Abstinence Violation Effects and How to Cope with Them

The typical response to a "slip" or episode of continued smoking following quit day is one of self-defeating thoughts and negative emotional reactions. This response is termed abstinence violation effect (AVE). Important things to remember about AVEs:

a. A slip (an instance or several instances of smoking) is different from a relapse (a return to baseline level smoking).
b. If one does slip, he/she is likely to feel bad, guilty, even somewhat depressed.
c. This negative emotional reaction is likely to involve negative attributions about oneself as "weak" or as a "failure" due to being "unable to quit smoking."

d. He/she is likely to think that "one slip makes me a smoker again," which serves as a rationalization for a return to smoking at one's baseline rate.

It is crucial to fight off this negative emotional reaction by doing the following:

a. Think of the slip as a mistake rather than as evidence that you are weak or are a failure.
b. Respond to it as you would other mistakes (i.e., use it as a learning experience, figure out what you did wrong and how to correct it or avoid doing it next time).
c. Realize that one cigarette does not mean you are a smoker unless you allow it to.
d. Redouble your coping efforts and remind yourself of all the successful, hard work you have put in so far.
e. Do not smoke the next cigarette, and remember that the depressed, guilty, angry feelings will decrease with each passing hour and day.

*Note: This is not to say it is "okay" to slip or to grant "permission" to slip. The surest way to quit smoking is to not have any slips. However, should you have a slip, you can recover and still successfully quit smoking.

Further Nicotine Fading

In your last week prior to quitting, aim for one last reduction of nicotine.

- Remember that the goal of nicotine fading is to make your quitting experience less difficult and to increase your likelihood of remaining abstinent.
- Don't forget about the progress you have made so far—whether you have managed to stay on track with your reductions or have experienced some difficulty—your successes are a product of your own effort.

Preparing for the Upcoming Quit Day

- Quit day is on the morning of our next session, _____.

- In order to quit on the morning of quit day, you must prepare yourself the night before, both mentally and physically.
  - Make sure you have permanently gotten rid of any remaining cigarettes before going to bed.
  - It is also helpful to have a specific, perhaps hour-by-hour plan for not smoking for the first day or even the first several days after quitting.
  - You may want to review your reasons for quitting smoking throughout the next week. It is important to keep in touch with the reasons that led you to quit smoking in the first place.
  - Following through on homework is particularly important this week. It will help equip you with tools that will make this quit attempt a *successful* quit attempt.
  - Remind yourself that: *You can do this.*

What tactics will you use to help get you through the first several days as a non-smoker? _____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Thought for the week:

THIS TIME NEXT WEEK I WILL BE A NON-SMOKER!!

Homework Assignments:

1. Complete the Coping with High-Risk Situations Worksheet, identifying high-risk situations and specific coping strategies to avoid smoking.
2. Continue to work on accomplishing the lifestyle change goals, as specified on the Nonsmoking Game Plan: Lifestyle Change Worksheet.
3. Continue to work on applying self-control strategies for trigger situations and complete the Managing Triggers for Smoking Worksheet.
4. Continue to practice relaxation exercise daily.
5. Complete Wrap Sheets.
6. Accomplish nicotine fading by fading both brand (smoke 90% nicotine-reduction brand) and rate (additional 10-15% rate reduction, if possible).

Session 5

Your Quit Day Experience

What strategies have you planned for dealing with today? _____

_____

_____

_____

_____

_____

What are your expectations for the next several days? _____

_____

_____

_____

_____

_____

How do you plan to be successful at staying abstinent during this time? _____

_____

_____

_____

_____

The Misconception About Urges

- Many smokers think that urges will not stop unless they give in to them and smoke a cigarette.
- However, the truth is that **urges are time limited**.
- Urges begin, increase until they reach their peak, and then subside. The entire process generally takes only several minutes.

Take one day at a time, one urge at a time.

Benefits from Quitting

What benefits of quitting have you noticed already? _____

_____

_____

_____

Rewarding Yourself

What interval and what rewards will you use to reward yourself for maintaining abstinence?

One day: _____
Three days: _____
One week: _____
Two weeks: _____
One month: _____
Three months: _____
Six months: _____
One year: _____

Identifying and coping with high-risk situations

The most common high-risk situations for relapse are those involving:

a. Negative mood
b. Positive mood (especially in social situations involving alcohol)
c. Social interactions with other smokers

AVEs and Coping with Them

The main task that one faces if a slip does occur is to prevent that slip from becoming a relapse. Helpful hints:

a. Think of the slip as a mistake rather than as evidence that you are weak or are a failure.
b. Respond to it as you would other mistakes (i.e., use it as a learning experience, figure out what you did wrong and how to correct it or avoid doing it next time).
c. Realize that one cigarette does not mean you are a smoker unless you allow it to.
d. Double your coping efforts and remind yourself of all the successful, hard work you have put in so far.
e. Do not smoke the next cigarette, and remember that the depressed, guilty, angry feelings will decrease with each passing hour and day.

Review of Lifestyle Changes

Notes/suggestions for implementing change: _____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Maximizing Social Support

- Social support can be a source of motivation for quitting and of positive reinforcement for successfully maintaining abstinence.
- Social support can provide a buffer against the stress of quitting.
- Positive support may also help to balance out the negative social influences you may encounter that can interfere with successful quitting.

Making Plans for Maintaining Abstinence

- Continue to be diligent at identifying high-risk situations and developing coping strategies.
- Make an active effort to involve yourself in making the lifestyle changes you indicated on your change plan.
- It is particularly important at this stage to make every effort to minimize stressful events and situations in your life and avoid highly tempting, high-risk situations.

Homework Assignments:

1. Complete the Social Support for Nonsmoking Worksheet, identifying ways of maximizing positive and minimizing negative social influences regarding quitting smoking.
2. Continue to work on identifying high-risk situations and specific coping strategies to avoid smoking and complete the Coping with High-Risk Situations Worksheet.
3. Continue to work on accomplishing the lifestyle change goals, as specified on the Nonsmoking Game Plan: Lifestyle Change Worksheet.
4. Continue to practice relaxation exercise daily.

Session 6

Withdrawal Symptoms

- Typically worse in the first week after smoking
- Should begin to improve no later than the 2nd or 3rd week after quitting
- Remember that symptoms should be less severe due to your hard work in the fading process prior to quitting.

Benefits from Quitting

What benefits of quitting have you noticed already? _____

_____

_____

_____

_____

Expectations:

What are your expectations for the next several days? _____

_____

_____

_____

_____

More on Urges

- Urges are an expected part of quitting smoking.
- Urges are time limited; they have a beginning, middle, and end.
- It is common to feel panicky or anxious when thinking of quitting in terms of “forever” or “for the rest of my life.”

- Imagery may help fight urges
    - Think of urges as waves in the ocean that rise and fall or wax and wane. Imagining waiting out the urge and riding on top of it, like a surfer, may help to cope with the urge until it fades away and is washed out against the shore.
    - Imagine being a sword wielding samurai warrior, aggressively taking on urges as they occur and slicing through the urges with the sword
- When urges occur, *do something*, rather than passively wait for the urge to pass.
    - Pay attention to thoughts or beliefs that may accompany urges.
    - Cope with urges using behavioral strategies.

Coping with High-Risk Situations

*What high-risk situations are you able to anticipate and cope well in?*_____
_____
_____
_____
_____

What high-risk situations do you continue to have difficulty in? ___
_____
_____
_____
_____
_____

Increasing Social Support

If you requested change from others (either to increase positive or decrease negative) what was the most difficult aspect of that process? _____
_____
_____
_____
_____
_____

*If you have not requested change from others, what is holding you back?*_____
_____
_____
_____
_____
_____

Homework Assignments:

1. Work actively to utilize strategies for coping with urges to smoke.
2. Continue to work on identifying high-risk situations and specific coping strategies to avoid smoking and complete the Coping with High-Risk Situations Worksheet.
3. Continue to implement ways of maximizing positive and minimizing negative social influences per the Social Support for Nonsmoking Worksheet.
4. Continue to work on accomplishing the lifestyle change goals, as specified on the Nonsmoking Game Plan: Lifestyle Change Worksheet.

Session 7

Points to Remember When Dealing with Slips

The main task that one faces if a slip does occur is to prevent that slip from becoming a relapse. Helpful hints:

a. Think of the slip as a mistake rather than as evidence that you are weak or are a failure.
b. Respond to it as you would other mistakes (i.e., use it as a learning experience, figure out what you did wrong and how to correct it or avoid doing it next time).
c. Realize that one cigarette does not mean you are a smoker unless you allow it to.
d. Double your coping efforts and remind yourself of all the successful, hard work you have put in so far.
e. Do not smoke the next cigarette, and remember that the depressed, guilty, angry feelings will decrease with each passing hour and day.

Strategies for Managing Thoughts That May Encourage Relapse

It is important to be able to identify and manage thoughts that might be conducive to smoking and thus lead to relapse. There are a number of strategies you can use to help resist lingering smoking urges and strengthen your resolve to remain a non-smoker.

- *Identifying smoking resumption thoughts.* Rationalizations to resume smoking are the most dangerous kind of thoughts because they often develop without smokers being aware of them, and they directly undermine the goal of abstinence. Please refer to Strategies for Identifying and Counteracting Resumption Thoughts handout for examples.
    - *Nostalgia*—The main feature of these mismanaged thoughts is that they imply that you are missing something important.

- *Testing Control*—These tests often result in a resumption of smoking. You are better off admitting the challenge of remaining an ex-smoker and granting your adversary, the urge to smoke, a lot of power and influence.
- *Crisis*—It is possible for these thoughts to be anticipated and counteracted……crises and special occasions have a way of becoming regular events.
- *Unwanted changes*—Although some changes may occur, specific strategies should enable you to cope with the changes and even prevent them from happening. Controlling these thoughts is critical, as is taking steps to manage your weight, relax around others, and continue to work effectively at home or in the office.
- *Self-doubts*—Imagine how angry you would be if a neighbor or acquaintance said these things to you, yet you accept them when they come in the form of self-statements.

➢ *Challenging smoking resumption thoughts*—There are several strategies to help you attack your negative thoughts about smoking.

- *Challenging*—Challenging the thoughts that undermine your progress with logical, truthful statements can help you regain control of the situation
- *Benefits of nonsmoking*—Thinking of the benefits of nonsmoking will help you to see the results of your efforts in a positive light
- *Remembering the unpleasant smoking experience*—Clear memories of some of the unpleasant experiences can help you to overcome some of the lingering smoking urges and combat mismanaged thinking that pulls you towards resumption

- *Distractions*—Concentrating on pleasant, enjoyable subjects can help take your mind off smoking
- *Self-rewarding thoughts*—Positive self-statements can act as powerful incentives and guides to maintain motivation

Coping with High-Risk Situations

As you go through the process of quitting, previous high-risk situations may become irrelevant, and new high-risk situations are likely to emerge.

*What situations do you anticipate occurring in the next week that may present a high risk to you?*_____
_____
_____
_____
_____
_____

Homework Assignments:

1. Work actively to utilize strategies for identifying and challenging smoking resumption thoughts, using the Strategies for Identifying and Counteracting Resumption Thoughts handout as a reference.
2. Continue to work actively to utilize strategies for coping with urges to smoke.
3. Continue to work on identifying high-risk situations and specific coping strategies to avoid smoking and complete the Coping with High-Risk Situations Worksheet.
4. Continue to implement ways of maximizing positive and minimizing negative social influences per the Social Support for Nonsmoking Worksheet.
5. Continue to work on accomplishing the lifestyle change goals, as specified on the Nonsmoking Game Plan: Lifestyle Change Worksheet.

Session 8

Managing Thoughts That May Encourage Relapse

The first step in the process is to identify thoughts that undermine your goal to remain an ex-smoker.

What undermining thoughts can you identify?

1.

2.

3.

4.

5.

6.

The second step is to counteract the effects of these thoughts by using various strategies.

What strategies did/will you use to counteract the negative effect of these thoughts?

1.

2.

3.

4.

5.

6.

Identifying and Coping with High-Risk Situations

- As your quitting experience changes over time, you will need to keep a continual focus on what situations are currently high-risk.
- Continue to anticipate high-risk situations and try alternative coping strategies in situations where current strategies do not succeed.
- Coping is a trial-and-error process.

Progress with Lifestyle Changes

To what extent have you followed through with your Lifestyle Change plans? If you have not, what are some barriers that are preventing you from doing so?_____
_____
_____
_____
_____
_____

Planning for the Future

Possible Barriers to Becoming a Lifelong Nonsmoker

- Becoming overconfident
  - Many people have a tendency to react to abstinence by interpreting it to mean they are invulnerable to relapse and can have an occasional cigarette.
  - This process invariably leads to relapse; rarely are regular, addicted smokers able to become infrequent, occasional smokers.
- Succumbing to future high-risk situations
  - Continue to be vigilant to high-risk situations and be prepared with a plan for how to cope in those situations.
  - Be prepared for a generic type of upsetting situation that you might not now be able to anticipate.

What are some crises that may occur in the future (next week, next month, next year) that you will want to be prepared for? _____
_____
_____
_____
_____
_____
_____

What will you do to be prepared for them? How will you avoid them? _____
_____
_____
_____
_____
_____

Continue to use all the coping strategies and maintain the lifestyle changes that have thus far supported your efforts at abstinence.

Long Term Benefits for Not Smoking (that are particularly important to you):

1.
2.
3.
4.
5.

Don't forget to celebrate your efforts and successes,
no matter what size.
You deserve it.

Appendix G: Problem-Solving Workbook

Basic Steps to Successful Problem-Solving

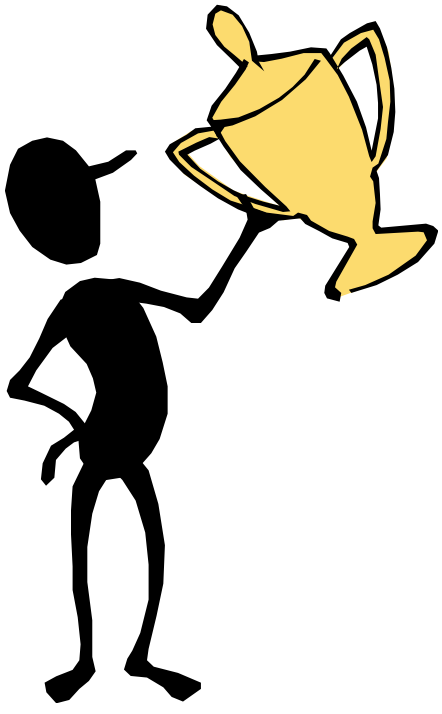


Table of Contents

*Page numbers correspond to actual manual

Problem-Solving

Goal

To teach you problem-solving skills that will help you overcome problems associated with quitting smoking (e.g., temptations, social pressures, stress).

Why Use Formal Problem-Solving?

The capacity of our conscious mind is limited. For example, it is hard to remember four or five items on a list of things to do, let alone to solve complex problems. Research has shown that people can greatly benefit from utilizing formal problem-solving skills.

Step 1: Identifying your Problem

The <u>first</u> important step that you must take is to <u>identify your problem</u>.

Some people are very good at identifying their problems and other people are not. If you are one of those people who is *not* good at identifying your problems, then here are some signs that a problem exists:

a. You find yourself continually getting upset in certain circumstances (e.g., you continually get upset with yourself for smoking when feeling stressed).

b. You repeatedly try to solve a problem and yet the problem still remains. For example, you attempt to do deep breathing to relax yourself, but end up smoking a cigarette anyway.

If you still cannot put your finger on the problem then use your <u>Smoking Cessation Problem Checklist</u> to help you identify your problem.

Step 2: Defining your Problem Orientation

Success at problem-solving often requires a ***positive problem orientation*.**

Here are some questions to ask yourself to determine whether you have a ***negative problem orientation*:**

1) Do you tend to blame yourself for the problem and think that the problem means that there is something wrong with you?

2) Do you avoid the problem or attack it without a plan?

3) Do you have low expectations for coping with the problem effectively (you feel the problem is unsolvable or that you are not capable of solving the problem)?

4) Do you think that you should be able to solve the problem with very little effort?

If you answered "YES" to all or some of these questions, you may have a *negative problem orientation.*

You will most likely benefit from developing a positive problem orientation.

Here are some characteristics of a ***positive problem orientation*:**

1) You tend to perceive your problems as normal ordinary events in life.

2) You view your problems as a “challenge” or an opportunity for personal growth and self-improvement.

3) You believe that there is a solution to your problem and that you are capable of finding the solution on your own and implementing it successfully.

4) You realize that solving problems is often likely to take some time and effort.

Step 3: *Defining* and *Formulating* your Problem

You will need to gather information about the problem. Ask yourself these questions:

1) Who is involved (if anyone)?

2) What happens that bothers you or interferes with quitting?

3) Where does the problem happen?

4) When does the problem happen?

5) Why does the problem happen?

6) What is your response to the problem?

Pointers/Tips:

- Make sure that you do not describe your problem in a way that is too vague or complex.
- It is always helpful to write down your description of the problem.
- It may help to imagine or visualize the problem.

Once you have all of the details written down, ask yourself these questions:

1) What present conditions are unacceptable to me?
   Example: I smoke in social situations.

2) What changes or additions do I desire?
   Example: I would like interact in social situations without smoking.

3) What obstacles are interfering with my response?
   Example: anxiety; habit.

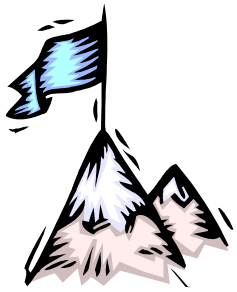
Quick Check: Once your problem has been defined, the problem might not always look as important or insurmountable. At this point, just make sure that the problem is still significant, important to you, and that you still want to solve it.

Now, what *goal* would you like to accomplish?

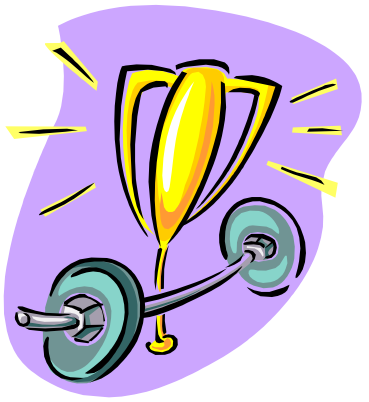
Remember:

1) Try to be realistic.

2) Make sure that your goal is not too broad or too narrow.



Step 4: Generation of Alternative Solutions



1) Now it is time to generate solutions to your problem.

2) At this point, you want to generate as many potential solutions as possible. Here are some helpful tips:

   a. Try to generate as many different types of solutions as possible.

   b. Do not judge the "goodness" or "badness" of any solutions until later.

   c. In some circumstances, you may have to seek more information about a problem or potential solutions before you can decide on the best solution.

Step 5: Choosing a Solution

It is time to choose a solution. Here are the steps you should take:

1) Eliminate any *clearly inferior* solutions. Such as a solution that poses a high risk of failure or a solution that is not feasible.

2) Evaluate your potential solutions. If the best solution does not seem apparent, you may need to formally evaluate the potential solutions. Use your Decision Evaluation Chart to numerically rate the solutions along the following dimension:

i. Problem resolution
ii. Emotional well-being
iii. Time/effort
iv. Overall well-being (e.g., health, personal, social)

3) Make sure you have a plan to implement your solution.

i. What steps will you take to solve the problem?
ii. How long will you try the solution before evaluating the successfulness of the solution?
iii. How will you know if the problem has been successfully solved?

Step 6: Solution Implementation and Verification

Decide if the solution is successful:

1) You have to decide the best way to determine whether your solution has been successful. This will require you to self-monitor some behavior (e.g., are you avoiding smoking when stressed, are you avoiding smoking during work breaks, are you avoiding smoking in social situations, etc?).

2) You might want to rate your solutions using a **Solution Evaluation Chart**. You can rate your emotional well-being, amount of time and effort expended, and total benefit/cost.

3) Finally, you must decide whether the solution needs to be:

a. implemented permanently, or

b. whether the problem-solving process needs to be revisited

Smoking Cessation Problem Checklist

Emotional/Psychological
Feeling stressed
- Work-related
- Family-related
- Relationship-related
- Financial

Smoking because you're feeling anxious
Smoking because you're bored
Smoking because you're unhappy
Worried about weight gain
Strong cravings for cigarette
Withdrawal symptoms
Questioning motivation/reasons for wanting to quit
Crave cigarettes all the time
Afraid of failure
Feeling overwhelmed by quitting
Feeling angry at yourself for not quitting/reducing
Lack of motivation to quit
Low self-confidence/self-efficacy interferes with quitting
Self-discipline problem (e.g. talk self out of quitting/reducing)
Doesn't seem important enough

Social
Smokers in social system (exposed to smoking)
Family/social gatherings where smokers are present
Significant other smokes
Lack of family support for quitting
People are constantly asking about why you're not smoking/trying to quit
Social pressure to smoke (afraid of hurting others' feelings by refraining)
Sabotage by other people of your cessation attempts

Behavioral
Too busy to invest effort in quitting right now
Not planning for non-smoking
Smoking at work
Work-breaks
Community smoking areas (e.g. work)
Alcohol consumption (disinhibition)
Holidays, vacations, special occasions (more difficult to abstain)
Lack of alternatives (what to do instead of smoke)
Cigarettes are too readily available
Taste of lower-nicotine cigarettes are not to your liking

Decision Evaluation Chart

For each potential solution rate the following items using the scale:

-5	-4	-3	-2	-1	0	1	2	3	4	5
Extremely Unsatisfactory		Moderately Unsatisfactory		Slightly Unsatisfactory		Slightly Satisfactory		Moderately Satisfactory		Extremely Satisfactory

*Decide before hand if one of the four factors is more important to you and weight it accordingly

Potential Solution #1_____

Problem Solution ("How likely is it that the solution will achieve the problem-solving goal?")	____
Emotional well-being ("If the solution is implemented, how good or bad am I likely to feel?")	____
Time/Effort ("How much time and effort is this solution likely to require?")	____
Overall personal-social well-being (total benefit / cost ratio)	____
TOTAL	____

Potential Solution #2_____

Problem Solution	____
Emotional well-being	____
Time/Effort	____
Overall personal-social well-being	____
TOTAL	**____**

Potential Solution #3_____

Problem Solution	____
Emotional well-being	____
Time/Effort	____
Overall personal-social well-being	____
TOTAL	**____**

Potential Solution #4_____

Problem Solution	____
Emotional well-being	____
Time/Effort	____
Overall personal-social well-being	____
TOTAL	**____**

Potential Solution #5_____

Problem Solution	____
Emotional well-being	____
Time/Effort	____
Overall personal-social well-being	____
TOTAL	**____**

Potential Solution #6_____

Problem Solution	____
Emotional well-being	____
Time/Effort	____
Overall personal-social well-being	____
TOTAL	**____**

Evaluate which potential solution yields the highest score, and then make sure it feels right on the “gut” level!

Solution Evaluation Chart

Rate the solution outcome using this scale with the following items:

-5	-4	-3	-2	-1	0	1	2	3	4	5
Extremely Unsatisfactory		Moderately Unsatisfactory		Slightly Unsatisfactory		Slightly Satisfactory		Moderately Satisfactory		Extremely Satisfactory

Solution being Evaluated_____

Problem Solution ("How did the solution achieve the problem-solving goal?") ____

Emotional well-being ("With the solution implemented, how good or bad do I feel?") ____

Time/Effort ("How much time and effort does the solution require?") ____

Overall personal-social well-being (total benefit / cost ratio) ____

TOTAL **____**

Appendix H: Demographics Questionnaire

Name:_____

Gender: Male Female

Birthdate: _____ Age: _____

Marital Status: Married _____
Engaged _____
Single/dating _____
Separated _____
Divorced _____
Single/Not dating _____
Widowed _____

Race: Caucasian _____
African-American _____
Hispanic _____
Asian-American _____
American Indian _____
Other _____

Employment: Employed full-time _____
Employed part-time _____
Unemployed _____
Student _____

Annual Income:
Less than $15,000 _____
$15,000 – $29,999 _____
$30,000 – $44,999 _____
$45,000 – $59,999 _____
$60,000 – $74,999 _____
$75,000 or more _____

Education: Number of years of education (beginning at kindergarten) _____ yrs

_____ Less than 7 years
_____ High school degree of GED
_____ Some college (junior college)
_____ Post-graduated work at university
_____ Grades 8 through 12, but did not graduate
_____ Trade school
_____ Graduated from 4 year college

How many years have you been a smoker? _____

What brands did you smoke, over what time period, and how many did you smoke on average during that time period? (make sure to include current information)
Brand_____ From _____To __Present___ Avg. # of cigarettes _____
Brand_____ From _____To _____ Avg. # of cigarettes _____
Brand_____ From _____To _____ Avg. # of cigarettes _____
Brand_____ From _____To _____ Avg. # of cigarettes _____
Brand_____ From _____To _____ Avg. # of cigarettes _____

How many times in the past have you made a serious attempt to quit smoking? _____

What was the longest period of time that you were able to quit smoking? _____

When was your most recent serious attempt to quit smoking? _____

How long were you able to stay quit during your most recent quit attempt? _____

Please list the relations of the people you live with and their smoking status:

Ex. Wife_____	Non-smoker_____
Ex. Best friend_____	Smoker_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Appendix I: Fagerstrom Tolerance Questionnaire

1. On average, how many cigarettes do you smoke a day? _____

2. Which brand of cigarettes do you consider your regular brand? _____

3. Do you inhale?

Yes, all the time _____
Some of the time _____
No _____

4. Do you smoke more in the morning than during the rest of the day?

Yes _____
No _____

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

Within 30 minutes or less _____
After 30 minutes _____

6. Of all the cigarettes you smoke each day, which cigarette would you hate the most to give up?

1st of the day _____
Any other _____

7. Do you smoke if you are so ill that you are in bed most of the day?

Yes _____
No _____

8. Do you find it difficult to refrain from smoking in places where it is forbidden, e.g., in church, at the library, in movie theaters, etc?

Yes _____
No _____

Appendix J: Stages of Change Algorithm

Smokers

Are you seriously thinking about quitting smoking in the next 6 months?

Yes No (stop questioning)

↓

Are you planning to quit smoking in the next 30 days?

Yes No (stop questioning)

↓

Have you quit smoking for at least 24 hours in the past year?

IF NO:

Have you planned a quit attempt but not gone through with it in the past year? Yes No
Have you planned a quit attempt but not gone through with it in the past month? Yes No
Have you had a quit attempt that lasted less than 24 hours in the past year? Yes No
If yes, how many hours did it last? _____
Have you had a quit attempt that lasted less than 24 hours in the last month? Yes No
If yes, how many hours did it last? _____
How strong is your intention to quit in the next 30 days?

1	2	3	4
Mild	Moderate	Strong	Very Strong

IF YES:

How many quit attempts (at least 24 hours long) have you had in the past year? _____
Have you quit smoking for at least 24 hours in the past month? Yes No
Have you quit smoking for at least 24 hours in the past week? Yes No
How long was your longest quit attempt in the past year? _____days
How strong is your intention to quit in the next 30 days?

1	2	3	4
Mild	Moderate	Strong	Very Strong

Ex-smokers

Did you quit:

Within the last 6 months? Yes

More than 6 months ago? Yes

Appendix K: Processes of Change Inventory

The following experiences can affect the smoking habits of some people. Think of any similar experiences you may be currently having or have had in the last month. Then rate the FREQUENCY of this event on the following five point scale.

1 = Never
2 = Seldom
3 = Occasionally
4 = Often
5 = Repeatedly

1.	When I am tempted to smoke I think about something else.	☐
2.	I tell myself I can quit if I want to.	☐
3.	I notice that nonsmokers are asserting their rights.	☐
4.	I recall information people have given me on the benefits of quitting smoking.	☐
5.	I can expect to be rewarded by others if I don't smoke.	☐
6.	I stop to think that smoking is polluting the environment.	☐
7.	Warnings about the health hazards of smoking move me emotionally.	☐
8.	I get upset when I think about my smoking.	☐
9.	I remove things from my home or place of work that remind me of smoking.	☐
10.	I have someone who listens when I need to talk about my smoking.	☐
11.	I think about information from articles and ads about how to stop smoking.	☐
12.	I consider the view that smoking can be harmful to the environment.	☐
13.	I tell myself that if I try hard enough I can keep from smoking.	☐
14.	I find society changing in ways that makes it easier for nonsmokers.	☐
15.	My need for cigarettes makes me feel disappointed in myself.	☐
16.	I have someone I can count on when I'm having problems with smoking.	☐
17.	I do something else instead of smoking when I need to relax.	☐
18.	I react emotionally to warnings about smoking cigarettes.	☐
19.	I keep things around my home or place of work that remind me not to smoke.	☐
20.	I am rewarded by others if I don't smoke.	☐

Appendix L: Decisional Balance Inventory

The following statements represent different opinions about smoking. Please rate HOW IMPORTANT each statement is to your decision to smoke according to the following five point scale:

1 = Not important
2 = Slightly important
3 = Moderately important
4 = Very important
5 = Extremely important

1. Smoking cigarettes is pleasurable. ❑

2. My smoking affects the health of others. ❑

3. I like the image of a cigarette smoker. ❑

4. Others close to me would suffer if I became ill from smoking. ❑

5. I am relaxed and therefore more pleasant when smoking. ❑

6. Because I continue to smoke, some people I know think I lack the character to quit. ❑

7. If I try to stop smoking I'll be irritable and a pain to be around. ❑

8. Smoking cigarettes is hazardous to my health. ❑

9. My family and friends like me better when I am happily smoking than when I am miserably trying to quit. ❑

10. I'm embarrassed to have to smoke. ❑

11. I like myself better when I smoke. ❑

12. My cigarette smoking bothers other people. ❑

13. Smoking helps me concentrate and do better work. ❑

14. People think I'm foolish for ignoring the warnings about cigarette smoking. ❑

15. Smoking cigarettes relieves tension. ❑

16. People close to me disapprove of my smoking. ❑

17. By continuing to smoke I feel I am making my own decisions. ❑

18. I'm foolish to ignore the warnings about cigarettes. ❑

19. After not smoking for a while a cigarette makes me feel great. ❑

20. I would be more energetic right now if I didn't smoke. ❑

Appendix M: Self-Efficacy/Temptations Inventory

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. With friends at a party. ❑

2. When I first get up in the morning. ❑

3. When I am very anxious and stressed. ❑

4. Over coffee while talking and relaxing. ❑

5. When I feel I need a lift. ❑

6. When I am very angry about something or someone. ❑

7. With my spouse or close friend who is smoking. ❑

8. When I realize I haven't smoked for a while. ❑

9. When things are not going my way and I am frustrated. ❑

Appendix N: Self-Efficacy Questionnaire (SEQ-12)

The following are some situations in which certain people might be tempted to smoke. Please indicate whether you are sure you could refrain from smoking in each situation.

	Not at all sure	Not Very sure	More or less sure	Fairly sure	Absolutely sure
1. When I feel nervous	1	2	3	4	5
2. When I feel depressed	1	2	3	4	5
3. When I feel angry	1	2	3	4	5
4. When I feel very anxious	1	2	3	4	5
5. When I think about a difficult problem	1	2	3	4	5
6. When I feel the urge to smoke	1	2	3	4	5
7. When having a drink with friends	1	2	3	4	5
8. When celebrating something	1	2	3	4	5
9. When drinking beer, wine or other spirits	1	2	3	4	5
10. When I am with smokers	1	2	3	4	5
11. After a meal	1	2	3	4	5
12. When having coffee or tea	1	2	3	4	5

Appendix O: Nicotine Fading

Week 1: Regular brand: Winston

Average # smoked per day:	Mg. nicotine per cigarette	Average nicotine per day
24	1.2	28.8

Week 2: 30% Reduction of nicotine Brand: Marlboro Lights

Average # smoked per day:	Mg. nicotine per cigarette	Average nicotine per day
20	0.8	16

Week 3: 60% Reduction of nicotine Brand: Winston King Ultra-Lights

Average # smoked per day:	Mg. nicotine per cigarette	Average nicotine per day
17	0.5	8.5

Week 4: 90% Reduction of nicotine Brand: Merit Ultima

Average # smoked per day:	Mg. nicotine per cigarette	Average nicotine per day
14	0.1	1.4

Appendix P: Social Problem-Solving Inventory- Revised

	Not at all True of me	Slightly True of me	Moderately True of me	Very True of me	Extremely True of me
1. I spend too much time worrying about my problems instead of trying to solve them.	1	2	3	4	5
2. I feel threatened and afraid when I have an important problem to solve	1	2	3	4	5
3. When making decisions, I do not evaluate all my options carefully enough	1	2	3	4	5
4. When I have a decision to make, I fail to consider the effects that each option is likely to have on the well-being of other people.	1	2	3	4	5
5. When I am trying to solve a problem, I often think of different solutions and then try to combine some of them to make a better solution.	1	2	3	4	5
6. I feel nervous and unsure of myself when I have an important decision to make.	1	2	3	4	5
7. When my first efforts to solve a problem fail, I know that if I persist and do not give up too easily, I will eventually find a good solution.	1	2	3	4	5
8. When I am attempting to solve a problem, I act on the first idea that occurs to me.	1	2	3	4	5
9. Whenever I have a problem, I believe that it can be solved.	1	2	3	4	5
10. I wait to see if a problem will resolve itself first, before trying to solve it myself.	1	2	3	4	5
11. When I have a problem to solve, one of the things I do is analyze the situation and try to identify what obstacles are keeping me from getting what I want.	1	2	3	4	5
12. When my first efforts to solve a problem fail, I get very frustrated.	1	2	3	4	5
13. When I am faced with a difficult problem, I doubt that I will be able to solve it on my own no matter how hard I try.	1	2	3	4	5
14. When a problem occurs in my life, I put off trying to solve it for as long as possible.	1	2	3	4	5

15. After carrying out a solution to a problem, I do not take the time to evaluate all of the results carefully.	1	2	3	4	5
16. I go out my of way to avoid having to deal with problems in my life.	1	2	3	4	5
17. Difficult problems make me very upset.	1	2	3	4	5
18. When I have decision to make, I try to predict the positive and negative consequences of each option.	1	2	3	4	5
19. When problems occur in my life, I like to deal with them as soon as possible.	1	2	3	4	5
20.When I am attempting to solve a problem, I try to be creative and think of new or original solutions.	1	2	3	4	5
21. When I am trying to solve a problem, I go with the first idea that comes to mind.	1	2	3	4	5
22. When I try to think of different possible solutions to a problem, I cannot come up with many ideas.	1	2	3	4	5
23. I prefer to avoid thinking about the problems in my life instead of trying to solve them.	1	2	3	4	5
24. When making decisions, I consider both the immediate consequences and the long-term consequences of each option.	1	2	3	4	5
25. After carrying out my solution to a problem, I analyze what went right and what went wrong.	1	2	3	4	5
26. After carrying out my solution to a problem, I examine my feelings and evaluate how much they have changed for the better.	1	2	3	4	5
27. Before carrying out my solution to a problem, I practice the solution in order to increase my chances of success.	1	2	3	4	5
28. When I am faced with a difficult problem, I believe that I will be able to solve it on my own if I try hard enough.	1	2	3	4	5
29. When I have a problem to solve, one of the first things I do is get as many facts about the problem as possible.	1	2	3	4	5
30. I put off solving problems until it is too late to do anything about them.	1	2	3	4	5

31. I spend more time avoiding problems than solving them.	1	2	3	4	5
32.When I am trying to solve problems, I get so upset that I cannot think clearly.	1	2	3	4	5
33. Before I try to solve a problem, I set a specific goal so that I know exactly what I want to accomplish.	1	2	3	4	5
34. When I have a decision to make, I do not take the time to consider the pros and cons of each option.	1	2	3	4	5
35. When the outcome of my solution to a problem is not satisfactory, I try to find out what went wrong and then I try again.	1	2	3	4	5
36. I hate having to solve the problems that occur in life.	1	2	3	4	5
37. After carrying out a solution to a problem, I try to evaluate as carefully as possible how much the situation has changed for the better.	1	2	3	4	5
38. When I have a problem, I try to see it as a challenge, or opportunity to benefit in some positive way from having the problem.	1	2	3	4	5
39. When I am trying to solve a problem, I think of as many options as possible until I cannot come up with any more options.	1	2	3	4	5
40. When I have decisions to make, I weigh the consequences of each option and compare them against each other.	1	2	3	4	5
41. I become depressed and immobilized when I have an important problem to solve.	1	2	3	4	5
42. When I am faced with a difficult problem, I go to someone else for help in solving it.	1	2	3	4	5
43. When I have a decision to make, I consider the effects that each option is likely to have on my personal feelings.	1	2	3	4	5
44. When I have a problem to solve, I examine the factors or circumstances in my environment that might be contributing to the problem.	1	2	3	4	5
45. When making decisions, I go with my “gut feeling” without thinking too much about the consequences of each option.	1	2	3	4	5

46. When making decisions, I use a systematic method of judging and comparing alternatives.	1	2	3	4	5
47. When I am trying to solve a problem, I keep in mind what my goal is at all times.	1	2	3	4	5
48. When I am attempting to solve a problem, I approach it from as many different angles as possible.	1	2	3	4	5
49. When I am having trouble understanding a problem, I try to get more specific and concrete information about the problem to help clarify it.	1	2	3	4	5
50. When my first efforts to solve a problem fail, I get discouraged and depressed.	1	2	3	4	5
51. When a solution that I have carried out does not solve my problem satisfactorily, I do not take the time to examine carefully why it did not work.	1	2	3	4	5
52. I am too impulsive when it comes to making decisions.	1	2	3	4	5

Appendix P: End of Treatment PST Questionnaire

PST

This questionnaire pertains to the fact that you were in the group that was eligible for individual counseling when/if you experienced difficulty with the reduction or with quitting. We want to know how you felt about the idea of receiving individual counseling.

1. To what degree did the potential for individual counseling make you feel anxious?

1	2	3	4	5
not at all		*somewhat*		*extremely*

2. To what degree did the potential for individual counseling make you feel supported?

1	2	3	4	5
not at all		*somewhat*		*extremely*

3. To what degree did the potential for individual counseling make you feel resentful?

1	2	3	4	5
not at all		*somewhat*		*extremely*

4. To what degree did you work hard to avoid individual counseling?

1	2	3	4	5
not at all		*somewhat*		*extremely*

5. To what degree did you appreciate the opportunity to receive individual counseling?

1	2	3	4	5
not at all		*somewhat*		*extremely*

This next set of questions pertain to the individual session(s) you received after experiencing difficulties with reducing/quitting:

1. Overall, how effective do you feel the individual sessions were in helping you achieve your non-smoking goals?

1	2	3	4	5
not at all		*somewhat*		*extremely*

2. What was/were the most helpful aspect(s) of the individual Problem-Solving Therapy sessions? (please pick no more than 3)

_____ Increased accountability
_____ Increased support
_____ Individual attention
_____ Learning formal problem-solving method
_____ Identifying your problem
_____ Understanding your problem
_____ Developing potential solutions to your problem
_____ Other: _____

3. What would have made the individual Problem-Solving Therapy more helpful?

_____ If we talked about different topics
_____ If I had better rapport with the counselor (i.e., felt more comfortable, felt better understood, got along with better)
_____ If the timing were better (example: received counseling sooner after I experienced difficulties)
_____ If I was invested in it/thought it would be helpful
_____ If I worked on what we discussed more outside of the sessions
_____ None
_____ Other:_____

Please provide any other comments you feel would be helpful to us in understanding your feelings about your experience with the individual counseling. (Please feel free to elaborate on any of your answers above.)