Smoking Cessation, Reduction and Motivation Change in a Predominantly Hispanic Sample

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SMOKING CESSATION, REDUCTION AND MOTIVATION CHANGE IN A
PREDOMINANTLY HISPANIC SAMPLE

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Dedication

I dedicate this thesis to my parents Maria de Jesús and Justo as well as to my brothers and sisters for all their support and encouragement to continue with my studies.
SMOKING CESSATION, REDUCTION AND MOTIVATION CHANGE IN A
PREDOMINANTLY HISPANIC SAMPLE

by

JOSÉ ALONSO CABRIALES, B.S.

THESIS

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The University of Texas at El Paso
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Abstract

To date, few studies have focused on smoking cessation specifically for light and intermittent smokers (fewer than 10 cigarettes per day). Light and intermittent smoking have been on the rise for the past years, and multiple studies have documented the detrimental health effects of low-level smoking. This study assessed the efficacy of a brief smoking cessation intervention for light smokers in a predominantly Hispanic community sample. Additionally, predictors of quitting were also assessed. Two hundred and fifty light and intermittent smokers were recruited primarily from a family health clinic and the UTEP campus. Participants completed baseline measures assessing demographics, tobacco use and history, stage of change, perceived competence (PCS) and expired Carbon Monoxide (CO) levels. Participants were randomly assigned to an immediate brief smoking cessation intervention or to a delayed brief smoking cessation intervention. At the three month follow-up, participants’ smoking status, stage of change, and PCS scores were assessed. Logistic and linear regression models were used to assess predictors of smoking cessation, smoking reduction, motivation change, and perceived competence. Independent variables included intervention assignment, age, smoking rate at baseline, and motivation to quit. Results indicated that intervention assignment was not associated with cessation, reduction, or perceived competence. However, increases in readiness to quit smoking were significantly predicted by intervention assignment, such that those in the delayed intervention group were .28 times as likely to increase readiness relative to those in the immediate intervention group. Future efforts should focus on capitalizing on motivation change to promote smoking cessation.
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Chapter 1: Introduction

1.1 Health Consequences of Smoking

Currently, tobacco use is the leading cause of preventable death in the United States (Centers for Disease Control and Prevention [CDC], 2009). Although smoking rates continue to decline, in 2008 an estimated 59.8 million people in the U.S. were current smokers (Substance Abuse and Mental Health Services Association [SAMHSA], 2009). Accordingly, a recent report by SAMHSA indicated that although smoking prevalence has declined over the past years, light smoking has increased particularly among young adults (Pierce, White & Messer, 2009; SAMHSA, 2009). Smoking harms nearly every organ of the body and has been associated with several types of cancer, cardiovascular and respiratory diseases, reproductive negative effects, and with an overall diminished health status (CDC, 2004). There is sufficient evidence indicating that smoking is associated with more than 10 types of cancer including lung, laryngeal, pharyngeal, oral, esophageal, pancreatic, bladder, kidney, cervical, and stomach cancer (CDC, 2004). Additionally, smoking is associated with respiratory diseases which include acute (e.g., pneumonia) and chronic respiratory diseases, as well as negative effects on reproductive health and pregnancy outcomes (e.g., preterm delivery, sudden infant death syndrome) (CDC, 2004). Each year, smoking is responsible for 443,000 deaths (including second-hand smoke related deaths) and for $97 billion in productivity loss in the United States (CDC, 2009). As a consequence of the harm produced by smoking and the use of other tobacco products, the current Treating Tobacco Use and Dependence: 2008 Update (Fiore et al., 2008), recommends health providers identify tobacco users and treat them with a combination of counseling and pharmacotherapy.
1.2 Light Smoking and Hispanics

Although there has been variability in categorizing low level smokers (Okuyemi et al., 2002), many recent studies have categorized non daily smokers as “intermittent” (Husten, 2009) and those smoking fewer than 10 cigarettes per day (cpd) as “light” smokers (Boulos et al., 2009; Fagan, Brook, Rubenstone, Zhang, & Brook, 2009; Fiore et al., 2008). As such, we adopted these definitions. Multiple health risks related to light and intermittent smoking have been documented. Light and intermittent smoking has been associated with shortness of breath and coughing (An et al., 2009), with a higher risk of premature death from cardiovascular disease (Luoto, Uutela, & Puska, 2000), with myocardial infarction (Prescott, Scharling, Osler, & Schnohr, 2002), with an increased risk for several types of cancer, and with ischaemic heart disease (Bjartveit & Tverdal, 2005; Burns, Levinson, & Prochazka, 2007; Lubin & Caporaso, 2006). Despite the association between light smoking and disease, light smokers are often unaware of the dangers that light smoking carries and thus tend to underestimate the risks associated with low level smoking (Hamilton, Cross, & Resnicow, 2000). Additionally, studies have tried to document the benefits (if any) of reduced smoking. A study by Tverdal and Bjartveit (2006) suggested that even a 50% reduction in smoking does not represent a significant reduction in the risk for specific diseases (e.g., lung cancer). Similarly, Hurt et al. (2000) found that heavy smokers who reduced their levels of smoking by 25% did not experience a reduction in smoking-related biomarkers. Thus, no safe level of smoking exists, which highlights the need to develop and implement smoking cessation interventions for light smokers.

Light and intermittent smoking is more common among ethnic minorities in the United States, especially in Hispanic populations (Evans et al., 1992; Okuyemi et al., 2002; Trinidad et al., 2009). Rodríguez-Esquível, Cooper, Blow, and Resor (2009) observed that in a Hispanic
sample two thirds of the participants were light smokers. A recent survey in California reported that more than 70% of Latino smokers smoked fewer than five cigarettes per day (cpd) (Zhu, Pulvers, Zhuang, & Baezconde-Garbanati, 2007). Similarly, another study reported that 63% of Hispanic participants were light smokers who smoked between one and ten cpd and reported the lowest levels of addiction to nicotine across several indices (e.g., mean cpd) compared to other ethnicities (Lawrence, Fagan, Backinger, Gibson, & Hartman, 2007).

Several characteristics have been identified that pertain to light and intermittent Hispanic smokers compared to other ethnic groups in the United States. Although Hispanics usually smoke at lower levels than non-Hispanic Whites on average, they smoke for longer duration, which increases the risk for lung cancer (Burns, Levinson, Lezotte, & Prochazka, 2007). Hispanics report more quit attempts compared to non-Hispanic Whites (Levinson et al., 2006); however, they are less likely to be advised to quit smoking by health care providers compared to other ethnicities (Houston, Scarinci, Person, & Greene, 2005). Studies also indicate that Hispanics smoke more in social situations (Foraker et al., 2006), report less use of and distrust of nicotine replacement therapy (NRT) and other pharmaceutical cessation aids (Levinson et al., 2006). Most Hispanics report a health-related desire to quit (Sias, Urquidi, Bristow, Rodriguez, & Ortiz, 2007), and believe smoking to be a weakness rather than an illness (Levinson et al., 2006). Additionally, Hispanics appear to be more prone to familial influence concerning smoking (e.g., parents that smoke, parental communication) (Marcus, Pahl, Ning, & Brook, 2007; Shakib et al., 2003) and are more likely to report reasons to quit related to family criticism or pressure (Perez-Stable, Marin, & Posner, 1998).
1.3 Cessation Interventions

Various pharmacotherapies for smoking cessation have been effective including NRT and other medications like varenicline (Eisenberg et al., 2008). However, although the current clinical guideline to treat tobacco use and dependence recommends practitioners to combine counseling and pharmacotherapy for smokers in general, it does warn about the not-yet proven efficacy of NRT and other medications with light and intermittent smokers (Fiore et al., 2008). For example, one study found that a 2mg nicotine gum was not better than placebo for treating light smokers (Ahluwalia et al., 2006). In a randomized controlled-placebo trial, Shiffman (2005) indicated that nicotine lozenge was an effective cessation aid with light smokers at a one year follow-up; however their definition of light smoking was 15 cpd or fewer, which is heavier than the most recently used cut-off of 10 or fewer cpd. According to some studies, light smokers have not developed a nicotine addiction (Benowitz, Jacob, Kozlowski & Yu, 1986; Rubinstein, Benowitz, Auerback, & Moscicki, 2009; Shiffman, 1989), and Hispanic smokers particularly, have expressed less use and distrust of NRT compared to other ethnicities (Levinson et al., 2004; Levinson et al., 2006). Hence, currently the use of NRT does not seem to be a best-practice recommendation for treating light smokers.

Compared to heavier smokers, light smokers perceive higher benefits from smoking, less risk from smoking, and higher self-efficacy to quit (Hamilton, Cross, & Resnicow, 2000). Additionally, the absence of nicotine addiction or tolerance, and their higher self-efficacy to quit suggests that this group might benefit from psychosocial approaches, since their smoking behavior might be driven more by environmental and social factors than by physiological addiction (Russell, 1990).
Health education (HE) has been reported as an effective smoking cessation strategy (e.g., Hall et al., 1996). Smokers continue to underestimate personal health risks associated with smoking; thus, improved and effective education that promotes healthy change among smokers is needed (Weinstein, 1999a; Weinstein, 1999b). A study by Windsor et al. (1993) compared a health education cessation intervention for pregnant women to a control group. An overall quit rate of 14.3% was observed, and a cost benefit analyses indicated that the HE intervention was cost-effective compared to usual care (UC). Similarly, Ahluwalia and colleagues (2006) compared motivational interviewing (MI) to HE with light smokers and found HE to be a better predictor of smoking cessation than MI. Nollen and colleagues (2006) compared the efficacy of two health education materials plus a transdermal nicotine patch. One packet contained standard education materials which included a video and a guide on strategies on how to quit smoking; the other packet included a tailored video and guide for African Americans on strategies on how to quit smoking. Results indicated that conditions yielded non significant cessation rates (tailored 18% vs standard 14.4%). Additionally, Schnoll et al. (2005) compared cognitive behavioral therapy (CBT) to HE with cancer patients and found no significant differences in quit rates between both conditions (44.9% vs 47.3% respectively). Thus, several studies suggest HE is a cost-effective and low intensity intervention that might be effective to help smokers quit smoking.

Motivational Enhancement (ME) has been used effectively in several studies to promote reduction and smoking cessation (e.g., Butler et al., 1999). ME is a component derived from Motivational Interviewing (Miller & Rollnick, 2002) which uses a client centered and empathic approach to help clients develop and resolve ambivalence towards quitting. Interventions derived and adapted from MI have been successful at promoting behavioral change including
smoking cessation (Dunn, Deroo, & Rivara, 2001). For example, Borrelli and colleagues (2005) presented findings on a smoking cessation intervention delivered by nurses in primary health care in which participants were randomly assigned to a standard care (SC) intervention or to an ME intervention and observed that ME outperformed SC on each outcome including cessation and quit attempts. A recent study compared the efficacy of contingency management (CM) and ME in a smoking cessation randomized controlled trial (RCT) against two control conditions (progressive muscle relaxation and a noncontingent reinforcement condition) (Tevyaw et al., 2009). The CM condition provided participants with increased monetary incentives contingent on biochemical smoking abstinence verification. Although the ME plus CM condition provided the best cessation outcomes at only 6.4%, there were no significant differences at follow-up compared to the control condition. A study by Ruger and colleagues (2008) analyzed the cost-effectiveness of MI cessation with pregnant women compared to usual care (UC). MI appeared to be cost-effective only for relapse prevention but not for cessation since it did not provide significantly higher cessation outcomes compared to UC. However, one study indicated light smokers were less motivated to quit compared to heavier smokers (Etter, 2004), and the Ahluwalia et al. (2006) study in which HE outperformed MI was implemented among smokers highly motivated to quit smoking. Thus, it may be that when assisting light and intermittent smokers of variable level of motivation to quit smoking, an ME component is appropriate.

Trigger management may be a promising approach to deal with smoking triggers and cues that light and intermittent smokers face. Seeing others smoking, being around other smokers, and changes in mood and affect increase smoking in heavier smokers (Shiffman et al., 2002; Surawy, Stepney, & Cox, 1985). In light smokers, increased smoking has been associated with caffeine and alcohol intake, by the presence of other smokers, and evening hours (6pm-
6am) (Krukowski, Solomon, & Naud, 2005; Marshall, Epstein, & Green, 1980). Hence, external cues might be as or more salient for light than for heavier smokers, since they demonstrate far lower levels of nicotine addiction relative to heavier smokers (Rodríguez-Esquível et al., 2009). As these studies suggest, light and intermittent smokers encounter external and internal triggers that might influence their smoking, hence a trigger management component might be useful to help light smokers develop effective coping strategies.

Currently, the literature reports only one cessation trial that focused on light smokers. The study by Ahluwalia and colleagues (2006) used a 2 by 2 placebo-controlled randomized design which focused on African Americans who smoked on at least 25 of the past 30 days and consumed 10 or fewer cpd. Participants were randomized into one of four treatment arms: nicotine gum plus health education (HE), nicotine gum plus motivational interviewing (MI), placebo gum plus HE, and placebo gum plus MI. Contrary to the author’s hypotheses, nicotine gum was no better than placebo gum, and HE outperformed MI, with participants in the HE condition being 2.17 times more likely to quit smoking. A recent study (Reitzel et al., 2009) that assessed differences in low-level, light and moderate/heavy Latino smokers found that higher levels of smoking correlated with greater levels of dependence and withdrawal but not with cessation. Thus, although Hispanics smoke at lower levels, their difficulty to quit might be comparable to moderate smokers, which highlights the need to offer cessation interventions specific to light and intermittent smokers.

1.4 Predictors of Cessation

In order to increase the efficacy of smoking cessation interventions, it is important to explore and identify possible predictors of cessation. For the purpose of this study four predictors will be assessed: intervention condition (immediate vs delayed), age, smoking
status/rate, and motivation to quit (measured via stage of change at baseline). Of course, multiple studies have identified an active treatment condition to be a predictor of cessation (e.g., Borreli et al., 2005; Nohlert et al., 2009). Several studies have found an association between smoking cessation and older age. For example Lee and Kahende (2007) found that individuals who quit smoking were more likely to be thirty five or older. Additionally, an association between spontaneous reduction in smoking and being older has been observed (Joseph, Bliss, Zhao, & Lando, 2005). Lower smoking status/rate as a proxy measure of nicotine dependence and fewer cigarettes per day has predicted cessation (Schumann et al., 2008) as opposed to higher levels of nicotine addiction which has predicted smoking and relapse (Augustson et al., 2008). Although light smokers usually do not present biomarkers for nicotine dependence, they have shown subjective signs of withdrawal as number of cigarettes per day increases (6-10 cpd); thus, suggesting it is still difficult for light smokers to quit (Rubinstein et al., 2009).

Additionally, increased cotinine levels have predicted continued smoking, which is associated with an increased number of cigarettes per day (Nollen et al., 2006).

Motivation to quit at baseline has been found to predict smoking cessation (DiClemente et al., 1991). The Transtheoretical Model (McConnaughy, Prochaska, & Velicer, 1983; Prochaska & DiClemente, 1982) asserts that motivation to change lies on a continuum and that as invidividuals’ motivation increases, the probabilities for behavior change increase (Prochaska et al., 1994). A study that implemented a brief cessation intervention reported that the intervention was more effective for smokers who were in the preparation stage (i.e., more motivated) relative to lower levels of readiness (Armitage & Arden, 2008).
1.5 Theoretical Approach

In order to guide the intervention and assessment portions of this study, three theoretical frameworks were employed: The Transtheoretical Model (TTM), self-determination theory (SDT), and the health belief model (HBM).

The Transtheoretical Model (TTM; McConnaughy, Prochaska, & Velicer, 1983; Prochaska & DiClemente, 1982; Prochaska & Norcross, 2001) describes a framework in which individuals move through stages according to their motivation to change their behavior. The TTM describes five stages: precontemplation, contemplation, preparation, action, and maintenance. The TTM model has been validated and adapted in a variety of addictive and health related behaviors (Prochaska et al., 1994) and has been effectively applied to smoking cessation (DiClemente et al., 1991; Velicer, DiClemente, Prochaska, & Brandenburg, 1985). Accordingly, this model was used as an assessment of stage of change at baseline and follow-up to explore whether individuals experience a change in their readiness to quit smoking. Additionally participants do not need to be matched according to their stage of change for smoking cessation interventions to be effective (Quinlan & McCaul, 2000).

Self-Determination Theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2000; Ryan, Kuhl, & Deci, 1997) focuses on humans’ inherent growth tendencies and psychological needs that yield to optimal development. A continuum from amotivation to intrinsic motivation is theorized (with extrinsic motivation in the middle) in which individuals who display intrinsic motivation achieve a better performance across tasks compared to individuals with the same self-efficacy and abilities (Ryan & Deci, 2000). Three psychological needs that have been identified within SDT are autonomy, competence, and relatedness are hypothesized to be essential for social development and personal well-being (Ryan & Deci, 2000; Ryan, Patrick, Deci, & Williams,
A distinction between autonomous and controlled motivation is made; the first being more intrinsically driven and the latter more extrinsically driven. SDT suggests that by enhancing autonomy, competence (or efficacy), and relatedness, individuals will move toward intrinsic or autonomous motivation, which in turn facilitates behavior change and personal growth (Williams, Gagné, Ryan, & Deci, 2002). Thus, as an intervention strategy, smokers’ own reasons to quit were elicited in order to increase autonomous motivation and self-efficacy and guide them toward cessation.

The health belief model (HBM; Becker & Maidman, 1975) emerged from medical settings as an approach to improve health screening and to promote health-related behaviors. The HBM proposes six constructs to be at the core of health-related behaviors: perceived susceptibility (how likely the person believes s/he will acquire or develop an illness), perceived severity (seriousness of the consequences of contracting a disease), perceived benefits (beliefs about efficacy of the advice to reduce risk of impact), perceived barriers (costs of the advised action), cues to action (strategies to activate readiness), and self-efficacy. A study by McKee and colleagues (2005) indicated that perceived risks and benefits of smoking were related to quitting and to treatment response. According to several studies, most current and ex-smokers report health reasons as a priority when thinking of quitting (McCaul et al., 2006). Additionally, in a study with moderate and heavy Hispanic smokers (specifically Mexican-Americans), 95% reported a desire to quit smoking for health related reasons (Sias et al., 2007). Thus a health education approach might benefit light smokers who have misconceptions about the risks of smoking (Hamilton et al., 2000) by increasing their perceived susceptibility, severity, and the benefits of quitting smoking.
The brief intervention integrated the mentioned theoretical models to promote cessation in light smokers. The TTM was used to assess individual’s stage of change and motivation to quit as well as to assist smokers to move toward quitting. Although for the purposes of this intervention individuals are not matched to intervention according to the stage of change, interventionists tailored responses according to participants’ readiness to quit. For example, for individuals who were already motivated, the target becomes increasing self-efficacy, trigger management, and coping skills. In addition to the TTM assessment portion, this model was primarily incorporated within the motivational enhancement portion of the intervention addressing the pros and cons of smoking and quitting. SDT was used in the intervention process by guiding smokers toward intrinsic motivators (e.g., seeing quitting as a personal achievement) to quit smoking instead of relying more on extrinsic motivators (e.g., quitting to please a significant other). Further, the HBM was used to educate smokers about the detrimental consequences of light smoking and the benefits of quitting, as well as clarifying any misconceptions about light smoking or smoking in general.

1.6 Aims and Hypotheses

The primary purpose of this study was to assess the efficacy of a brief randomized smoking cessation intervention in a Hispanic community sample. The main outcomes were smoking cessation and smoking reduction (continuous). Possible predictors of cessation and reduction were analyzed: intervention assignment, age, smoking status/rate at baseline, and motivation to quit. It was hypothesized that intervention assignment (immediate intervention), older age, lower smoking status/rate at baseline, and increased motivation to quit would be significant predictors of smoking cessation and reduction.
Secondary aims of this study included the assessment of changes in motivation post-intervention (in line with TTM), as well as changes in perceived competence (in line with SDT) based on intervention assignment. Intervention assignment, age, smoking status at baseline, and motivation to quit at baseline were analyzed as predictors of follow-up increased motivation to quit and perceived competence. It was hypothesized that increased cessation motivation and increased perceived competence were associated with receiving the intervention.

Chapter 2: Method

2.1 Participants

Prior to beginning data collection, permission was obtained from the Institutional Review Board at the University of Texas at El Paso (UTEP). Two hundred and fifty participants between the ages of 18 and 74 years ($M = 42.49$ years, $SD = 12.67$) were recruited primarily from a family health clinic and the UTEP campus which has a majority of Hispanic students (75.1%; CIERP, 2008). Centro San Vicente (CSV) is a primary health care clinic that provides services to a predominantly Hispanic population on the US/Mexico border in the El Paso region. El Paso County has a population of 644,638 and comprises a metropolitan area of more than two million inhabitants (together with Cd. Juárez, MX; INEGI, 2005). Hispanics represent 80.8% of the total El Paso County population (U.S. Census Bureau, 2008). Centro San Vicente serves an average of 15,555 people per year providing a variety of services including preventive, dental, and behavioral health, general care, and dental services (CSV, Annual report, 2006).

The singular inclusion criterion was to have smoked at least one cigarette during the past 30 days but no more than 10 cigarettes per day (cpd). Fifty-two percent of the participants were male, and 48% were female. The sample was predominantly Hispanic (87%) and self-identified as follows: 44% Mexican National, 31% Mexican American, 12% Other Hispanic (e.g., Chicano,
Puerto Rican), 4% non-Hispanic White, 2% African American, 1% Asian American, and 1% Native American, and 5% self-reported as other ethnicity (e.g., Mexican American-white).

A power analysis was performed a priori, using the test for binomial independent (treatment condition) proportions on abstinence rates, with \( \alpha = .05 \), equal randomization of participants (50/50) to each condition, and power set to .80; a necessary sample size of 198 participants total (99 per condition) was determined to detect a difference of quit rates between 26% (meta-analytic abstinence estimate for 31-90 min of intervention) and 11% (0 min of intervention) between intervention conditions (Fiore et al., 2008). However, in order to account for attrition, 250 participants were recruited. As suggested by Hosmer and Lemeshow (2000) and other researchers (Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996), at least 10 events are needed for every predictor (EVP) when using the logistic regression model. However, this study analyzed four independent variables as possible predictors of cessation (intervention, age, smoking status, and motivation to quit) based on the suggestion by Vittinghoff and McCulloch (2006) of relaxing the 10 EVP rule.

2.2 Measures

The following paper and pencil measures were completed by participants at baseline and follow-up for the purposes of this study.

A Tobacco use behavior and attitudes survey (see Appendix A) was administered which included questions regarding typical demographic information as age, gender, ethnicity, and previous mental health diagnosis, as well as a history of previous tobacco use (e.g., quit attempts, intention to quit). These tobacco measures have been used in multiple studies (e.g., Rodriguez-Esquivel et al., 2009). Smoking status was assessed in which participants indicated (a) smoking more than one cpd, (b) smoking fewer than one cpd, but more than one cigarette per week, (c)
smoking less than one cigarette per week, yet greater than one cigarette per month, (d) formerly smoking (e.g., quitting to be used particularly for follow-up), or (e) never smoking. Baseline smoking status was coded as either intermittent smoking (non-daily) or light smoking (between 1 and 10 cpd). Additionally, smoking status was assessed as a continuous variable in order to analyze reduction in cigarettes smoked at follow-up. A measure of mean number of cigarettes per month was computed by multiplying the average of cigarettes smoked per day (on the days that a person smoked) times the number of days that the person smoked during the past month. Smoking cessation was determined by a quit smoking response at follow-up. Reduction was measured by subtracting cigarettes smoked per month at follow-up from number of cigarettes smoked per month at baseline.

The Smoking: Stage of Change (Short Form; see Appendix B) is a three-question algorithm designed to assess the motivation of the individual to quit smoking while placing him/her into one of the five stages of change (DiClemente et al., 1991; McConnaughy et al., 1983) depending on his/her willingness to quit in the next month or next six months. Precontemplation, contemplation, and preparation stages have been found to predict attempts to quit, as well as cessation success at 1- and 6-month follow-ups (DiClemente et al., 1991).

Perceived Competence Scale (PCS; see Appendix C) includes four items using a Likert scale that reflect participants’ feelings of competence to quit smoking from (1) not at all true to (7) very true. Item responses are averaged, with higher scores indicating higher perceived competence to quit smoking. The PCS has demonstrated adequate reliability (alpha ≥ .80) (Williams & Deci, 1996; Williams, Freedman, & Deci, 1998; Williams et al., 2002) and in this study, internal consistency was Cronbach’s α = .91.
The Bedfont Scientific EC50 Micro-III Smokerlyzer was utilized to assess participants’ Carbon Monoxide (CO) levels. Participants were asked to hold their breath for 15 sec and then to blow into the machine which displays a measure of CO in parts per million (ppm) with a sensitivity and specificity precision above 95% (Hald, Overgaard, & Grau, 2003).

2.3 Procedure

Participants were recruited through radio, newspaper advertisement, and in person at a primary health care clinic. The following screening question was asked: “How many cigarettes have you smoked in the past 30 days?” with the inclusion criterion being having smoked at least one cigarette during the past month but fewer than 10 a day. This question was adopted instead of “are you a smoker” because many light smokers do not consider themselves smokers. If the person was eligible, then he/she completed the informed consent process as well as the paper and pencil measures. After completion of the survey, participants were randomly assigned to an immediate intervention or to a delayed intervention. Following the completion of the measures, participants in the delayed intervention were thanked for their participation, provided a $15 giftcard, and informed that they were going to be contacted and compensated to complete a three month follow-up assessment, as well as have the opportunity to participate in the intervention. If participants were in the immediate intervention, after completing the measures, their CO levels were assessed followed by a brief smoking cessation intervention. Participants were thanked and paid ($15 giftcard) after completing the intervention and informed about the three-month follow-up assessment.

Participants were contacted three months after they participated via phone, and given the option of completing their follow-up assessment by telephone, mail, or in person. Research assistants called every participant three times in order to assess the most convenient method for
follow-up completion. It should be noted that research assistants completing the follow-up were not blind to intervention assignment. Participants who could not be reached by phone (disconnected/not working) were mailed a reminder of their follow-up assessment and were mailed the follow-up survey as well. In order to improve retention rates, a prize draw was implemented for those participants who completed the study. Ten participants who completed their follow-up assessment were chosen at random to receive a $100 giftcard. If participants completed their follow-up via telephone, or by mail, their $15 giftcard was sent by mail to their home address. If participants completed their follow-up in person, they were paid in person after completing the paper and pencil measures. Staff who conducted telephone and in person follow-ups were not blind to treatment assignment. Participants who were in the delayed intervention group were encouraged to make an appointment with program interventionists to receive the intervention once they completed the paper and pencil measures.

2.4 Intervention

Trained master’s level clinical psychology students (one female, and two male) recruited smokers in-person or through appointment and delivered the intervention individually to participants. The interventionists were second and third year masters’ level students who were trained by a clinical psychologist to deliver the intervention. Interventionists adhered to a manualized treatment protocol, and supervision was provided by the clinical psychologist as necessary. The time to complete the study including the paper and pencil assessment plus the brief intervention was approximately one hr. The study was also offered in Spanish to participants if this was their dominant or preferred language. All assessment measures and the intervention were back translated by two certified translators, and checked for discrepancies with a bilingual interventionist and with the bilingual program coordinator as recommended by
previous studies and guidelines (Beaton, Bombardier, Guillemin, & Bosi-Ferraz, 2000; Sinaiko & Brislin, 1973).

As part of the intervention, participants had their carbon monoxide levels measured with the Bedfont® Smokerlyzer. Feedback was provided to participants which included an explanation of what their particular CO level meant (relating it to the participant), and a brief explanation about the decay of CO in the body, as well as addressing any questions or doubts the participant might have regarding biomarker feedback. This portion of the intervention lasted approximately 5 min.

A motivational enhancement component included measuring participants’ motivation and confidence to quit, followed by a motivational enhancement worksheet which sought to develop discrepancies between quitting and continued smoking and resolving ambivalence about quitting by reviewing with the participant both the motivators to continue smoking and the motivators to quit. The strategy of “tiping the scales” was used by the interventionist to help the participant to identify more motivators to quit smoking (i.e., benefits of quitting, and costs of smoking) as opposed to motivators to smoke (i.e., benefits of smoking, and costs of quitting). If the participant had difficulty identifying motivators to quit, the interventionist used questions to help him/her identify them and as a consequence “tip the scales.” An example question was: “what would happen to your health if you quit smoking?” Lastly, the interventionist reviewed the motivators to quit smoking provided by the participant and asked him/her to reflect on the motivators and relate them to his/her own life and readiness to change. This component required approximately 15 minutes of intervention time.

The trigger management component sought to help participants identify internal and external triggers to smoke. The interventionist explained that internal triggers can be thoughts,
feelings (mood), or physical sensations and that external triggers can be places, people, time of
the day, and events (e.g., going out with friends or after eating a meal). After this brief
introduction, participants were asked to identify their own triggers (internal and external). The
interventionist then introduced three ways of managing triggers: escaping, avoiding, and coping
with triggers and elicited from participants examples of each. After the participant listed the
coping strategies for the triggers, the interventionist asked him/her how these strategies would be
implemented afterwards. This component of the intervention typically lasted for 10 min.

The interventionist reviewed two handouts with the participant, one listing some common
health risks of light smoking and the other containing the immediate, and long lasting benefits of
quitting smoking. At this time, the interventionist clarified any question the participant may
have, and encouraged him/her to review in detail these handouts at home. Additionally, the
interventionist assessed if the participant was ready to set a quit date and if so, advice was
provided (e.g., remove ashtrays, tell a significant other of their plan). This portion of the
intervention lasted approximately 5 min.

2.5 Approach to Analyses

An intent to treat approach was used for statistical purposes concerning cessation. An
intent to treat analyses treats non-completers as smokers; this is the most conservative approach
to handling missing smoking status data. Descriptive statistics were used to assess participant
characteristics to include demographics, tobacco use behaviors and history, and scores on
transtheoretical and self-determination measures.

Primary analyses included two regression models to assess potential predictors of
cessation (logistic) and reduction (linear). Independent variables included: intervention condition
(immediate vs delayed), age, smoking status/rate, and motivation to quit.
Secondary analyses included the assessments of change in motivation and perceived competence between baseline and follow-up. Motivation change was assessed via the stage of change at baseline and follow-up. First, a logistic regression was performed with increase (1 = increase vs 0 = decrease or no change) in motivation to quit smoking as the dependent variable and intervention assignment, age, smoking status/rate, and motivation to quit at baseline as independent variables. Second, a multiple linear regression was performed with follow-up perceived competence score as the dependent variable. The independent variables included: intervention assignment, age, smoking rate at baseline, motivation to quit at baseline, and baseline perceived competence score. A logistic regression model also explored whether those lost to follow-up differed from those who completed the study on any of the relevant independent variables.

Finally, univariate analyses to assess interventionist, language (English vs Spanish), setting differences (CVS vs UTEP), and intermittent vs daily light smoking status were performed. The former three predictors were assessed given potential process-related differences, while the latter variable was assessed for covariate inclusion because of a failure of randomization (see Table 3.1). The inclusion of covariates is based on the meeting of two criteria: (a) the potential covariate is significantly related to the dependent variable of interest, and (b) the potential covariate is not significantly associated with other independent variables in the model. Among the four variables of interest, only language met the inclusion criteria with the perceived competence dependent variable, \( \chi^2 (123, 1) = 3.31, p < .05 \), indicating that the perceived competence score at follow-up was significantly higher in Spanish speaking individuals. To maintain consistency, language was included in all four regression models.
Chapter 3: Results

The mean age of the sample was 42.49 ($SD = 12.68$), and 51.6% were female. Of the total sample, 42.4% of the participants reported less than a high school education, 28.7% reported having earned a high school diploma, 22.3% reported some college education, 4% reported being college graduates, and 2% reported some graduate coursework. The mean age of first use of tobacco was 17.73 ($SD = 6.51$). Participants’ reported their smoking status as the following: 63.9% smoked at least one cigarette per day ($M = 5.79$, $Mdn = 5.00$, $SD = 3.06$), 22.9% smoked 1 to 6 cpd, 10.4% smoked less than one cigarette per week, and 2.8% smoked less than one cigarette per month. The mean expired CO reading for intervention participants was 4.15 ($Mdn = 3.00$, $SD = 4.58$), 95% CI [3.32, 4.99] and the mean FTND score for the whole sample was 1.95 ($Mdn = 1.00$, $SD = 1.93$), 95% CI [1.71, 2.19].

According to the stage of change measure, 0.4% of participants were in the action stage, 47.6% of the participants were in the preparation stage, 27.8% in the contemplation stage, and 24.2% in the precontemplation stage. The perceived competence mean score was 4.99 ($Mdn = 5.50$, $SD = 1.84$), 95% CI [4.76, 5.22]. Using an intent to treat approach (ITT), overall 9.6% of participants quit smoking, and no significant differences in quit rates between immediate and delayed conditions were found (8.1% and 11% respectively). Additionally, 33.6% of participants reduced their monthly smoking by at least one cigarette at the 3 month follow-up (See Tables 3.1 and 3.2).
Table 3.1: Demographic characteristics of light and intermittent smokers by intervention assignment

<table>
<thead>
<tr>
<th>Variables</th>
<th>Immediate</th>
<th></th>
<th></th>
<th>Delayed</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td></td>
<td>N</td>
<td>%</td>
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</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>65</td>
<td>53</td>
<td>56</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>58</td>
<td>47</td>
<td>71</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>5</td>
<td>4.1</td>
<td>5</td>
<td>4.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>2</td>
<td>1.7</td>
<td>2</td>
<td>1.6</td>
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<td></td>
</tr>
<tr>
<td>Mexican American</td>
<td>38</td>
<td>31.4</td>
<td>39</td>
<td>31.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexican National</td>
<td>53</td>
<td>43.8</td>
<td>57</td>
<td>45.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Hispanic</td>
<td>15</td>
<td>12.4</td>
<td>11</td>
<td>8.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian American/Pacific Islander</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native American</td>
<td>1</td>
<td>.8</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other ethnicity</td>
<td>7</td>
<td>5.8</td>
<td>11</td>
<td>8.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
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</tr>
<tr>
<td>Less than high school</td>
<td>50</td>
<td>41</td>
<td>56</td>
<td>44</td>
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<td></td>
</tr>
<tr>
<td>High school/GED</td>
<td>36</td>
<td>30</td>
<td>35</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some college</td>
<td>26</td>
<td>22</td>
<td>29</td>
<td>23</td>
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<tr>
<td>College graduate</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate coursework</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily light</td>
<td>87</td>
<td>71</td>
<td>72</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermittent</td>
<td>36</td>
<td>29</td>
<td>54</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage of change baseline</td>
<td></td>
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</tr>
<tr>
<td>Action</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparation</td>
<td>58</td>
<td>48</td>
<td>60</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contemplation</td>
<td>32</td>
<td>26</td>
<td>37</td>
<td>29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precontemplation</td>
<td>32</td>
<td>26</td>
<td>28</td>
<td>22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3.2: Continuous Demographic Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Immediate</th>
<th></th>
<th></th>
<th>Delayed</th>
<th></th>
<th></th>
<th>Range</th>
<th>t</th>
<th>df</th>
<th>ns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>41.49</td>
<td>12.87</td>
<td>43.46</td>
<td>12.46</td>
<td>18-74</td>
<td>t (245) = -1.224, ns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarettes per month</td>
<td>124.66</td>
<td>103.05</td>
<td>111.96</td>
<td>102.9</td>
<td>1-480</td>
<td>t (242) = .963, ns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco initiation (age in years)</td>
<td>17.91</td>
<td>6.63</td>
<td>17.55</td>
<td>6.4</td>
<td>5-60</td>
<td>t (236) = .428, ns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FTND</td>
<td>2.09</td>
<td>1.96</td>
<td>1.82</td>
<td>1.90</td>
<td>0-8</td>
<td>t (248) = 1.107, ns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCS</td>
<td>4.83</td>
<td>1.80</td>
<td>5.16</td>
<td>1.87</td>
<td>1-7</td>
<td>t (244) = -1.386, ns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exhaled CO (ppm)</td>
<td>4.15</td>
<td>4.58</td>
<td>0-24</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The logistic regression model predicting smoking cessation (quitter = 1, smoker = 0) did not fit the data, $\chi^2 (6) = 8.61, ns, R^2 = .045$ (see Table 3), and thus predictor associations with the dependent variable were not interpreted.

Table 3.3: Logistic regression predicting cessation at 3 month follow-up

<table>
<thead>
<tr>
<th>Variables</th>
<th>OR</th>
<th>p</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention assignment (ref. is immediate)</td>
<td>1.38</td>
<td>0.488</td>
<td>0.549</td>
<td>3.507</td>
</tr>
<tr>
<td>Age</td>
<td>1.025</td>
<td>0.194</td>
<td>0.987</td>
<td>1.064</td>
</tr>
<tr>
<td>Cigarettes per month</td>
<td>0.995</td>
<td>0.054</td>
<td>0.989</td>
<td>1.000</td>
</tr>
<tr>
<td>Motivation to quit (ref. is precontemplation)</td>
<td>1.442</td>
<td>0.555</td>
<td>0.428</td>
<td>4.863</td>
</tr>
<tr>
<td>Preparation</td>
<td>0.644</td>
<td>0.565</td>
<td>0.144</td>
<td>2.878</td>
</tr>
<tr>
<td>Contemplation</td>
<td>0.881</td>
<td>0.797</td>
<td>0.334</td>
<td>2.323</td>
</tr>
<tr>
<td>Language (ref. is Spanish)</td>
<td>0.032</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Abstinence rates at 3 month follow-up (Immediate = 8.1% v. Delayed =11.0%). $\chi^2 (6) = 8.61, ns, R^2 = .045$
In model two, a multiple linear regression with smoking reduction as the dependent variable (mean number of cigarettes smoked per month at follow-up) was performed. The overall model was significant $F(6, 231) = 2.54, p < .05, R^2 = .062$ (see Table 4), and mean number of cigarettes smoked per month at baseline (higher) significantly predicted reduction. For every increase in cigarette smoked per month at baseline, there was a .138 decrease in smoking at follow-up, 95% CI [.051, .225]. Other predictors included in the model were not significant (intervention assignment, age, motivation to quit, and language).

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>Beta</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>40.138</td>
<td>0.074</td>
<td>.074</td>
<td>-3.951 - 84.226</td>
</tr>
<tr>
<td>Intervention assignment (ref. is immediate)</td>
<td>-10.632</td>
<td>-0.076</td>
<td>.240</td>
<td>-28.430 - 7.167</td>
</tr>
<tr>
<td>Age</td>
<td>-0.578</td>
<td>-0.104</td>
<td>0.115</td>
<td>-1.297 - 0.142</td>
</tr>
<tr>
<td>Cigarettes per month</td>
<td>0.138</td>
<td>0.201</td>
<td>0.002</td>
<td>0.051 - 0.225</td>
</tr>
<tr>
<td>Motivation to quit (ref. is precontemplation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparation</td>
<td>-4.918</td>
<td>-0.035</td>
<td>0.671</td>
<td>-27.668 - 17.832</td>
</tr>
<tr>
<td>Contemplation</td>
<td>-6.146</td>
<td>-0.040</td>
<td>0.631</td>
<td>-31.346 - 19.055</td>
</tr>
<tr>
<td>Language (ref. is Spanish)</td>
<td>3.846</td>
<td>0.027</td>
<td>0.686</td>
<td>-14.874 - 22.566</td>
</tr>
</tbody>
</table>

Note: Dichotomous reduction rates at 3 month follow-up (Immediate = 38.2% v. Delayed =29.1%).

$F(6, 231) = 2.54, p < .05, R^2 = .062$
Model three assessed motivation change via a logistic regression with change in motivation to quit post-intervention (positive change = 1 vs. negative change or no change = 0) as the dependent variable fit the data, $\chi^2 (6) = 24.57, p < .001$, $R^2 = .197$ (see Table 5). Relative to the immediate intervention, individuals in the delayed intervention were less likely to increase their motivation to quit at follow-up, Odds Ratio ($OR$) = .278, 95% CI [.11, .69], $B$ = -1.278, $p$ = .006, and those in the preparation stage at baseline were less likely to increase their motivation to quit smoking at follow-up relative to those in the precontemplation stage $OR$ = .164, 95% CI [.053, .504], $B$ = -1.80, $p$ = .002. Age, mean number of cigarettes smoked per month at baseline, and language did not significantly predict a positive change in motivation.

Table 3.5: Logistic regression predicting motivation change at 3 month follow-up

<table>
<thead>
<tr>
<th>Variables</th>
<th>OR</th>
<th>$p$</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention assignment (ref. is immediate)</td>
<td>0.278</td>
<td>0.006</td>
<td>0.112 – 0.693</td>
</tr>
<tr>
<td>Age</td>
<td>1.028</td>
<td>0.126</td>
<td>0.992 – 1.064</td>
</tr>
<tr>
<td>Cigarettes per month</td>
<td>0.998</td>
<td>0.278</td>
<td>0.993 – 1.002</td>
</tr>
<tr>
<td>Motivation to quit (ref. is precontemplation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparation</td>
<td>0.164</td>
<td>0.002</td>
<td>0.053 – 0.504</td>
</tr>
<tr>
<td>Contemplation</td>
<td>0.960</td>
<td>0.944</td>
<td>0.309 – 2.987</td>
</tr>
<tr>
<td>Language (ref. is Spanish)</td>
<td>0.645</td>
<td>0.360</td>
<td>0.253 – 1.648</td>
</tr>
<tr>
<td>Constant</td>
<td>3.785</td>
<td>0.239</td>
<td></td>
</tr>
</tbody>
</table>

Note: Positive motivation to quit change 3 month follow-up (Immediate = 45.8% v. Delayed = 27.9%). $\chi^2 (6) = 24.57, p < .001$, $R^2 = .195$
Model four assessed perceived competence score at follow-up as the dependent variable via a multiple linear regression, \( F(7, 110) = 7.38, p < .01, R^2 = .333 \) (see Table 6). Baseline perceived competence was associated with follow-up perceived competence; for every unit increase in baseline perceived competence score, there was a .372 unit increase in perceived competence at follow-up, 95% CI [.214, .529]. No other predictors were associated with perceived competence at follow-up. Finally, the logistic regression model with attrition as the dependent variable (0 = completer, 1 = non-completer), was not significant \( \chi^2 (6) = 10.11, p = \text{ns}, R^2 = .042 \) (see Table 7); thus, individual predictors were not interpreted.

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>Beta</th>
<th>( p )</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>2.975</td>
<td>0.00</td>
<td>1.47</td>
<td>4.479</td>
<td></td>
</tr>
<tr>
<td>Intervention assignment (ref. is immediate)</td>
<td>-0.063</td>
<td>-0.019</td>
<td>0.811</td>
<td>-0.58</td>
<td>0.455</td>
</tr>
<tr>
<td>Age</td>
<td>0.018</td>
<td>0.136</td>
<td>0.094</td>
<td>-0.003</td>
<td>0.04</td>
</tr>
<tr>
<td>Cigarettes per month</td>
<td>-0.001</td>
<td>-0.076</td>
<td>0.348</td>
<td>-0.004</td>
<td>0.01</td>
</tr>
<tr>
<td>Motivation to quit (ref. is precontemplation)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparation</td>
<td>0.475</td>
<td>0.143</td>
<td>0.169</td>
<td>-0.204</td>
<td>1.155</td>
</tr>
<tr>
<td>Contemplation</td>
<td>-0.007</td>
<td>-0.002</td>
<td>0.985</td>
<td>-0.746</td>
<td>0.732</td>
</tr>
<tr>
<td>PCS baseline</td>
<td>0.372</td>
<td>0.415</td>
<td>0.000</td>
<td>0.214</td>
<td>0.529</td>
</tr>
<tr>
<td>Language (ref. is Spanish)</td>
<td>-0.464</td>
<td>-0.141</td>
<td>0.107</td>
<td>-1.029</td>
<td>0.101</td>
</tr>
</tbody>
</table>

Note: Perceived competence score at 3 month follow-up [Immediate = 5.22 (1.61) v. Delayed = 5.32 (1.79)]. \( F(7, 110) = 7.38, p < .01, R^2 = .333 \)
Table 3.7: Logistic regression predicting attrition

<table>
<thead>
<tr>
<th>Variables</th>
<th>OR</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention assignment (ref. is immediate)</td>
<td>0.963</td>
<td>0.888</td>
<td>0.570 - 1.626</td>
</tr>
<tr>
<td>Age</td>
<td>0.980</td>
<td>0.059</td>
<td>0.959 - 1.001</td>
</tr>
<tr>
<td>Cigarettes per month</td>
<td>1.001</td>
<td>0.579</td>
<td>0.998 - 1.003</td>
</tr>
<tr>
<td>Motivation to quit (ref. is precontemplation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparation</td>
<td>1.743</td>
<td>0.107</td>
<td>0.887 - 3.424</td>
</tr>
<tr>
<td>Contemplation</td>
<td>1.588</td>
<td>0.225</td>
<td>0.753 - 3.350</td>
</tr>
<tr>
<td>Language (ref. is Spanish)</td>
<td>0.477</td>
<td>0.009</td>
<td>0.272 - 0.834</td>
</tr>
<tr>
<td>Constant</td>
<td>2.000</td>
<td>0.296</td>
<td></td>
</tr>
</tbody>
</table>

Note: Attrition rates (Immediate = 49.6% v. Delayed = 48%). χ² (6) = 10.11, p = ns, R² = .042

Chapter 4: Discussion

Study hypotheses concerning smoking cessation and reduction were not supported. Inconsistent with study hypotheses, individuals in the immediate intervention assignment were not significantly more likely to quit or reduce their smoking at a three month follow-up compared to those in the delayed intervention condition. Further, the cessation rates for this study were inconsistent with those observed by other studies.

The Clinical Practice Guideline for treating tobacco use provides two indices to assess cessation rates (Fiore et al., 2008). The first index indicates that for 31-90 min of intervention contact, a 26% quit rate is expected. However, according to the number of sessions’ criteria (zero to one session as the ref. group) a 12.4% quit rate is suggested. In addition, multiple studies have found that active psychosocial treatments produce higher cessation rates compared to control or minimal contact interventions (Borreli et al., 2005; Nohlert et al., 2009). To date, only one study has assessed the efficacy of a cessation intervention exclusively with light smokers (Ahluwalia et al., 2006). Results of that study indicated higher quit rates in the HE condition (vs MI) even at a 6 month follow-up. It should be noted that in the Ahluwalia et al.
(2006) study, participants were highly motivated to quit smoking. Another study indicated HE outperformed usual care with pregnant female smokers (14.3% and 8.5% respectively). In this case it can be noted that higher quit rates may be due to the fact that health consequences from smoking during pregnancy may increase motivation to quit. On the contrary, similar to the present study, other researchers have reported low cessation rates with motivational enhancement interventions (4.8% at 3 months; Tevyaw et al., 2009), and no differences between MI and usual care (8% and 6.36% respectively; Ruger, Weinstein, Hammond, Kearney, & Emmons, 2008). It was hypothesized that the combined HE and ME intervention would result in greater abstinence among light and intermittent smokers with a broad range of motivation to quit. As such, it is important to explore potential reasons for reduced cessation rates.

First, random assignment was ineffective in that greater numbers of daily light smokers (vs intermittent smokers) were randomly assigned to the immediate intervention group. Studies have indicated that intermittent (non-daily) smokers are less addicted to nicotine than daily smokers (Gilpin, Cavin, & Pierce, 1997), report more recent planned quit attempts (Levy, Biener, & Rigotti, 2009) and are more likely to quit compared to daily light smokers (Hennrikus, Jeffery, & Lando, 1996). For example, Cooper et al. (in press) assessed differences between intermittent (non daily) and light daily smokers in a larger, representative young adult military sample. Intermittent smokers reported lesser perceived addiction to nicotine and a higher likelihood of thinking about quitting and planning to quit smoking. At the one-year follow-up, 45% of intermittent and 23% of daily light smokers reported 7 day abstinence from smoking; 41% of intermittent and 22% of daily light smokers reported continuous abstinence. Consequently, the failure of randomization in the present study concerning smoking status may have influenced the lack of intervention difference results.
Second, high attrition rates (48%) were observed, which suggests that with an intent to treat approach, cessation rates will be low regardless of condition. It has been pointed out that retention of fewer than 70% of participants may be a threat to study results (McLellan et al., 1997). A salient characteristic of the current sample was mobility concerning contact information which included changed/disconnected cell phone numbers, and change of addresses/incorrect addresses. In order to guard against this possibility, the survey queried about home, cell and/or alternate telephone contact information. However, others have recommended asking for even more alternate phone numbers and addresses (e.g., from a spouse, relative) (Seed, Juarez, & Alnatour, 2009). Although participants were offered multiple methods to complete their follow-up assessment that included in-person, telephone, and postal mail alternatives, lack of transportation, and extended work schedules were reported as difficulties. Improved collaboration of research assistants with participants is warranted to provide more convenient methods for study completion (e.g., convenient call times). In the current study, participants’ whose telephone numbers were not current or were disconnected were mailed a reminder of the three month follow-up along with a survey packet; however, a non-trivial proportion were not returned. A possible strategy to increase participants’ responses would be to send colorful reminder postcards (before the follow-up is due) and ‘freepost’ envelopes for participants to return their surveys (Boys et al., 2003; Wadland, Soffelmayr, & Ives, 2001). In order to boost retention rates, the current study implemented a lottery with a monetary incentive as the prize. Although retention rates increased toward the end of the study, the desired level was not achieved. Multiple and improved contact methods are warranted to achieve higher cessation rates.
Third, the intervention in this study was brief in nature, including only one face to face session (approximately 30-35 min) which may have not been intensive enough to promote cessation. For example, one study that compared a three session MI intervention to anti-smoking advice found that the MI condition resulted in an 18.4% quit rate at longer term follow-ups (Soria, Legido, Escolano, Lopez Yeste, & Montoya, 2006), yet others (Butler et al., 1999) have reported non-significant differences in abstinence rates between an MI-type intervention and brief advice (1.5% and 3% respectively).

Even higher intensity interventions (longer sessions/multiple sessions) have been implemented as well. For example, Schnoll and colleagues (2005) observed a 47.3% quit rate for cognitive behavioral therapy (CBT) and a 39.2% quit rate for HE condition; both interventions consisted of a 90 minute face to face intervention and 3 telephone sessions. Similarly, Killen et al. (2008) compared the efficacy of extended CBT to a brief telephone intervention. All participants received 8 weeks of NRT and CBT and nine weeks of bupropion. Subsequently, participants were randomized to extended CBT (12 weeks) or to telephone supportive therapy (4 calls over 12 weeks). Results indicated a 45% quit rate at 20 weeks follow-up for the extended CBT condition, and a 29% quit rate for the telephone supportive therapy condition, although the between condition difference was not significant at one year follow-up (31% and 27% respectively). Finally, Nohlert et al. (2009) compared a high intensity cessation condition (8, 40-min sessions) to a low intensity condition (one 30-min session) in a dentistry setting. Results favored the high intensity condition in terms of both point prevalence and continuous abstinence. A dose response relationship between intervention intensity and cessation rates has been repeatedly demonstrated (Fiore et al., 2008); however, given the dearth of light and intermittent smoking interventions, cost effective (e.g., brief) initial efficacy studies
with low level smokers are warranted. Future directions however may seek to gradually increase intervention intensity, while continuing to limit participant burden and maintain cost effectiveness.

Fourth, it is unclear whether the combination of intervention strategies used in the intervention were the most suited for light and intermittent smokers and/or whether their individual doses were appropriate. Although the efficacy of motivational interviewing (MI) addressing behavioral change across domains has been suggested, its efficacy for smoking cessation has not been established yet, particularly when addressing a broad range of interest in quitting smoking. A meta-analysis of the efficacy of MI for several problem behaviors indicated a non-significant effect size (Cohen’s $d = .11$, $ns$) for smoking cessation; however only two studies were included in this review (Burke, Arkowitz, & Menchola, 2003). Okuyemi et al. (2007) compared MI plus nicotine gum (2 in-person sessions, 3 via phone) to a control condition in low income participants. A six month follow-up indicated low cessation rates and no significant differences between conditions (MI 7.6% vs control 9.3%). It may be that a focus on lower socioeconomic status and less formal education participants in both the Okuyemi et al. (2007) and the present study retarded cessation rates regardless of treatment condition and/ or intervention components (e.g., see Fiore et al., 2008). On the other hand, studies have observed higher quit rates using HE interventions (e.g., Ahluwalia et al., 2006). The present intervention may benefit from strengthening its health education component to clarify misconceptions about the risks of light and intermittent smoking. The possibility exists that a more directive approach might be more effective in this population; thus, greater advice and more tools to enhance self-efficacy and coping skills could be provided. Future studies may wish to assess varying levels of
ME and HE interventions and/or add other empirically validated cessation strategies or components.

Finally, the Clinical Practice guideline clearly recommends a greater use of targeted and tailored interventions for smoking populations (Fiore et al., 2008), particularly perhaps those who have been underserved in the smoking cessation literature. This study focused on light and intermittent smokers, 87% of whom reported being of Hispanic descent. Although efforts were made to target both low level and Hispanic smokers, it is possible that the intervention was not targeted enough and/or that even more sophisticated methods of tailoring (e.g., on measures of self-efficacy, computer assisted) may heighten cessation rates. Future efforts should continue to consider the unique characteristics of the smoking populations of interest.

Although smoking reduction was not significantly different across conditions at follow-up, those receiving the immediate intervention smoked fewer cigarettes per month than those in the delayed intervention. Although this result was not statistically significant, these differences (and reduction in both groups) may be clinically meaningful. Smoking reduction has been studied in relation to future cessation and as a harm reduction option for those who are not ready to cease smoking. Smoking reduction can be seen as a step toward cessation, which in turn may increase individual self-efficacy toward change (Hugues & Carpenter, 2006). In a longitudinal study it was observed that those who reduced their smoking by more than 25% had greater chances of quitting in the future (Broms, Korhonen, Kaprio, 2008). Additionally, the likelihood of quitting smoking increased with greater reduction ($OR = 1.94$). Similarly, a study indicated that moderate (25-50%) to large reductions (> 50%) in smoking quantity increased the likelihood of cessation ($OR = 1.61$ and $OR = 2.96$ respectively) and those who reduced and quit were less likely to relapse than those who quit without reducing ($OR = .43$) (Falba, Jofre-Bonet, Busch,
Duchovny, & Sindelar, 2004). Further, at least two reviews, one that included 9 studies and a second that included 16 studies suggested that smoking reduction is related to cessation (Fagerstrom, 2004; Hugues & Carpenter, 2006). To date, the evidence of a harm reduction approach to smoking is equivocal since even non-trivial amounts of smoking reduction (> 50%) do not translate into decreased health related risks (Hurt et al., 2000; Tverdal, & Bjartveit, 2006); thus, cessation, not reduction, remains the ultimate goal of programmatic efforts. Future efforts should include components that heighten reduction (particularly relative to control participants) and capitalize on observed reduction toward cessation.

Consistent with my hypothesis, participants receiving the immediate intervention were more likely than delayed intervention participants to increase their motivation to quit at follow-up. Three considerations are noteworthy. First, increases in motivation to quit heighten the likelihood of future quit attempts (Zhou et al., 2009). Although the link between intention and future behavior may be modest (Rise, Kovac, Kraft, & Moan, 2008), studies demonstrate this relationship exists (Manfredi, Cho, Crittenden, & Dolocek, 2007; Pai & Edington, 2008). Evidence supports a focus on both the motivational and volitional processes associated with intention to promote cessation (Armitage & Arden, 2008); thus, adding volitional elements to intermittent and light smoking interventions may capitalize on readiness increases to promote actual cessation. Second, smoking cessation researchers have begun to posit a phase based cessation model: phases (and suggested outcomes) include motivation (increases in readiness), pre-cessation (quit attempts), peri-cessation (short term abstinence), and maintenance (long term abstinence; avoidance of relapse) (Baker, 2010). Thus, given the inherent challenges with smoking abstinence and its maintenance, motivation increases in and of themselves are critical to the cessation process, and future efforts should consider and monitor multiple phases and
outcomes within the process. Third, light smoking has been identified by some studies as an unstable pattern of smoking in which quit attempts and relapse may be common (White, Bray, Fleming, & Catalano, 2009), and intention to quit has been observed to change over short periods of time (Hughes, Keely, Fagerstrom, & Callas, 2005). Thus, longer (and more) follow-ups (six and nine months) may serve as more accurate indicators of future quit attempts and even cessation. Future light and intermittent smoking studies should consider including volitional elements, consider measuring multiple phase based outcomes, and utilize longer and more frequent follow-up periods to capture the entirety of the cessation process.

The present intervention may be informed and improved by a deeper assessment of theoretical underpinnings. For example, the positive change in readiness to quit in the intervention condition relative to the delayed condition suggests that the use of the Transtheoretical Model as a guide for motivation change was efficacious and is promising. The lack of association between intervention and follow-up perceived competence (an SDT construct) may suggest heightened attention to this theory, perhaps by heightening attention to MI style and tone (Ryan, Tobin, & Rollnick, 2005). In fact, Markland and colleagues (2005) suggest that the MI process can be implemented to affect the three main SDT constructs. Competence can be bolstered by helping the client to develop clear goals and by supporting self-efficacy; autonomy can be heightened by rolling with resistance and avoiding coercion; relatedness can be increased by expressing empathy and avoiding judgment on part of the client. Thus continued refinements attending not only to empiricism but also theory are likely to enhance future light and intermittent cessation efforts.
4.1 Limitations

Three limitations are noteworthy. The focus on a predominantly community Hispanic sample potentially limits the generalizability of the results from this study to other age or ethnocultural groups. Second, this study assessed smoking status at follow-up by self-report rather than using a biochemical method. Although biochemical verification of smoking status is often preferred, self-report is typically noted as valid, and in a sample that presents multiple challenges to follow-up survey completion, CO or cotinine verification was not feasible. The third limitation of note within the study was the emerging recognition that the survey and intervention materials were at an uncomfortable reading level for many community participants. Future efforts should attend to increasing instrument readability.

4.2 Strengths

Despite the limitations of this study, its strengths are of note as well. Currently, only one study has assessed the efficacy of a cessation intervention specifically geared to light smokers. Thus, this is one of the first intervention studies in the light and intermittent smoking literature, and likely the first study to compare the efficacy of a light smoking intervention to a control condition (delayed) in a predominantly Hispanic sample. Second, all study materials were translated and back translated to promote the equity of study materials in both English and Spanish. Third, recruitment was both proactive and reactive; thus, the sample consisted of smokers at multiple stages of readiness to quit smoking. Finally, the intervention was guided both by theory and empiricism.

4.3 Conclusion and Future Directions

In conclusion, the present study observed no significant differences in cessation and reduction rates between the immediate and delayed intervention conditions. Significant positive
changes in motivation to quit were observed in the immediate intervention compared to the delayed intervention condition, which is promising to promote future quit attempts and possible cessation. Future directions include making every effort to promote study retention rates, continuing to assess and refine intervention intensity, content, and process and including longer follow-up periods. Such efforts are likely to bolster increases in readiness, reduction, and cessation to reduce tobacco prevalence in a typically underserved group of smokers.
References


Doi:10.1016/j.aabeh.2008.11.013

Appendices
Appendix A

Participant # __________

Tobacco Use Behavior and Attitude Survey

Today’s Date: _________________________

How old are you? __________

Gender: _____ Male _____ Female

What is your level of education?

_____ Less then high school
_____ High school diploma/GED or equivalent
_____ Some college
_____ College graduate (e.g., B.A., B.S.)
_____ Graduate coursework

I am:

_____ Single (never married)
_____ Married
_____ Divorced
_____ Widow/Widower
_____ Separated
_____ Living with someone

Please indicate the ethnic group(s) to which you belong:

_____ Mexican National _____ Mexican American
___ Other Hispanic/Latin ethnic group (please specify) _______________________

___ White  

___ African American  

___ Asian American  

___ Native American  

___ Other (please specify) __________________________

Have you ever received Mental Health Services?  

_____ Yes  

_____ No

If yes, what conditions were you treated for?  

_____ Substance Abuse  

_____ Depression  

_____ Anxiety  

_____ Post Traumatic Stress Disorder  

_____ Schizophrenia  

_____ Other (please describe) __________________________

What is your smoking status?  

_____ I smoke at least one cigarette per day; **If so, how many cigarettes per day? _____**

_____ I smoke 1 to 6 cigarettes per week  

_____ I smoke less than 1 cigarette per week  

_____ I smoke less than one cigarette per month  

_____ I no longer smoke, but in the past smoked at least 1 cigarette per day;  

**If so, how many cigarettes per day? _____**  

_____ I no longer smoke, but in the past smoked 1-6 cigarettes per week  

_____ I have smoked a cigarette or a few, just to try it  

_____ I have never smoked before, not even a puff

On how many days did you smoke cigarettes in the last 30 days?  

_______ Number of days (please state your best estimate)
On the days that you smoked, what is the average number of cigarettes you smoked per day?  
_______ Number of cigarettes per day (please state your best estimate)  

Do you smoke cigars? _____ Yes  If so, how many per week? _____  
_______ No  

Do you use dip? _____ Yes  If so, how much per week? _____  
_______ No  

Do you use chew? _____ Yes  If so, how much per week? _____  
_______ No  

Do you use hookah? _____ Yes  If so, how much per week? _____  
_______ No  

At what age did you first try tobacco? _____  
If you use tobacco, for how many years have you used at least once per day? _____  

How many times have you quit using tobacco for at least one day?  
_______ None  
_______ Once  
_______ Twice  
_______ Three times  
_______ More than three times  

When is the last time you tried to quit using tobacco? _______________________

What is the longest that you have ever quit tobacco?  
_______ I have never quit  
_______ One day  
_______ More than a day but less than a week  
_______ One week  
_______ More than a week but less than a
During your longest quit attempt, did you gain weight?  _____ Yes  _____ No
If yes, how much weight did you gain? ____________ pounds

In attempts to quit tobacco, have you ever used:

- Nicotine patch __yes __no
- Nicotine gum __yes __no
- Nicotine inhaler __yes __no
- Nicotine nasal spray __yes __no
- Cold turkey __yes __no
- Slowly cutting back __yes __no
- Zyban (Bupropion, Wellbutrin) __yes __no

How interested are you in stopping your use of tobacco?  _____ Not at all
_____ A little
_____ Some
_____ A lot
_____ Very much so

If you decide to quit tobacco, why would you considering quitting?  (choose only one)

- Personal choice
- Health
- Person close to me wants me to (wife, child, friend, etc.)
- Tobacco is expensive
- My faith
- Other _________________________________
Appendix B
Smoking: Stage of Change (Short Form)

Are you currently a smoker?

_____ Yes, I currently smoke.
_____ No, I quit within the last 6 months
_____ No, I quit more than 6 months ago
_____ No, I have never smoked

In the last year, how many times have you quit smoking for at least 24 hours? __________

If you are currently a smoker, are you seriously thinking of quitting smoking?
(If you are not currently a smoker, please skip this question.)

_____ Yes, within the next 30 days
_____ Yes, within the next 6 months
_____ No, not thinking of quitting
Appendix C
Perceived Competence (Not Smoking)

Please indicate the extent to which each statement is true for you, assuming that you were intending either to permanently quit smoking now or to remain permanently abstinent from smoking. Use the following scale:

1  2  3  4  5  6  7
not at all somewhat very true true true true

1. I feel confident in my ability to not smoke.
   
   1  2  3  4  5  6  7

2. I now feel capable of not smoking.
   
   1  2  3  4  5  6  7

3. I am able to not smoke anymore.
   
   1  2  3  4  5  6  7

4. I am able to meet the challenge of not smoking.
   
   1  2  3  4  5  6  7
Appendix D
StopLite Intervention

From 1 to 10, how interested are you in quitting smoking? _____________

From 1 to 10, how confident are you in your ability to quit smoking? ______

If student responds with a low number, you might ask open ended questions designed to get the participant to open up about any ambivalence.

What do you think keeps you from being a 10 in terms of interest?

What do you think keeps you from being a 10 in terms of confidence?

What would have to occur to boost your interest to a 10?

What might increase your confidence to a 10?

One thing that often helps people increase their desire to quit smoking is to review the good and bad things about smoking and quitting smoking. Let’s see if we can create your list.

Use Motivational Enhancement Worksheet. Begin to fill out with participant.

Boosting the Benefits: These questions may help increase the number of benefits relative to costs, thus increasing motivation in the participant.

What would happen to your health if you quit smoking?

What would happen to the way you feel about yourself if you quit smoking?

What would happen to your relationships if you quit smoking?

What would happen to the quality of your life if you quit smoking?

Make a copy of the Motivational Enhancement Worksheet and provide it to the participant.

When thinking about quitting, it sometimes helps to think of situations and feelings that cause you to smoke. It is also helpful to come up with a plan for dealing with these situations and feelings when they arise. Let’s identify your triggers to smoke and ways to cope with them.

Complete the Triggers to Smoke Worksheet with the participant, make a copy of it, and provide it to the participant.
## Motivational Enhancement Worksheet

<table>
<thead>
<tr>
<th>Motivators to Quit Smoking</th>
<th>Motivators to Smoke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of Quitting Smoking (Good Things)</td>
<td>Benefits of Smoking (Good Things)</td>
</tr>
<tr>
<td>Costs of Quitting Smoking (Bad Things)</td>
<td>Costs of Smoking (Bad Things)</td>
</tr>
</tbody>
</table>
Triggers to Smoke
Smoking triggers can be anything that gives you the urge to smoke. Use this worksheet to help identify triggers that prompt you to smoke and ways you can manage the triggers.

What are three external smoking triggers you have?
External triggers are environmental triggers such as specific times, places, things and events.
1. _____________________________________________________
2. _____________________________________________________
3. _____________________________________________________

What are three internal smoking triggers you have?
Internal triggers are triggers such as emotions, thoughts, and physical feelings.
1. _____________________________________________________
2. _____________________________________________________
3. _____________________________________________________

What are three ways to deal with smoking triggers?

Avoiding: Make an effort to stay away from the cue. This can help with external cues.
Escaping: Getting out of the place/area with the smoking triggers. This is best for triggers that are unexpected in the outside world.
Coping: Using skills to deal with the trigger while it is with you. This is suitable for both kinds of triggers.

Escaping Smoking Triggers
How can you escape the smoking trigger?
1. _____________________________________________________

Avoiding Smoking Triggers
What are two ways you can stay from the smoking trigger?
1. _____________________________________________________
2. _____________________________________________________

Coping with Smoking Triggers
What are some skills you can use to cope with smoking triggers?
1. _____________________________________________________
2. _____________________________________________________
3. _____________________________________________________
4. _____________________________________________________
5. _____________________________________________________
6. _____________________________________________________
Common Health Costs of Tobacco

- Tobacco is the only product you can legally buy in the United States that is likely to cause cancer if you use it.
- Stopping smoking is one of the best ways to prevent illness and death in the United States.
- Smoking related illnesses account for almost 20% of all deaths and more that 25% of all deaths in the 35-64 age group.
- People who smoke miss about 7 more days of work per year than people who don’t smoke.
- People who smoke go to the doctor about 6 more times a year than people who don’t smoke.
- People who live with smokers go to the doctor about 4 more times a year than people who live with nonsmokers.
- About 53,000 people die each year from exposure to secondhand smoke.
- People who live with smokers are at a 15% increased risk of death.
- People who smoke between 1 and 4 cigarettes per day are 3 times more likely to die from lung cancer and heart disease.
- People who smoke occasionally have 60% higher heart disease death rates than nonsmokers.
- Smoking just one or two cigarettes per day increases your risk of heart attack.
- Light smokers have a 50% higher death rate from all causes in comparison to nonsmokers.
- Smoking 3 to 6 cigarettes per day (and not inhaling) increases your risk for heart attack by 60%.
- Cigarette smoking increases the risk of cardiovascular or heart disease.
- Nonsmokers living with smokers have a 30% increase in the risk of death from heart disease.
- Smokeless tobacco (e.g. chew, dip) users are at increased risk for high blood pressure.
- Using smokeless tobacco increases your heart rate.
- For all smokers, smoking reduces the quality of life. For example, it causes lower energy levels, more shortness of breath, and more frequent colds.
The Benefits of Quitting Tobacco

**WITHIN:**

- **20 minutes**  
  Blood pressure, heart rate and the temperature of your hands and feet return to normal. You’ll feel less tired when you’re exercising.
  
  Oxygen level in your blood increases to normal and carbon monoxide level drops to normal. With more oxygen in your blood, you’ll feel more awake and you won’t need as much coffee during the day.

- **8 hours**  
  The risk of a heart attack begins to decrease.

- **24 hours**  
  Nerve endings start to re-grow and your ability to smell and taste things increases. Now you’ll *really* be able to taste your home cooking!

- **2 days**  
  Your body is free of nicotine. Bronchial tubes relax, making it easier to breathe. Your lung capacity increases.

- **3 days**  
  Coughing, sinus congestion, fatigue, and shortness of breath decrease. Cilia or tiny hairs reactivate in the lungs, increasing your ability to handle mucus, clean the lungs, and reduce infection, like coughs or colds.

- **1 to 9 months**  
  The risk of heart disease from smoking is reduced by 50%.

- **1 year**  
  Lung cancer death rate for the average smoker (one pack a day) decreases from 137 per 100,000 to 72 per 100,000.

- **5 years**  
  Risk of stroke for ex-smokers return to that for non-smokers.

- **5 to 10 years**  
  Risk of Lung cancer drops to as much as half of that of current smokers. Lung cancer death rate for the average smoker drops to 12 deaths per 100,000 or almost the rate of non-smokers. Pre-cancerous cells are replaced. Other cancers, such as those of the mouth, larynx, esophagus, bladder, kidney and pancreas decrease.

- **10 years**  
  Health risks are similar to non-smokers.

- **15 years**  
  Health risks are similar to non-smokers.
Curriculum Vitae

José Alonso Cabriales was born in Cd. Juárez, Chih, MX. He is the sixth child of María de Jesús Navarrete and Justo Cabriales. He graduated from Bowie High School in El Paso, TX in 2002; he then entered the University of Texas at El Paso. He earned a bachelor of science in Psychology with a minor in Biology in 2006 and joined two psychological research laboratories, completing an Honors Thesis project. Then, he attended the Masters in Clinical Psychology program at UTEP where he has worked with Dr. Theodore V. Cooper in the Prevention and Treatment in Clinical Health Lab conducting research in light smoking cessation. He will attend the health psychology doctoral program at UTEP.

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