BEHAVIORAL SUBSTITUTES AND SMOKING CESSATION:

DO THEY MAKE QUITTING EASIER?

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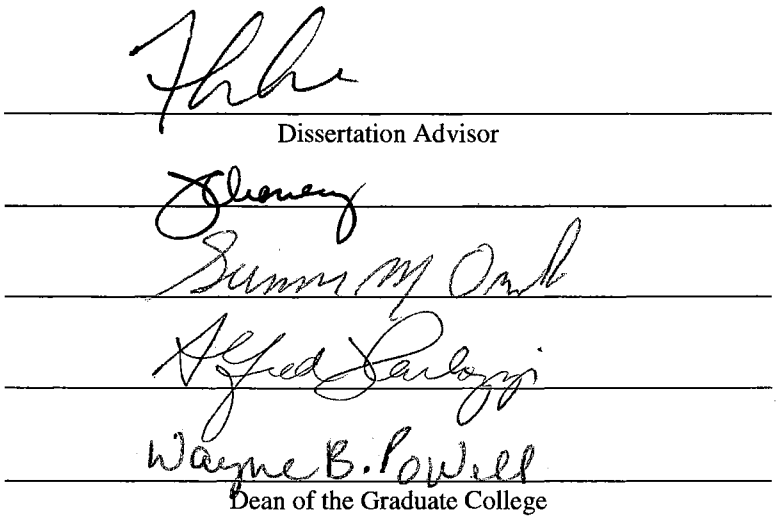

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NOMENCLATURE

AVE	abstinence violation effect
BAI	Beck Anxiety Inventory
BDI	Beck Depression Inventory
BE	behavioral economics
BS	behavioral substitute treatment condition
COa	Aveolar Carbon Monoxide
FTND	Fagerstrom Test for Nicotine Dependence
FTQ	Fagerstrom Tolerance Questionnaire
LSS	Life Stress and Support
NAS	Nicotine Abstinence Scale
NAS-Craving	Nicotine Abstinence Scale, Craving item
NF	nicotine fading treatment condition and nicotine fading/brand in general
NON-Abs	participants who were not completely abstinent from midnight before session 5 to 6
NRT	nicotine replacement therapy
PANAS-X NA	The Positive and Negative Affect Schedule-Expanded Form (PANAS-X): Negative Affect Scale
PANAS-X PA	The Positive and Negative Affect Schedule-Expanded Form (PANAS-X): Positive Affect Scale
PANAS-X	The Positive and Negative Affect Schedule-Expanded Form (PANAS-X)
QSU	Questionnaire of Smoking Urges
QSU-Factor 1	Questionnaire of Smoking Urges: Factor 1 Scale
QSU-Factor 2	Questionnaire of Smoking Urges: Factor 2 Scale
RP	relapse prevention
RTCQ	Rating of Therapy and Consulstants Questionnaire
SCL-90R GSI	Symptom Checklist 90-revised, General Symptom Index subscale
SHQ	Smoking History Questionnaire
SOC	Stages of Change
SOC-A	Action Stages of Change ladder
SOC-C	Contemplation Stages of Change ladder
SOC-P	Precontemplation Stages of Change ladder
ST	standard (or base) treatment condition
SUC-Abs	participants who were completely abstinent from midnight before session 5 to 6
TTRS	Therapy Topic Rating Scale
UP	unit price

CHAPTER 1

INTRODUCTION

Smoking and Health

Cigarette smoking is the cause of many serious health problems. Smoking is the leading cause of premature and preventable morbidity and mortality in the United States (U.S. Department of Health and Human Services [US DHHS], 1988). The death rate of smokers is 30-80% higher than that of nonsmokers (Holbrook, 1983). According to US DHHS (1988) figures more than 400,000 deaths annually in the United States are attributed to cigarette smoking; this in contrast to the annual deaths from other drugs of abuse: alcohol = 125,000-150,000, Alcohol plus other drugs = 4,000, heroin = 4000, cocaine = 2000-4000, and marijuana = 75. This information displays a clear relationship between smoking and later health concerns; however, quitting smoking has proven extremely difficult for many people.

Even with all the best components included, smoking cessation programs typically have limited success (i.e., 1-year abstinence less than 30%; Hajek, 1994). With the health risks attributed to smoking, 30% success rates are hardly adequate. To improve smoking cessation success rates, it is necessary to better understand the pharmacological and behavioral aspects of smoking. During the last decade, understanding of pharmacological aspects of nicotine has increased greatly with many researchers looking at the efficacy of various forms of nicotine replacements (e.g. nicotine gum or patch) and the development of commercially available nicotine replacements. However, the behavioral aspects of smoking have been neglected the past few years in the research compared to the large amount of research conducted focusing on pharmacological aspects of smoking. Where treatment is concerned, significant research has been completed on behavioral smoking cessation treatments over the years but limited research has been conducted during the past decade. The amount of research on behavioral treatments recently conducted pales in comparison to the large amount of treatment research focused on pharmacological treatments for smoking cessation. Information from the 1988 Surgeon General's Report was consistent with a behavioral view of drug addiction and dependence and suggests that behavioral techniques are helpful in the successful treatment of nicotine addiction and dependence (Henningfield & Higgins, 1989). Although understanding of the mechanisms of delivery of nicotine has improved, nicotine replacement therapy have become more tolerable and available, and smoking behavior has been heavily researched, the success rates for smoking

cessation treatments have improved only modestly.

The important previous work comes from the smoking cessation literature, but also depends heavily on the concept of Behavioral Economics (BE), learning theory, smoking urges, withdrawal symptoms, and the relationship between mood and smoking. The proposed research builds upon information collected by BE researchers with other substances and other organisms, but also upon the current theoretical researchers that believe that substitution (usually nicotine replacement) is important. The important theoretical aspects for the proposed study are conditioning, reinforcement, extinction, and substitution. The following review of pertinent literature will expand on the important elements of the smoking literature for the current project, specifically focusing on the current literature on smoking cessation treatments, followed by a discussion of theories that help explain nicotine addiction.

Smoking Cessation Treatment Literature

Many different approaches to smoking cessation have been largely due to the generally poor success rates that researchers and clinicians have attempted to improve. The following section will briefly discuss common component and techniques used in smoking cessation treatment programs that have proven to be most promising for promoting abstinence. This section will be broken down into two categories, behavioral and pharmacological components.

Behavioral Components

The easiest way to view behavioral components of smoking cessation is to break down the programs into three somewhat artificial categories. First, education/information about smoking cessation that occurs before actual cessation and helps prepare the person to quit. Second, treatment strategies specifically aimed at reducing the number of cigarettes smoked or nicotine intake, which is believed to make quitting easier. Finally, treatment strategies that follow cessation to reduce the likelihood of relapse (Hatsukami & Lando, 1993).

Education/Information. It is very important to start cessation programs with education about smoking, so individuals will better understand their smoking habit and the steps to follow to achieve successful abstinence. One place to start is with self-monitoring and smoking questionnaires to gain information about participants' smoking habit. This allows individualization of treatment and allows individuals to learn more about their smoking habit. Self-monitoring often looks at time of day, activity, and mood as possible

antecedents to smoking. It is important for individuals to have this information, which help identify and prepare individuals for problematic situations. Further, self-monitoring provides the person with examples for discussion in group sessions. In this way self-monitoring tends to improve group participation because individuals have studied their habit between sessions and also provides them with specific examples of problematic situations that require further attention. Understanding their smoking habit requires individuals to dispel common myths about smoking cessation and their smoking habit (e.g., when they smoke, why they smoke).

One important common myth to dispel is about withdrawal symptoms that may occur during cessation, such as: craving for cigarettes, irritability, anxiety, difficulty concentrating, restlessness, impatience, increased appetite, insomnia, and depressed mood (Hatsukami, Hughes, & Pickens, 1993). Education on when withdrawal symptoms are most likely to occur is often helpful and dispels myths about the severity and persistence of withdrawal symptoms. Withdrawal symptoms generally peak within 24 to 72 hours after smoking cessation, with these symptoms typically returning to baseline smoking levels by four weeks post-cessation (Hatsukami & Lando, 1993). Hughes and Hatsukami (1986) reported that the following characteristics were associated with more withdrawal discomfort during abstinence: more previous quit attempts; more intense withdrawal symptoms during the last quit attempt; rate the first cigarette in the morning as the most difficult to do without; smoke soon after rising; and surprisingly, smoking fewer cigarettes per day.

Reduction of Cigarettes Smoked or Nicotine Intake. These strategies are based on the belief that if an individual reduces the number of cigarettes they are smoking and/or reduces the amount of nicotine they are consuming daily they will experience fewer withdrawal symptoms and urges to smoke when they abstain from smoking. One specific strategy for reducing nicotine intake is nicotine fading (NF), which involves systematically reducing the nicotine level in the cigarettes smoked prior to quitting. NF has proven to be effective at reducing withdrawal symptoms during abstinence (McGovern & Lando, 1991). NF has been shown to increase treatment success when combined with other methods of smoking cessation (Lando & McGovern, 1985). This procedure requires individuals to switch to progressively lower nicotine content cigarettes. Many different levels of systematic fading have been documented such as a gradual fading 25%-50%-75%-90% of the nicotine content of their preferred brand on a weekly basis. The more common fading

procedure decreases content more rapidly with a 30%-60%-90% reduction on a weekly basis (Foxx & Brown, 1979). NF procedures have been promising when combined with other treatment components (e.g., aversion procedures) but have 6-month abstinence rates as high as 75% but alone this procedure has not shown consistent success rates (Lando & McGovern, 1985). The most comprehensive NF procedures, as the one described above, also include provisions that force individuals to switch brands after each pack of cigarette. This method, often included under the umbrella of NF, is called brand switching. Brand switching provides an additional element to NF in that the individual has to sample a variety of different cigarettes, all of which taste different. Usually smokers have a preferred brand, which provides them with a taste that they like enjoy. NF combined with brand switching is something that makes smoking less enjoyable because the individual is receiving less nicotine but also receiving a cigarette that does not taste as good as his/her preferred brand.

Aversive procedures, those that punish smoking behavior (e.g., snapping a rubberband during or after smoking or urges to smoke) or pair smoking with aversive conditions (e.g., rapid smoking) have been mildly successful at producing abstinence (Hatsukami & Lando, 1993). These techniques have been mildly successful when paired with other strategies but have become unpopular in recent years, primarily because the success rates are not high enough to warrant the extreme measures, discomfort, and potential for harm. These techniques will probably continue to lose acceptability with the continued success of nicotine replacement strategies.

Identification and manipulation of environmental cues is often done in combination with self-monitoring to expose those situations that are most associated with smoking for each individual. This makes individuals aware of problematic situations, which allows them to prepare for those situations, change the environment if possible (e.g., put cigarettes in car trunk), and act quickly to prevent smoking. Often it is helpful to avoid high probability situations (e.g., bars, parties) during the initial stages of cessation and reduction of smoking until the individual has developed more resistance to smoking urges. Another related method is to change the association between a particular situation and smoking. One example is taking a short walk on a coffee break, as opposed to drinking coffee in the smoking area. This may be helpful in breaking the association between coffee breaks and smoking.

Another component often included in smoking cessation programs is an attempt to break the

association between smoking and stressful situations. Some smokers are more prone to smoking during stressful situations because they believe smoking "helps calm them down" a very common statement made by smokers. Consequently, it is helpful to learn coping skills to deal with stress and extreme emotions that may be associated with smoking. Multi-component behavioral treatment programs generally include relaxation techniques, such as deep breathing or deep muscle relaxation to provide the individual with alternative stress management procedures that replace smoking. Also included are learning/practicing problem-solving skills, especially as applied to assessing high-risk situations and choosing alternatives but are also helpful for general living problems that add to an individuals stress (Hatsukami & Lando, 1993).

Relapse Prevention (RP). The final group of components included in cessation programs is relapse prevention (RP) exercises and planning. These components build on knowledge gained earlier in cessation program (e.g., assessing high-risk situations and stress management procedures). RP prepares and teaches smokers how to deal with high-risk situations and more importantly, how to deal with a slip, if the individual should have one.

The importance of dealing with how individuals handle slips or returns to smoking is very important and has been thoroughly researched under the term Abstinence Violation Effect (AVE). AVE has been associated with the process of a slip becoming a full-blown return to previously levels of use, which is commonly called a relapse. The important aspect of AVE is the emotional response that occurs when the person recognizes that they have slipped. This emotional response is usually associated with feelings of failure and thoughts such as, "I have already failed, I might as well just smoke the whole pack." These thoughts and feelings make it more likely the individual will return to previously levels of use.

In RP individuals are taught how to recognize the chain of events that lead to a slip and how to manage a slip emotionally in order to prevent a relapse, hence the name. Further, individuals usually practice or role-play situations that are high risks for slips and may develop note cards to help them in these situations or following a slip. The importance of AVE and RP has been clearly documented in the literature and is a needed component in any smoking cessation program.

Summary of Behavioral Components. In summary, the behavioral programs include many components that assist individuals in changing their smoking habit, coping with high-risk situations, coping with withdrawal symptoms, and preparation for life without smoking. Further, these programs attempt to break

the association between specific environments and smoking, which allow individuals to function in those environments without smoking. Though these programs generally include many components, they rarely include components that address the behavior most consistently paired and associated with smoking, that is topographical aspects of smoking (e.g., manipulating objects with fingers, mouth movements). Analysis of topographical aspects could lead to a better understanding of the entire attraction of smoking and the difficult nature of the quitting process, as well as may provide information about ways to improve cessation success rates.

Nicotine Replacement Therapy - Pharmacological Components

Because this project is focused on the behavioral aspects of smoking Nicotine Replacement Therapy (NRT) is discussed in terms of learning and a complete review of the various NRTs available and their success rate will not occur. The basic idea behind NRT (e.g., nicotine gum or transdermal nicotine patches) is simply to provide the nicotine dependent smoker with a consistent amount of nicotine that will reduce withdrawal symptoms associated with nicotine deprivation. This allows people abstaining from nicotine to experience fewer withdrawal symptoms associated with actual nicotine deprivation, which should make them feel better physically (and psychologically) as they go through the quitting process. Further, by reducing the physical problems associated with nicotine deprivation the quitters should be more able to focus more on the psychological and behavioral components of smoking (Hatsukami & Lando, 1993).

There are two goals for this type of treatment as currently formalized by pharmacological and behavioral researchers. Pharmacologically, the goal is to get the quitter through the initial rough periods where withdrawal symptoms are most severe, then the quitter will be in a better position to continue abstinence. In this model nicotine will gradually be decreased to insure that the quitter will never feel significant symptoms associated with nicotine deprivation. Behaviorally, the process consists of a strange type of extinction process. That is, the nicotine effects that have become associated with several environmental stimuli (e.g., time of day, first cigarette of morning) and behavior (e.g., driving in car) through repeated pairings are now not temporally related to those behaviors. For example, when an individual arises in the morning they smoke a cigarette and get a rush of nicotine to their semi-nicotine deprived system. When they use NRTs they no longer go through the behavior of smoking a cigarette in the morning but continue to get some of the effects of nicotine, albeit significantly less powerful. This is akin to

a backward extinction process. Instead of the behavior being presented with no reinforcement to follow, the reinforcer is presented alone following no behavior. Most behavior theorists would suggest that this type of extinction will not be effective because new associations will form between the reinforcer and a new set of behavior (e.g., chewing nicotine gum, putting new patch on arm) or new environmental stimuli (e.g., experience of patch on his/her arm).

Hughes (1991) suggested that some quitters using pharmacological supplements may attribute their quitting success to the medications. When this occurs, individuals are likely to do one of two things or both. First, they may use the replacement strategies longer than suggested, not just the first 4-6 weeks of abstinence, which is clearly sufficient to wean the body off nicotine with no nicotine specific deprivation symptoms. Secondly, they may have slips or relapse completely when they quit using the nicotine replacements. Attribution theory of drug effects (Davison & Valin, 1969) predicts that if quitters believe the medication (NRT) is responsible for their successful abstinence, when the NRT is discontinued the quitter will expect several things. First, the quitter may expect to experience symptoms associated with nicotine deprivation. This expectancy could lead to the person to actually developing those symptoms. Secondly, the person may expect to relapse or slip because they no longer have the NRT to "take care of the problem."

Success Rates of Smoking Cessation Treatments

The smoking cessation components discussed above (i.e., behavioral and NRTs) have had limited success rates alone, usually producing 1-year abstinent rates in the 30% range (Hajek, 1994). However, abstinence rates as high as 45% at one-year have been found for treatments that use a combination of behavioral and pharmacological components, which are generally considered the most successful treatment (Hughes, 1991). Both major components and several of the minor components (e.g., self-monitoring, relapse prevention) are important to successful smoking cessation, with each component adding something to boost rates of success. The pharmacological treatments continue to improve, especially in the past decade, but still do not address, and never truly will, the topographical aspects of smoking (to be discussed later). One important aspect of behavioral strategies is skill training that provides quitters with new behavior and coping strategies that decrease the likelihood of relapse and increase the likelihood of long-term abstinence (Hatsukami & Lando, 1993). The next section focuses on theories that have provided additional treatment ideas that could add significantly to the success rates of smoking cessation.

Behavioral Economics

One area of research that has had success in improving abstinence rates for cocaine addicts has used BE to better define the important components of cocaine treatment programs (Budney, Higgins, Wong, & Bickel, 1996; Higgins et al., 1991; Higgins et al., 1993). Recently, BE has received a great deal of attention because it has provided descriptive, explanatory, and predictive data for self-administration of a variety of drugs (Hursh, 1980; Bickel, DeGrandpre, Hughes, & Higgins, 1991). BE is important to the understanding of smoking behavior and smoking cessation because it provides solid rationale why smoking and nicotine dependence is so difficult to treat and components that may improve treatment.

BE is a combination of general economic principles (e.g., demand law, unit price, substitutes, and complements) and traditional reinforcement principles (Bickel, DeGrandpre, & Higgins, 1993). Economic principles help clarify the relationship between the price of a consumer good and the demand for that consumer good, as well as provide information on the "value" of a commodity or reinforcer to that organism. It is important to note that in BE, economic terms "purchased," "consumer good or commodity," and "price" are synonymous with behavioral terms "self-administered," "reinforcer," and "response requirement."

Demand Law. The fundamental concept in BE is the demand law, which states that "all else being equal, total consumption decreases as price increases" (Allison, 1979, p 405). Demand law holds true whether the price of a good is in monetary value or in terms of the amount of effort required to obtain the good. More simply, drug use decreases as response requirements (or cost of the drug) increase.

Vuchinich and Tucker (1988) noted the importance of this concept. They suggested that one factor that makes alcohol so reinforcing is the combination of low cost and its accepted use in many different situations (e.g., parties, softball games, or with dinner). Nicotine also is inexpensive and accepted in many different situations. Demand law suggests that alcohol and nicotine consumption is high because the cost-benefit ratio is low (i.e., low cost for positive drug effects). BE uses the demand law to explain the following: relationships between the cost of a commodity and the benefits of the commodity (i.e., unit price); to define the relationships between two or more commodities (i.e., substitutes and complements); and to identify different types of commodities based on how quickly changes in price, result in changes in

consumption (i.e., elasticity).

Unit Price. Unit price (UP) in BE is the cost required to obtain a commodity divided by the amount of commodity obtained (Hursh, Raslear, Shurtleff, Bauman, & Simmons, 1988). The basic equation for UP consists of: the number or type of response required to obtain a reinforcer (e.g., bar presses or money) divided by the amount or size of the reinforcer received (Bickel, DeGrandpre, Higgins, & Hughes, 1990). The response requirement could be bar presses, monetary cost, or a combination of the effort to go to a store and purchase the good. BE adds behavioral components to traditional measures of cost (e.g., type of behavior required, effort required, or schedule of responding). Further, the UP equation may include the cost of a good, the cost of the commodity or activity that it was chosen over (e.g., benefits of the forgone alternative). In this analysis, the UP of the chosen commodity is a better cost-benefit ratio than the UP of the alternative it is chosen over. This allows for direct comparison of the value of commodities, which is an important contribution of BE.

According to BE, consumption should be similar at comparable UPs, no matter what components make up those UPs. For example, a researcher could use several components to attain the same UP and thus the same level of consumption. Various combinations of a fixed-ratio (FR) schedule can produce a UP of 10. For example, a person who can smoke one cigarette for every 10 correct answers (or bar presses) would smoke the same number of cigarettes as someone allowed to smoke two cigarettes for 20 correct answers. The ratio or UP is still 10 to 1 and BE predicts that consumption will be similar at comparable unit prices. Bickel et al. (1990) analyzed data from several drug self-administration studies in a UP format and found that drug consumption tended to be the same at the same UP. This occurred even when the UP consisted of different combinations of dose size and response requirements.

UP permits measurement of commodity "value" and how cost-effective commodities are at particular price and reinforcement levels. The elegance of BE is that it allows for many different components to make up each portion of the unit price calculation. NF and brand switching, which was discussed earlier, provides a nice example of how UP works. When an individual is forced to smoke a lower nicotine cigarette and choose a brand different from their preferred brand the value of the choice will be lower than smoking their preferred brand. The person will not be receiving the reinforcement value of the nicotine and the taste they desire from the cigarette. BE in this situation would predict that the individual would smoke more cigarettes

than previously in order to make up the difference in nicotine, if, of course, the taste is not too punishing and unacceptable. That is generally what is noted in NF studies, individuals tend to smoke more of the lower nicotine cigarettes than they had been smoking of their regular cigarettes. They do likely take in less actual nicotine but smoke more actual cigarettes than previously.

Elasticity. Elasticity refers to the amount consumption decreases as response requirement, or price, increases; that is, how responsive consumption is to price changes (DeGrandpre, Bickel, Hughes, & Higgins, 1992). A commodity is considered either a luxury or necessity based on that commodity's elasticity of demand. A commodity's demand is considered elastic (i.e., a luxury) when consumption of that commodity changes greatly with small UP increases. For example, at low UPs, bubble gum consumption will be high (i.e., $0.25/1 pc.) but consumption decreases rapidly, eventually to zero, as UP rises (e.g., $5.00/1 pc.).

There are, however, commodities that humans and animals will consume no matter what the cost. This type of demand is considered inelastic demand. An example in the literature is water and food consumption in rats (Sakagami, Hursh, Christensen, & Silberberg, 1989; Silberberg, Bauman, & Hursh, 1993). These studies showed that rats will continue to consume and work for water and food even when the UP for those commodities become quite high. Necessities are commodities that have relatively inelastic demand and luxuries are commodities with relatively elastic demand. Demand is not elastic or inelastic; rather, demand is on a continuum from elastic (i.e., luxury) to inelastic (i.e., necessities). For more information on elasticity, Hursh (1980) defines the criteria and formulas for computing elasticity of demand.

The importance of elasticity in drug use is undeniable when defining drug addiction and the process of developing drug dependence. When individuals start using drugs, demand for those drugs is probably elastic. If the UP gets too high, the beginning drug users will stop using those drugs. However, as the person develops tolerance, withdrawal symptoms, physiological addiction, and psychological addiction the demand for that drug becomes relatively inelastic, meaning the person will continue to self-administer the drug at extremely high UPs. This means that common interventions meant to cut down on drug use (e.g., cigarette taxes, jail time for possession of drugs) will decrease use beginning in users but these same approaches. However, these same interventions will be less effective at producing behavior change in individuals who have developed a drug addiction (physiological or psychological). Elasticity is also important for drug

treatment programs because relatively weak interventions (e.g., information, education, DARE programs) may work for users who have not developed dependence or individuals who have never used. It is unlikely that those same intervention will be effective for drug dependent users because their demand has become relatively inelastic. For this reason, treatment programs focusing on nicotine dependent smokers will require more power to make similar changes in behavior. In effect, the interventions must be significantly stronger and more comprehensive to effectively change the behaviors associated with nicotine dependence. Related to the concept of elasticity are the concepts of independents, complements, and substitutes, which define relationships between alternative reinforcers.

Commodity Relationships. Another benefit of BE is it allows comparison of multiple commodities across different prices and reinforcer components. This allows for analysis of how price and reinforcer components affect consumption. Another valuable aspect of BE is that it allows for analysis of commodity relationships that affect commodity consumption. The three most useful terms in this area are independents, substitutes, and complements. Commodity relationships are on a continuum from mutually exclusive substitutes on one end, independents in the middle, and dependent complements on the other end.

Independent relationships are those where a commodity's consumption, price, size, or value does not affect the consumption of another commodity (Bickel, Hughes, DeGrandpre, Higgins, & Rizzuto, 1992). Two commodities have an independent relationship when a change in the UP of one commodity does not result in a change in consumption of the other commodity. A real life example of commodity independence is a change in the cost (or use, value, etc.) of a kite does not change the consumption of a gallon of milk.

Complementary relationships are those where the availability (or consumption, cost, value, etc.) of one commodity changes the consumption of another commodity in the same direction (Bickel et al., 1992). Complementary relationships are more likely to occur when two or more commodities combine to make a more desirable entity, than either commodity alone. Cookies and milk are a good example of a complementary relationship. If milk is available at a reasonable price a person may eat more cookies. Complementary relationships occur when one commodity makes another commodity more desired or valued. How many people would eat a hot dog at a baseball park if ketchup and mustard were not available? Probably a great deal less than if ketchup and mustard were available. Further, people do not eat ketchup and mustard without anything to put them on, this suggests that ketchup and mustard function as

complements to many different commodities but are not desirable products when used alone. The strict definition of complementary relationships is: commodity A is a complement to commodity B when commodity A's consumption is positively correlated with commodity B's consumption.

A study by Hursh (1978) showed how the availability of water complemented food consumption in rats. When the UP of water became too high, food consumption decreased in the rats. In this study it appeared as if water made food consumption more desirable. One reason for nicotine's popularity may be that it serves as a complement to many commodities and activities (i.e., parties, ball games, or boring tasks). Nicotine, as a complement, can make activities more enjoyable, desirable, or tolerable.

Bickel et al. (1993) showed that cigarettes and coffee have a one-sided complementary relationship; such that, as cigarette UP increased, coffee consumption decreased. However, when the UP of coffee increased, cigarette consumption did not change. This suggests that coffee complements the desirability of cigarette consumption but cigarette consumption does not require coffee. Commodities can have different types of complementary relationships, as displayed by the complementary relationship between cigarettes and coffee that is different from the relationship between food and water, but both are complementary relationships.

Substitutable relationships are those where one commodity can replace another commodity when the price, availability, or value makes that product less cost-effective (Bickel et al., 1992). Substitutes occur when the UP of one commodity increases (consumption decreases) and the consumption of another commodity increases (Vuchinich & Tucker, 1988). When consumption of commodities is inversely correlated, they are substitutable commodities (e.g., coffee and tea). The relationship between Coke and Pepsi is an example of a substitutable relationship. People generally value one brand over the other. However, if one brand is not available or the cost is higher (high UP), then the other commodity is usually a suitable substitute and consumption of that commodity will increase. For example, how many people would continue to drink Coke if it cost $5.00 more than the same amount of Pepsi? Not many! It is not necessary for substitutes to have the same properties or produce the same effects; however, commodities are more likely to be substitutes when they share common properties or produce similar effects (Vuchinich & Tucker, 1988).

The importance of BE principles when applied to drug dependence, self-administration, and cessation

programs are immeasurable. One reason alcohol and nicotine are so highly used and difficult to treat is that they act as both substitutes and complements for many different activities (Vuchinich & Tucker, 1988). Nicotine can be a substitute when available alternatives are not desirable or have a high UP. For example, instead of reading a research article a person can smoke a cigarette. Further, nicotine can be a complement to an activity, such as when a person must read a research article they may smoke to increase the pleasure of that activity. Alcohol acts in a similar way. If a person is presented with poor alternatives, he/she may choose to drink alcohol and attain a drunk state that serves as a substitute to those poor alternatives. Further, individuals often learn early in life that alcohol or a drunk state increases the enjoyment of a party. Strongly related to BE is how conditioning affects smoking behavior. This is discussed next.

Conditioned Aspects of Smoking Behavior

Nicotine dependence and smoking has several components. In recent years smoking cessation programs have begun to address the multicomponent nature of smoking (Hatsukami & Lando, 1993). The components of cigarette smoking go far beyond an individual's physical dependence on nicotine and include the reinforcing effects of nicotine, reinforcing aspects of smoking topography, and psychological aspects. The reinforcing/pleasurable aspects of cigarette smoking can be broken down into two categories, physiological and behavioral/conditioned components.

Physiological Aspects of Smoking. The reinforcing aspects of nicotine may include positive mood enhancement, negative mood reduction, a means of coping with stress, anxiety, boredom, or a lack of stimulation (Hatsukami & Lando, 1993). Of primary interest in this section are the physiological effects of nicotine that might provide reinforcement for self-administration. Nicotine is a paradoxical drug in that it has both stimulating and sedating or emotion-reducing properties (Murray, 1991). It is not important for this paper to review all the complex effects that nicotine has on an organism, what is important are those effects that might serve as reinforcers and increase the likelihood of continued self-administration.

The following are several nicotine effects that may function as reinforcers: increased arousal; body weight reduction; enhanced attention/vigilance; diminished appetite; facilitation of learning and memory; and relief from anxiety and depression (Benowitz, 1992; Jarvik, 1991; Warburton, 1990). Nicotine also removes several aversive acting as a negative reinforcer for self-administration. Some potential negatively reinforcing aspects of nicotine are mood normalization, anxiety reduction, and reduction of symptoms

associated with nicotine deprivation (Hughes, Gust, Keenan, & Fenwick, 1990). These physiological effects of nicotine are clearly important to continued self-administration, as well the cessation difficulties encountered by smokers. In summary, nicotine has many positive physiological effects, which translate into nicotine providing complex reinforcement for behavior associated with smoking and increases the likelihood of self-administration. The next section focuses on the behavioral aspects of nicotine dependence.

Behavioral/Learning Aspects of Nicotine Dependence. Some authors believe the learning processes involved in smoking to be largely classical conditioning (Rose & Levin, 1991), while others believe that operant conditioning more accurately describes the cigarette smoking habit (Tiffany & Cepeda-Benito, 1994). Both types of conditioning appear important for different aspects of self-administration and knowledge about the conditioning processes behind smoking may suggest areas where treatment could be improved. Clearly, whatever conditioning process is responsible (or both), there are plenty of learning/conditioning trials in an individual's smoking history to make the conditioning strong and well developed. Another aspect is also clear, both physiological effects of nicotine and behavior associated with smoking lead to continued self-administration.

Tiffany and Cepeda-Benito (1994) have shown just how ingrained associations between smoking behavior and physiological aspects of nicotine, become in smokers. The average smoker in their sample took over one million puffs and smoked over 90 thousand cigarettes to date in their lifetime. On average, these smokers spent over two hours and 15 minutes per day with a lit cigarette in their hand or nearby. This data emphasize the incredible learning history of smokers and the need for increased understanding of behavioral components of smoking. Whether the belief is that nicotine serves as a primary reinforcer for behavior associated with smoking (i.e., operant conditioning), that nicotine is an unconditioned stimulus to the conditioned stimulus sensory aspects of smoking (i.e., classical conditioning), or a combination of both; it is clear strong associations develop between nicotine effects and smoking behavior. Smoking behavior consistently leads to a pleasurable state of affairs which produces strong conditioned effects. What may make these relationships more difficult to extinguish is that some aspects may change in strength at different administrations (variable reinforcement). For example, the first cigarette in the morning produces the most euphoric sensations, while as the day goes on (and tolerance develops) the strength of nicotine's effect

decreases. This, in effect, is variable reinforcement, the type of reinforcement that is most difficult to extinguish.

The data on the average smoker from Tiffany and Cepeda-Benito (1994) displays how difficult it must be to quit anything that consumes or fills so much time during the average day. To place a greater burden on smokers attempting to quit, those two hours per day are strongly associated with smoking through repeated pairings for the many years. Smokers may have had over one million conditioning trials, taking puffs in consistent environments every day (e.g., two cigarettes on the drive to and from work each day). Thus, when individuals quit smoking, they do not just have time to fill, they have to fill those times during the day that are most strongly associated with smoking.

Why are these learning/conditioning views important for smoking behavior? There are several components of smoking that are being associated together through repeated pairings as discussed above. First, originally neutral stimuli/behaviors have gained reinforcing properties though repeated pairings with nicotine's reinforcing drug effects. For example, through pairings with nicotine effects in a nearly perfect temporal relationship (i.e., holding cigarette, taking drag on cigarette leads to nicotine effect in 5-7 seconds) the behaviors that are part of the process of smoking (e.g., inhalation, fine motor movements in hands, mouth movements) become associated with the reinforcing effects of nicotine and become secondary reinforcers over time. This means that the behaviors themselves begin to provide reinforcement in and of themselves. There is a strong argument that many of the reinforcing aspects of smoking may be due to the behaviors, as opposed to strict nicotine effects (e.g., social aspects of smoking, fine motor movements). For example, many people find fine motor movements (e.g., playing with pens, doodling) and mouth movements (e.g., chewing gum, chewing on fingernails) enjoyable and useful to reduce anxiety and increase pleasure in a nonreinforcing environment (e.g., department meetings). If this aspect of smoking behaviors is analyzed, it may be that the behaviors are not neutral at the beginning; rather, they have reinforcing properties that only get more developed with continued pairing with nicotine effects and other reinforcing aspects of smoking (e.g., social activity).

Of primary interest in smoking cessation is the break down and extinction of the relationships between behavior associated with smoking (e.g., behavioral topography of smoking) and the reinforcement gained from nicotine consumption (i.e., nicotine effects). The extinction of this relationship can occur by,

according to learning principles, providing the person with activities similar to the behavior associated with smoking (e.g., mouth movements, fine motor finger movements, and deep breathing) in the absence of nicotine effects (reinforcement).

In summary, cigarette smoking is a complex mix of physiological and behavioral processes that, when paired hundreds of thousands of times, produce severely extinction resistant behavior. Not well addressed in the literature is the idea that behavior associated with smoking becomes strong secondary reinforcers. These secondary reinforcers may be partially responsible for many pleasurable effects that make up smoking (e.g., anxiety reduction). Although the proposed research more actively addresses behavioral issues of smoking, the pharmacological aspects of nicotine are ever present in the conditioning process and are very important for successful smoking cessation.

Purpose of the Study

Tiffany and Cepedo-Benito (1994) report that the breakdown of smoking behavior has been severely under addressed in the literature and requires more attention. The proposed research is an attempt to reduce the strength of the relationship between smoking behavior and the reinforcing nicotine effects. If substitutes can be found for smoking behavior, they can be presented without nicotine effects, in effect, extinction trials. Further, the behavior that has gained secondary reinforcer status, if used correctly, could decrease withdrawal symptoms smokers experience during abstinence. The proposed research assesses whether the use of behavioral topographical substitutes (i.e., activities that mimic the behavior performed while smoking) are useful adjuncts to smoking cessation and decrease the difficulty commonly associated with smoking cessation.

The proposed research ties together components from the above review to look at one possible way to improve the success rates associated with smoking cessation programs. The basic idea is that over a long history of repeated pairings with the reinforcing effects of nicotine, the topographical aspects of smoking have become secondary reinforcers that are one part of the total reinforcing effects associated with smoking. The next step in this analysis of the reinforcing effects of smoking is that during the cessation process, BE suggests that providing individuals with the topographical secondary reinforcers would help in two ways. First, topographical secondary reinforcers will provide the smoker with some reinforcement usually gained from the entire smoking process, by that, allowing the quitter to retain some reinforcement. Secondly, the

systematic pairing of topographical aspects of smoking with non-nicotine, non-smoking stimuli in the absence of nicotine effects will lead to a reduction of the association between topography and nicotine effects.

The hypothesis or rationale behind the proposed research is that individuals are not only going through withdrawal from nicotine's effects but are also dealing with the withdrawal of strong secondary reinforcers, the topographical aspects of smoking. By providing individuals with behavioral topography substitutes they receive some of the reinforcing aspects that make up the total smoking episode, but the behavior will not be associated with nicotine. This does two things: (1) provides individuals with some reinforcement while going through the quitting process and (2) extinguishes the need for constant fine motor movements and mouth activity that are generally associated with smokers going through withdrawal (e.g., increased eating, increased nervous finger/hand behavior).

The proposed research represents one area that has been largely unstudied but has potential to improve the success of current treatment programs. The basic idea is to apply the BE concept of substitutes aggressively within a multicomponent smoking cessation program. Behavioral topography substitutes may improve treatment success rates by reducing withdrawal symptoms and urges to smoke. Further, substitutes will provide individuals with skills that will help them control or manage urges to smoke more systematically, and provide extinction trials for behavior associated with smoking (i.e., smoking behavior without pleasurable nicotine effects). This should decrease the likelihood of relapse, which is most commonly associated with urges or desires to smoke (craving) and depression (West, Hajek, & Belcher, 1990).

The assessment instruments in the proposed research will detect whether behavioral topography substitutes decrease withdrawal symptoms, depression, and urges to smoke during the quit-week. The purpose of this project is to determine whether behavioral topography substitutes increase the effectiveness of a common program, when added to a multi-component cessation program. It is important to collect information about the mechanisms that lead to the dichotomous variables of abstinence (success) or failure (Hajek, 1991). The important information to collect during treatment for smoking is information on: mood, affect, urges to smoke, withdrawal symptoms, and general physical symptoms. Ideally, data should be collected before, during, and after the cessation program, with special attention on quit week, which is the

focus on this project.

Hypotheses

The hypotheses for the proposed research are simple and straight-forward. The majority of the hypotheses look at differences between treatment conditions during quit week (Quit Day [Session 5] and Session 6) because the withdrawal symptoms peak during this time. Each hypothesis focuses on a different part of the quitting experience, from symptoms of nicotine deprivation to urges to smoke to symptoms of anxiety or depression. There are several reasons why the analyses utilize quit week data instead of Session 10 data or follow-up data. First, scores on all assessment measures should be highest during quit week thereby allowing for the greatest range of scores and largest effect sizes. This allows for proper separation of the conditions on these. Secondly, the number of symptoms associated with nicotine deprivation is highly predictive of a smokers ability to maintain abstinence. This is because individuals often have several quit attempts before finally succeeding, with lower withdrawals symptoms during quit week on previous quit attempts as one of the best indicators of long-term abstinence (Hughes & Hatsukami, 1986).

The experimental design allows analysis of various measures of affect, mood, symptoms of nicotine deprivation, and urges to smoke at several times (Time: Pretreatment, Session 5 [quit day], and Session 6) across three conditions (Condition: Behavioral Substitutes [BS], Nicotine Fading/Brand Switching [NF], and Standard Behavioral Treatment [ST]) that will be explained in depth later in the next chapter. Briefly, the design is an additive treatment comparison in which all conditions receive several standard components. The BS and NF conditions have one treatment component in addition to those standard treatment components. The BS condition has behavioral substitutes added, while the NF has nicotine fading and brand switching as the additional component. The ST condition consists of only standard treatment components. All components included in the ST condition are also included in the BS and NF conditions. The comparisons of interest are two-fold: (1) Does the addition of behavioral substitutes to the standard treatment components significantly improve the participants' response to abstinence during quit week (i.e., less severe response to nicotine deprivation, lower depressive symptoms etc.); (2) Does the addition of behavioral substitutes to the standard treatment components makes them as successful as the nicotine fading/brand-switching participants' in terms of their reported measures. Although it is impossible to statistically show that two conditions are the same or approximately the same but it is possible to show that

two conditions differ from a comparison condition in similar ways, which is how the comparison of the NF and BS conditions will occur. This combination will provide two pieces of information, does the behavioral substitutes add to the standard package and does its efficacy approach the efficacy that a recognized component for smoking cessation when that component is added to the standard components. The hypotheses are separated into primary hypotheses and secondary hypotheses.

Primary Hypotheses

Primary hypotheses focus on changes or differences in measures directly related to smoking or thoughts about smoking. These hypotheses, then, will look at changes or differences between condition in abstinence rates, biochemical measures of smoking, self-report of symptoms associated with nicotine deprivation, self-report of urges to smoke and reported thoughts about their effort in quitting smoking in terms of their stage of change.

Abstinence. It was hypothesized that participants in the BS and NF conditions would have higher levels of abstinence at Sessions 5 and 6 than participants in the ST condition. Further, it was anticipated that individuals in the BS and NF conditions would have more participants who would remain abstinent from quit day through Session 6.

Alveolar Carbon Monoxide (COa). Alveolar Carbon Monoxide (COa) is a biochemical measure of smoking behavior (Vogt, Selvin, Widdowson, & Hully, 1977). It was expected that participants in the BS and NF conditions because of higher rates of abstinence would have greater reduction in COa rates from Pretreatment level to Sessions 5 and 6 when compared to the ST condition. Further, it was anticipated that the NF condition would show the greatest reduction in COa because it focuses on reducing nicotine, which is also associated with a reduction in tar. Lower nicotine cigarettes tend to have lower levels of tar and lower tar levels are associated with lower COa levels.

Symptoms of Nicotine Deprivation. It was hypothesized that participants in the BS and NF conditions would show fewer and less severe symptoms associated with nicotine deprivation than the ST condition. Further, it was hypothesized that the BS condition would show fewer and less severe symptoms than the NF condition. It was anticipated that behavioral substitutes would provide replacements for a portion of the symptoms associated with not smoking; that is, the behavioral components of smoking that have become secondary reinforcers. It was expected that individuals who abstain from smoking would show symptoms of

deprivation from these secondary reinforcers, as well as from the deprivation from nicotine.

Urges to Smoke. It was anticipated that participants in the BS and NF conditions would show lower scores in their reported urges to smoke than the ST condition. It was believed that the BS and NF conditions would, because they would experience fewer symptoms associated with nicotine deprivation, also experience less severe urges to smoke. Further, the BS condition would show fewer urges to smoke than would the NF condition because they were provided with mechanisms to manage urges more so than the NF and ST conditions.

Stages of Change (SOC). The stages of change (SOC) questionnaire has proven to be helpful in predicting treatment outcome. It was hypothesized that all conditions would make significant movement on the SOC scales, specifically precontemplation, contemplation, and action scales. However, it was predicted that the BS condition would make the most significant movement and show higher levels at Session 5. Also, a significant difference was anticipated between the NF and ST conditions. It was expected that the NF condition would show higher levels because of the nicotine fading activities that require more effort during the weeks preceding the quit day and, therefore, they would move more quickly through the stages.

Secondary Hypotheses

Secondary hypotheses are those that look at factors or measures that are expected to change with the quitting process but are not directly related to smoking behavior or thoughts about smoking. These are all self-report measures of anxiety, depression, general symptoms, and affect. Changes were expected in these measures due to the stress and major life change that most individuals associated with smoking cessation. These dimensions, although not direct measures of smoking behavior, have been associated with successful abstinence from cigarettes and therefore are important variables to determine the efficacy of these treatments.

Anxiety. It was hypothesized that participants in the BS and NF conditions would show fewer anxiety symptoms during quit week than the ST condition. Anxiety symptoms are often associated with nicotine deprivation. Further, it was anticipated that the BS condition would show lower levels of anxiety symptoms because they were provided with common anxiety reduction behaviors (e.g., behavioral substitutes to be described later).

Mood/Depression. It was hypothesized that participants in the BS and NF conditions would show

lower levels of depression during quit week (Sessions 5 and 6) than individuals in the ST condition. The belief was that these individuals would have less increase in depression scores because they had more powerful treatments to combat symptoms of deprivation from cigarettes and smoking than the ST condition, which would allow them to manage their mood more effectively.

General Physical and Psychological Symptoms. It was hypothesized that individuals in the BS and NF conditions would show lower levels of physical complaints and fewer psychological symptoms because they would be "coping" with the nicotine deprivation and abstinence from smoking more effectively than the ST condition. Further, it was expected that the BS condition scores would be lower, and functioning better, than the NF condition because of the added help of the behavioral substitutes.

Affect. It was hypothesized that individuals in the BS and NF conditions would show higher levels of positive affect and lower levels of negative affect as compared to the ST condition. Again this was believed because the individuals would have an easier time of quitting and quitting would be more enjoyable. It was hypothesized that participants in the BS and NF conditions would show lower scores on indices of general physical symptoms because they would be feeling better going through symptoms associated with nicotine deprivation.

CHAPTER 2

METHODS

Participants

The participants were 35 individuals from a midwest community who desired to quit smoking. A total of 53 individuals were interviewed for participation. Following the interview, eight participants did not meet selection criteria for the study, either reporting not being able to attend the appropriate number of sessions or did not report an interest/desire in quitting smoking. Those individuals were eliminated from the sample. Of the remaining individuals screened 10 participants did show to at least one treatment session but did not meet the requirement of attending 4 of the first 6 sessions, including attending sessions 1, 5, and 6. These individuals were excluded from analyses because insufficient data was present and they missed valuable treatment information. Of the remaining individuals who were initially screened, 35 individuals (19 females, 16 males) participated in the study, as described below. Primary reasons for declining participation or dropping out of the study prior to treatment were inability to make the time commitment (2 1-hour sessions per week), no desire to quit smoking (e.g., were referred for smoking cessation by physician but did not want to quit), or did not desire to participate in a group based treatment program. Those who dropped out or declined participation following the initial interview did not differ from those who agreed to participate in smoking rates but did differ significantly in their desire to quit smoking as measured by a 7-point Likert scale.

Individuals were given free smoking cessation treatment for their participation. Participants were recruited through newspaper stories and through an area Veterans Administration (VA) hospital through contact with potential referral sources in the VA (i.e., Department of Behavioral Medicine staff who manage the VA smoking cessation programs). Participants were over 18 years of age. All participants were randomly assigned to conditions. All participants interviewed for participation in this study were given referral information, but were not directly talked to about their scores or answers to any of the questions asked (e.g., level of depression). Interested subjects were contacted by phone.

A brief interview was conducted to provide information about the study and to insure that they were willing to participate given the excessive time demands and that they meet certain requirements for inclusion. Subjects who were interested in participating in the project met the following selection criteria:

(a) had desire to quit smoking; (b) were able to attend three of four pre-quit day group meetings; (c) were able and willing to self-monitor smoking behavior during the pre-quit day period; (d) were able to attend sessions 5 and 6 (quit week); (e) were able to attend the first session; and (f) were 18 years of age or older. Subjects that did not meet the selection criteria were offered a referral to a program that better met their desires or limitations and were thus, excluded from the study.

The final participant pool consisted of 35 individuals who met the above requirements. The proposed number of participants was 45 individuals, divided equally among the three conditions. However, due to several reasons (i.e., low recruitment rate, poor session attendance/drop out rate, and inability for individuals to attend an intensive multi-session per week program) the number of participants was adjusted. The final group of participants had a mean age of 51.9 (SD = 13.9), with 13 participants assigned to the BS condition with a mean age of 52.1 (SD = 14.2), 11 participants assigned to the NF condition with a mean age of 48.9 (SD = 14.7), and 11 participants assigned to the ST condition with a mean age of 54.6 (SD = 13.3). Because this was a deviation from the proposed number of participants and planned sample for each condition the power associated with this change is important (A section later in this chapter is devoted to discussing extensively the power of the analyses and issues of collecting data on fewer individuals than was planned.).

Design

Groups were run in a staggered fashion over an 8-month period, with at least two groups run for each condition (two groups of 3-8 participants, with three conditions equals a total number of 35 participants). The participants were randomly assigned to one of three conditions after the initial individual interview, those conditions were: (a) Standard Behavioral Treatment Condition (ST) [n=11], (b) Nicotine Fading and Brand Switching Condition (NF) [n=11] and (c) Behavioral Topography Substitutes Condition (BS) [n=13]. Each of the individuals in each of the conditions was assessed on sessions 1, 5, and 6. All subjects were asked to self-monitor their smoking behavior for the two-week pre-quit day period.

All group sessions (pre-quit day and post-quit day groups) were 1.0 hours in length. Following are brief descriptions of the three conditions. The three conditions consisted of a base condition (ST), a base condition plus nicotine fading and brand switching (NF), and the base condition plus behavioral topography substitutes (BS). Individuals in the latter two conditions received all the components that individuals receive

in the ST condition but also received one additional major component (i.e., nicotine fading/brand switching or behavioral topography substitutes). A brief description of the components included in the base treatment package is provided on the General Treatment Package consent form attachment in the Appendix B. Following are brief descriptions of the treatment conditions.

Standard Treatment Control Condition (ST)

This condition is an attempt to control for common placebo treatment factors, such as contact with professionals, education about smoking cessation, and group factors (e.g., support and advice from group members). In this condition individuals were given information about smoking cessation, provided with group support for their cut-down efforts, and self-monitored their smoking. A complete description of session by session components is included in the "Smoking Cessation Manual" that is included in Appendix A.

Nicotine Fading/Switching Condition (NF)

In this condition, individuals will be given a common component of smoking cessation programs, that is, nicotine fading and brand switching. Participants are required to pick each pack of cigarettes from a list of brands, with each subsequent brand smoked having lower nicotine content and will be a different brand. This type of intervention changes the nicotine content and taste of smoking for the individual.

A 30%-60%-90% reduction rate from the baseline cigarette nicotine level was used, consistent with Foxx and Brown's (1979) fading procedure. However, because the pre-quit period was only two weeks long, compared to a usual fading procedure that would last at least 3 weeks, the procedure progressed at a faster rate than is usual. Participants were given lists of acceptable cigarettes to smoke each session that were based on the nicotine level in their preferred brand. Participants in this condition were required to buy one pack at a time and not to smoke two packs of the same brand in succession at any time.

Information on the specific additional components are presented in the "Smoking Cessation Manual" in Appendix that includes the nicotine fading sheets that participants followed. There were three levels of fading sheets, one for smokers of cigarettes with nicotine content 1.1 and higher, one for smokers of cigarettes with nicotine content between .7 and 1.0, and one for smokers of cigarettes with nicotine content .6 and below. Each list included five non-menthol and five menthol brands so that individuals have ample choice in choosing the cigarettes they smoke. Participants smoked cigarettes on switch 1 (90%) from

session one to session 3, cigarettes from switch 2 list from sessions 3 to 4, and cigarettes from switch 3 from sessions 4 to quit day. The initial switch is most difficult, for this reason individuals are given a week at nicotine level to acclimate to the fading process.

Behavioral Topography Substitute Condition

This intervention provided smokers with behavioral substitutes for smoking (e.g., manipulating objects, deep breathing, and mouth activity). This condition was given several activities to perform when they have an urge to smoke, they were: (a) squeze ball to manipulate with their hands; (b) toothpicks to manipulate with their mouth, teeth, and lips; (c) sugarless gum to chew; and (d) deep breathing exercises. In addition to these main activities individuals were also given lollipops, cinnamon sticks, straws, and rubber bands, which individuals have found to be pleasant objects to manipulate. All of these activities mimic the behaviors associated with smoking and were provided to the smokers in bags at session 1 and were given as many refills as desired throughout the program.

Participants were encouraged to use the substitutes during each session, thus allowing them to practice these techniques in nonsmoking situations, to increase the likelihood that they would use the techniques outside of sessions to reduce urges to smoke. As part of this condition participants were asked to role-play the use of substitutes in high-risk situations (e.g., bars and while driving), again to increase the likelihood that they would use them during those situations. A complete description of the behavioral substitutes components is included in the "Smoking Cessation Manual" presented in Appendix A.

Materials

Each participant was measured by a variety self-report instruments and one biochemical method throughout the treatment program. Of primary importance were: indicators of current level of smoking and nicotine addiction; biochemical indicators of smoking; symptoms of nicotine deprivation; urges to smoke; depression; anxiety; general physical symptoms; stages of change information; and general background information. To fully understand the amount of information collected, below each instrument and the time it was collected is discussed. A summary of the measures and collection times is presented in Table I.

Measures of Smoking Behavior

Smoking History. Smoking History Questionnaire (SHQ) is a structured interview that collects information about individuals smoking history and support system, as well as demographic information that

Table I

Assessment Schedule for Measures

Instruments	Screening Interview	1	2	3	4	5	6
BAI		X				X	X
BDI		X				X	X
COa	X	X	X	X	X	X	X
FTQ/FTND	X						
LSS	X						
NAS (MOM)		X	X	X	X	X	X
PANAS-X		X				X	
QSU		X	X	X	X	X	X
SOC	X					X	
SCL-90-R	X					X	
SHQ	X						
Weight		X				X	

Note: Assessment occurred at the beginning all sessions

will be used to contact participants at follow-up. The questionnaire included several important measures to determine severity of nicotine addiction. The SHQ included a rating of desire to quit smoking, which was a 7-point Likert scale, from "no desire to quit" to "strong desire to quit" with higher scores indicating a greater desire to quit smoking. Also information on the when participants began smoking and the amount of their smoking was collected. SHQ data was collected during the initial screening interview. A copy of the SHQ is presented in Appendix B.

Measures of Nicotine Dependence. The Fagerstom Tolerance Questionnaire (FTQ) was developed to provide a concise and convenient self-report that would provide a measure of nicotine dependence (Fagerstrom, 1978). The FTQ has eight items with either yes-no (1 or 0) scoring criteria or multi-point scoring from 0 to 4. Higher totals on the FTQ have been significantly correlated to biochemical markers of nicotine dependence (Fagerstrom & Schneider, 1989). A recent revision of the FTQ, called the Fagerstrom Test for Nicotine Dependence (FTND) has shown increased correlation with biochemical markers of nicotine dependence. This occurred by dropping two items from the FTQ and revising the scoring criteria and point values of two other FTQ items (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991; Payne, Smith, McCracken, McSherry, & Antony, 1994). For this study, data was scored using both the FTQ and FTND formats, which allowed further comparison of these measures. Although two items from the FTQ were dropped from the FTND due to low correlation with biochemical markers, these items (nicotine yield and inhalation) may provide information for smoking cessation. However, they do not discriminate sufficiently to be included in a measure of nicotine dependence. FTND and FTQ data were collected during the initial screening interview. Copies of the FTND and FTQ are presented in Appendix B.

Aveolar Carbon Monoxide (COa). The only biochemical measure was alveolar carbon monoxide (COa), which was included because it reflects on smoking behavior (Vogt, Selvin, Widdowson, & Hully, 1977). Expired air samples were analyzed for CO content using the standard model. Air samples were collected at the beginning of each session, estimated to occur between 5-30 minutes after the participants' last smoking experience.

Symptoms Associated with Nicotine Deprivation. The Nicotine Abstinence Scale (NAS) is a 15-item scale that assesses the presence and severity of common symptoms associated with nicotine deprivation for individuals who regularly use nicotine. Participants rated how severe they were experiencing the symptoms

associated with nicotine deprivation "At This Moment" on a 4-point Likert scale. This scale provides required information to make an accurate DSM-IV diagnosis of nicotine dependence. NAS data was collected at every contact with each participant (screening interview and all sessions) but the data of interest was collected at the beginning of Sessions 1, 5, and 6. A copy of the NAS is presented in Appendix B.

Urges to Smoke. The Questionnaire of Smoking Urges (QSU) is a 32-item questionnaire that assesses urges to smoke. The QSU is a 7-point Likert-type scale, where participants indicate how strongly they agree with each item. The QSU has been shown to have a two-factor structure in a factor analysis study that consists of selected items from the four scales (Tiffany & Drobes, 1991). One factor is most closely associated with a "clear intention and desire to engage in smoking behavior that is anticipated as pleasant, enjoyable, and satisfying" (pg. 1471, Tiffany & Drobes, 1991). The other factor was most closely associated with an " anticipation of relief from negative affect through smoking" (pg. 1471, Tiffany & Drobes, 1991). QSU data was collected at each contact with participants (initial interview and all sessions) but the data of interest in this study was collected at the beginning of Sessions 1, 5, and 6. A copy of the QSU is presented in Appendix B.

Stages of Change. The Stages of Change Questionnaire (SOC) is a 6-question anchored ladder (0-10) scale that measures individuals' thoughts about smoking, smoking cessation, and relapse (Rustin & Tate, 1991). The SOC is helpful in detecting the progression of an individual's desire to quit smoking and remain abstinent. The ladders of interest for this study were the Precontemplation, Contemplation, and Action ladders, which were most useful at determining an individuals movement towards a greater desire to quit smoking and behavior change associated with smoking. SOC data was collected prior to session 1 and at the beginning of Session 5. A copy of the SOC questionnaire is presented in Appendix B.

Self-Monitored Smoking Behavior. Daily Cigarette Count (Wrap Sheet) is a cigarette self-monitoring sheet. Individuals fill out one line for each cigarette smoked during the self-monitoring period. Ideally this data will only be collected pre-quit day; however, if individuals are unable to stay abstinent they will continue to collect this information. This data was not specifically analyzed because of questions of reliability and validity but was used to identify problem areas for individuals. A copy of the wrap sheets used in this study is presented in Appendix B.

Nonsmoking Measures

Life Stress. The Life Stress and Support (LSS) scale was used to assess the amount of stress in an individual's life. The LSS is a 13-item scale that consists of items related to current life stressors and the participants' support system during the past 6-month period. This was used to determine if any of the conditions consisted of people that were under greater levels of stress or had less support. Higher LSS scores indicate fewer stressors and better support, while lower LSS scores indicate greater number and severity of stressors and smaller support systems. LSS data was collected during the initial screening interview. A copy of the LSS is presented in Appendix B.

General Physical and Psychological Symptoms. The Symptom Checklist-90-Revised (SCL-90R) is a 90-item checklist that assesses common physical symptoms and thoughts that individuals have (Derogatis, 1983). These 90 items provide nine subscale scores, they are: Somatization; Obsessive-Compulsive; Interpersonal Sensitivity; Depression; Anxiety; Hostility; Phobic Anxiety; Paranoid Ideation; and Psychotocism. The subscale score of interest for the SCL-90R was the General Symptom Index (GSI) scale, which is a combination of all the items and has been shown the most powerful indicator of psychological and physical functioning (Derogatis, 1983). The SCL-90R data was collected during the initial screening interview and at the beginning of Session 5. A copy of the SCL-90R is presented in Appendix B.

Mood/Depression. The Beck Depression Inventory (BDI) is a 21-item inventory that assesses if an individual is experiencing common symptoms of depression and rates the severity of those symptoms (Beck & Steer, 1987). BDI data was collected at the beginning of Sessions 1, 5, and 6. A copy of the BDI is presented in Appendix B.

Anxiety. The Beck Anxiety Inventory (BAI) is a 21-item inventory that assesses if an individual is experiencing common symptoms of anxiety and rates the severity of those symptoms (Beck & Steer, 1993). BAI data was collected at the beginning of Sessions 1, 5, and 6. A copy of the BAI is presented in Appendix B.

Affect. The Positive and Negative Affect Schedule-Expanded Form (PANAS-X) is a 60-item affect rating scale. This scale is a list of 60 words or short statements that describe feelings people often experience (Watson & Clark, 1991). Individuals rate the number that best describes how they feel "Today" with the past 1.5 hours as a reference period. The scales of interest from the PANAS-X are Negative Affect

(NA) and Positive Affect (PA). PANAS-X data was at the beginning of Sessions 1 and 5. A copy of the PANAS-X is presented in Appendix B.

Treatment Integrity Measures

Participant Ratings of Treatment. The Rating of Therapy and Consultants Questionnaire (RTCQ) was an11-item questionnaire that allowed participants to rate their smoking cessation experience. Specifically, the participants rated the therapy, how beneficial the therapy was, and the consultants and other participants (group atmosphere). The 11-items were rated on a 7-point Likert scale (strongly disagree to strongly agree) with two of those items reverse keyed. The remaining item requested participants to select the three most beneficial topics discussed during the sessions from a list of all the major topics discussed in the sessions. RTCQ data was collected at the beginning of Session 7. A copy of the RTCQ is presented in Appendix B.

Treatment Consistency. The Therapy Topics Rating Scale (TTRS) was a series of 5-8 item questionnaires that were filled out by the consultants after each session. These items were constructed from the main topics as high-lighted by the Smoking Cessation Manual for each session. For example, the Session 1 TTRS included the following items on a 4-point Likert scale (0=not discussed, 1=discussed very briefly, 2=discussed with some detail, 3=discussed completely) they were: discussed nicotine fading/brand switching; discussed self-monitoring/tally sheets; discussed ways to reduce nicotine that are not detailed in nicotine fading/brand-switching; discussed individuals smoking background; discussed group rules; and discussed using behavioral topography substitutes to make not smoking easier. The following questions were included on the Session 1 TTRS that were yes/no ratings: were behavioral substitute bags handed out to group members; were group members given nicotine fading/brand switching sheets; and were group members given self-monitoring/tally sheets. This was done for each session, with both consultants providing an independent rating of their perception of the information discussed during the group. In this way, there was an assessment of how accurately the Smoking Cessation Manual was followed as assessed by the smoking consultants. Copies of Session 1-6 TTRS are presented in Appendix B.

Procedure

Recruitment

Participants were recruited through a variety of mediums following previous research on successful recruitment of a community sample of smokers for treatment programs (Lando, 1982). Some of the methods

were: flyers to community organizations, letters to local physicians, flyers to local businesses, news in brief ads in a local newspaper, and word of mouth communication. The basic message is "Quit smoking now! Participate in a free smoking cessation program, if interested call Mike at 624-7484." At the VA hospital individuals who were referred to the Department of Behavioral Medicine for smoking cessation were contacted and offered participation in this group instead of the standard VA hospital program that consisted of a similar group combined with nicotine replacement therapy. When interested individuals called they were given a brief outline of the program, if they were able to meet the basic time restraints (meetings two times/week for five weeks) and were interested in quitting smoking, an individual interview was scheduled.

Screening Interview

The individual interview has three purposes: (1) to provide interested participants with information about the project, requirements of the project, and information about the dates and times of anticipated sessions, if known at the time of the interview; (2) if participants are still interested they will read and sign the informed consent document (Appendix B); and (3) to collect demographic information from the individual, information on smoking history, and collect baseline information on individuals' mood, anxiety level, withdrawal symptoms, urges to smoke, and stage of change regarding smoking cessation. As noted above, there were multiple self-report measured filled out by participants during the initial screening inventory, please refer to Table I for specific inventories completed at that time.

Condition Assignment

After participants completed the initial screening interview and met the requirements for participation in the study, they were eligible for random assignment to one of the three treatment conditions. Due to time limitations on the number of groups that could be run at any one time, it was decided that two groups were to be run concurrently, with each group representing a different condition (e.g., BS, NF, ST). For example, the first two groups ran were the initial BS and NF groups. Participants who were eligible to participate in a group at that time were randomly assigned to either the BS or NF conditions. When those groups were near completion recruitment started for the second series of groups, this was the initial ST and the second BS group. Participants were then randomly assigned to those two groups. This process repeated to attain the current number of participants. Therefore, the assignment is not true random assignment but is consistent with the guidelines of random assignment, that is, that no individual was placed into a specific group based

on his/her characteristics.

Cessation Program Conditions

Once assigned to a group, individuals were provided with a schedule of all meetings and were in that group for the remainder of the study. Treatment conditions followed a specific outline that was documented in the Smoking Cessation Manual, which is presented in Appendix A.

Analyses

The analyses were planned to determine if condition differences exist that were due to differences in the treatment the participants received. There were four different types of analyses performed. The four sets of analyses focused on: treatment integrity, as rated by the participants and consultants; analysis of demographic variables (e.g., age, amount smoked, FTND scores) to determine if the conditions were different before treatment began; analysis of session 5 and 6 scores for primary and secondary hypotheses; and, finally, explorative analyses for individuals who were completely abstinent between quit day and session 6 and those who were not to determine if there were differences between these individuals that would help identify characteristics that would lead to success in smoking cessation programs. An alpha level of .05 was used for all statistical tests. A Scheffe post-hoc test was used for all post-hoc analyses to compare conditions directly. Given the large number of analyses planned for the data a correction for study-wise error would be appropriate. However, because this study was a pilot treatment study it was decided that this would inappropriately limit the knowledge that could be gleaned from this study. The four analyses are discussed in more depth next.

Treatment Integrity

These analyses are related to treatment integrity, which consist of participant ratings of the treatment they received and consultant ratings of the topics covered in the various conditions. Participant ratings were used to determine if they 'believed' that they received a viable treatment and that the consultants provided them with reasonable support and appeared reasonably knowledgeable of the treatment of nicotine dependence. This will help determine if the treatments (and consultants) were delivered in a consistent manner, thus, providing the participants with a reasonable belief that they received a beneficial treatment. The consultant ratings were used to show that the treatments differed on the intended components (i.e., discussion of behavioral topography substitutes and nicotine fading/brand-switching) but also to show that

other important topics consistent across conditions (e.g., self-monitoring, opponent-process) were discussed in similar depths across conditions. The participant ratings were analyzed using one-way ANOVAs for several of the items or groups of items (e.g., rating of consultant knowledge) and descriptive information for other items (e.g., which topic participants felt was most helpful). Consultant ratings, due to the few number of observations, were analyzed descriptively, as opposed to statistically.

Pretreatment Analyses

This set of analyses was used to describe the sample according to the various conditions. Of interest was that the conditions did not differ significantly on various demographic measures (e.g., age, weight, education) and on various measures of their pretreatment smoking history (e.g., years smoked, rate of smoking, FTND). Although there is not a test for similarity, it is important to determine if the conditions differed at pretreatment, which will assist in the interpretation of results. These analyses were conducted utilizing One-way ANOVAs looking for between condition differences, if these ANOVAs were significant, Scheffe post-hoc tests were conducted.

Session 5 and 6 Measures

The main analyses of interest for the primary and secondary hypotheses, assuming treatment integrity was sufficient and pretreatment differences did not exist, were differences between conditions at sessions 5 and 6 when session 5 and 6 scores are adjusted for pretreatment levels. Difference scores were used (i.e., session 5 scores minus pretreatment scores and session 6 scores minus pretreatment scores) to adjust for pretreatment levels of the measures used to measure treatment outcome at sessions 5 and 6. In this way, the difference scores at session 5 and 6 would be due to differences that were due to treatment assignment as opposed to individual differences. The actual analyses conducted will be Repeated Measures ANOVAs on session 5 and 6 change scores. The change scores are based on Z-scores for the entire series of data for that measure across the session of interest, then using session 5 and 6 change from baseline levels. This was done to create consistency across measures and insure understandable results and consistent graphs of results. For measures that were only collected two times (e.g., pretreatment and session 5) One-way ANOVAs were conducted on the change score. As noted above, an alpha level of .05 was used for all statistical tests. Where appropriate Scheffe post-hoc analyses were conducted to compare two treatments directly.

Successful Abstainers vs. Others

These analyses were used to determine if participants who were able to abstain between quit day and session 6 (SUC-Abs) differed in any observable pretreatment measure or somehow showed a different pattern of treatment changes than did those individuals who were not able to abstain from quit day to session 6 (NON-Abs). These analyses were intended to determine relevant factors in smoking cessation and determine variables that are predictive of successful abstinence. Further, these analyses would likely be able to provide information on what was responsible for treatment outcome, whether it was related to treatment differences or due to some pretreatment variables. These analyses focused on pretreatment differences between these two self-selected post-hoc groups and differences noted in change scores at sessions 5 and 6. Repeated Measures ANOVAs are used where appropriate and One-way ANOVAs are used when Repeated Measures were not applicable.

Power Analysis

To insure that sufficient power existed to detect differences between conditions an extensive power analysis was conducted using a computerized power analysis program developed by Cohen and Borenstein (1988). The method of determining the effect size was as suggested by that program. The formula was based the square root of the estimated (or actual) F value of the analysis divided by the F value plus denominator

degrees of freedom for the analysis. For this power analyses actual F values and denominator degrees of freedom were utilized. To determine if collecting additional data would lead to greater significant results, additional power analyses were conducted using the higher n, 15 per treatment cell. These analyses provided information about the increase in power, based on the current effect size, that would occur if the proposed number of participants had been involved in the study to determine if those additional participants would add to the conclusions drawn from the study.

Effect sizes and the magnitude of power were determined for two different types of analyses. First, these were determined for all pretreatment measures both pretreatment only measures (e.g., FTND, smoking history questions) and pretreatment measures that were assessed again during Session 5 and 6. These power analyses and effect sizes were based on One-way ANOVAs by treatment condition. The second type of effect size and power analysis conducted was done on Session 5 and 6 scores, which was done in a repeated

measures format by treatment condition that included an interaction term of Time x Treatment Condition.

Discussion of the power of these analyses is pertinent to this section because it relates to the number of participants from which data was collected. Power analyses were conducted for all analyses conducted in this study. The purpose of the analyses of power were two-fold: first, was there sufficient power for the analyses to detect between condition differences based on the effect sizes found with the 35 participants and secondly, would the addition of 10 subjects (2 for the BS condition, 4 each for the NF and ST conditions) make a substantial difference in the power and, thus, justify acquiring more subjects. The second purpose is of utmost importance because a total of 45 participants, 15 in each condition, was the number proposed for this study.

The first analyses of power focused on the actual power of the analyses, given the number of participants in the conditions and the actual effect sizes gained. Based on these data, power levels ranged from .054 (FTQ) to .608 (SOC-C) for One-way ANOVAs on pretreatment measures. For Repeated Measures ANOVAs the power levels ranged from .113 (NAS) to .460 (BDI) for the Time x Condition interaction. Clearly, these power levels are very low and it would be desirable if the power levels were in the .80 to .90 range. However, given the small effect sizes noted for these measures and the small number of participants, only moderate levels of power are present in this study. The main effect for Condition is the effect of interest and those power levels ranged from .270 (QSU-Factor 2) to .947 (COa) for Repeated Measures ANOVAs. Actually, the general power levels for the main effect of Condition are reasonable with four of the seven analyses having power above .80.

The second series of analyses of power were conducted to determine if the addition of 10 participants, given the current effect sizes, would make a sufficient difference in power to make the addition of those participants meaningful. The addition of 10 participants improved the range of power levels from 0.056 (FTQ) to 0.730 (SOC-C) for One-way ANOVAs. The addition of 10 participants produced an average of increase in power of 0.061 for the One-way ANOVAs. For the Repeated Measures ANOVAs the addition of 10 participants improved the range of power levels from 0.134 (NAS) to 0.565 (BDI) for the Time x Condition interaction term. There was an average increase in power due to the addition of 10 subjects of 0.056. As for the main effect of Condition, the addition of 10 participants produced an increase in the range of anticipated power levels to .339 (QSU-Factor 2) to .983 (COa), with three of the power levels above .90.

Given the low levels of power observed in this study and the modest effect sizes it was determined that significantly more subjects would have to be added to the study to produce meaningful levels of power (i.e., greater than .80). The addition of 10 participants, although it would increase power, it does not produce a meaningful increase in power that would be likely to change the results of the study. Although, power was reasonable for the Condition main effect, the addition of 10 participants and the subsequent increase in power might have affected two analyses (BDI and NAS-Craving) which had strong trends toward significance with the current power level. However, given the difficulty and cost in collecting data on 10 more participants and given other results, this did not appear feasible at this time. Much discussion of power levels will occur later in the paper. The actual power levels and the predicted power with the addition of 10 participants are presented in Table II (pretreatment only One-way ANOVAs), Table III, (pretreatment One-way ANOVAs), Table IV (Repeated Measures ANOVAs), and Table V (One-way ANOVAs for change scores).

Table II

Analysis of Power and Effect Size for Pretreatment Measures

ONEWAY	Actual F-value	df nom.	df den.	p-value	Actual Effect Size	Actual Power	Power for Proposed N
General Demographics							
Age	0.4570	2	32	0.637	0.1602	0.116	0.141
Education	2.0917	2	32	0.140	0.3344	0.385	0.488
Height	0.2664	2	32	0.768	0.1227	0.086	0.099
LSS	0.1812	2	32	0.835	0.1013	0.072	0.081
Weight	0.6679	2	32	0.520	0.1930	0.152	0.188
Smoking Related Demographics							
FTND	0.3470	2	32	0.709	0.1398	0.098	0.116
FTQ	0.0575	2	32	0.944	0.0572	0.054	0.056
Age Began Smoking	0.1808	2	32	0.836	0.1012	0.072	0.081
Smoking Rate	0.3228	2	32	0.726	0.1349	0.094	0.110
Years Smoked	0.3675	2	32	0.695	0.1438	0.101	0.120
Desire to Quit	0.9928	2	32	0.382	0.2342	0.206	0.261

Note. * The actual sample size was 35 with 13 (BS), 11 (NF), and 11 (ST). These numbers were used in the calculation for power for the actual sample size power. ** The proposed sample size was 45 with 15 in each of the 3 groups. A sample size of 45 was used in the calculation for power for the proposed sample size power.

Table III

Analysis of Power and Effect Size for Outcome Measure at Pretreatment

ONEWAY	Actual F-value	df nom.	df den.	p-value	Actual Effect Size	Actual Power	Power for Proposed N
BAI	2.1371	2	32	0.135	0.3378	0.393	0.498
BDI	1.6520	2	32	0.208	0.2991	0.316	0.404
COa	3.3653	2	32	0.047	0.4164	0.557	0.683
NAS							
Craving	2.3744	2	32	0.109	0.3548	0.428	0.539
Total	0.4302	2	32	0.654	0.1555	0.112	0.135
SCL-90R: GSI	0.2762	2	32	0.761	0.1249	0.087	0.101
PANAS-X							
Negative Affect	0.5932	2	32	0.559	0.1821	0.139	0.171
Positive Affect	2.1654	2	32	0.131	0.3399	0.397	0.503
QSU							
Factor 1	2.7234	2	32	0.081	0.3781	0.477	0.595
Factor 2	1.6721	2	32	0.204	0.3008	0.319	0.408
SOC							
Precontemplation	0.2420	2	32	0.786	0.1170	0.082	0.094
Contemplation	3.7992	2	32	0.033	0.4398	0.608	0.734
Action	0.9789	2	32	0.387	0.2326	0.204	0.259

Note. * The actual sample size was 35 with 13 (BS), 11 (NF), and 11 (ST). These numbers were used in the calculation for power for the actual sample size power. ** The proposed sample size was 45 with 15 in each of the 3 groups. A sample size of 45 was used in the calculation for power for the proposed sample size power.

Table IV

Analysis of Power and Effect Size for Outcome Measures at Session 5 and 6

	Actual F-value	df nom.	df den.	p-value	Actual Effect Size	Actual Power	Power for Proposed N
BAI 5, 6							
C	2.34	2	32	0.113	0.3524	0.718	0.826
T	1.46	1	32	0.236	0.2820	0.631	0.738
C X T	0.37	2	32	0.692	0.1443	0.163	0.201
BDI 5, 6							
C	3.28	2	32	0.051	0.4116	0.848	0.927
T	0.56	1	32	0.458	0.1770	0.302	0.373
C X T	1.26	2	32	0.297	0.2628	0.460	0.565
CO 5, 6							
C	4.82	2	32	0.015	0.4884	0.947	0.983
T	1.43	1	32	0.240	0.2792	0.622	0.729
C X T	1.08	2	32	0.351	0.2439	0.342	0.427
NAS: Craving							
C	3.30	2	32	0.050	0.4128	0.850	0.928
T	3.10	1	32	0.088	0.4012	0.900	0.957
C X T	0.24	2	32	0.788	0.1165	0.120	0.143
NAS 5, 6							
C	1.15	2	32	0.328	0.2514	0.426	0.527
T	3.01	1	32	0.093	0.3958	0.892	0.952
C X T	0.22	2	32	0.804	0.1116	0.113	0.134
QSU: Factor 2							
C	3.75	2	32	0.034	0.4372	0.890	0.953
T	0.00	1	32	0.952	0.0000	0.050	0.050
C X T	0.39	2	32	0.680	0.1481	0.170	0.209
QSU: Factor 2							
C	0.68	2	32	0.516	0.1947	0.270	0.339
T	2.85	1	32	0.101	0.3861	0.877	0.942
C X T	1.00	2	32	0.380	0.2350	0.378	0.471

Note. * The actual sample size was 35 with 13 (BS), 11 (NF), and 11 (ST). These numbers were used in the calculation for power for the actual sample size power. ** The proposed sample size was 45 with 15 in each of the 3 groups. A sample size of 45 was used in the calculation for power for the proposed sample size power.

Table V

Analysis of Power and Effect Size for Outcome Measures at Session 5

ONEWAY	Actual F-value	df nom.	df den.	p-value	Actual Effect Size	Actual Power	Power for Proposed N
SCL-90R: GSI	2.5421	2	31	0.095	0.3717	0.449	0.567
PANAS-X							
Negative Affect	0.5748	2	32	0.566	0.1793	0.136	0.167
Postive Affect	0.7009	2	32	0.504	0.1976	0.156	0.194
SOC							
Precontemplation	0.2485	2	32	0.782	0.1185	0.083	0.095
Contemplation	2.4812	2	32	0.100	0.3621	0.443	0.556
Action	0.2511	2	32	0.779	0.1191	0.083	0.096

Note. * The actual sample size was 35 with 13 (BS), 11 (NF), and 11 (ST). These numbers were used in the calculation for power for the actual sample size power. ** The proposed sample size was 45 with 15 in each of the 3 groups. A sample size of 45 was used in the calculation for power for the proposed sample size power.

CHAPTER 3

RESULTS

General Results

Session Attendance

Participants missing two or more of the sessions 1-4 and/or those who missed Sessions 1, 5, or 6 were eliminated from the treatment sample. Mean number of sessions attended through Session 6 by the remaining participants was 5.46 (S.D. = 0.66) for the BS condition, 5.55 (S.D. = 0.69) for the NF condition, and 5.55 (S.D. = 0.52) for the ST condition. Data from 35 participants (13 BS, 11 NF, 11 ST) were thus included in the analyses. A One-way ANOVA for sessions attended by Treatment Condition (BS, NF, and ST) did not show a significant difference in number of sessions attended F (2, 32) = .07.

Pretreatment Only Measures

The effectiveness of randomization was tested by conducting a One-way ANOVA for the three Treatment Conditions (BS, NF, and ST) on pretreatment scores (i.e., desire to quit smoking, FTND scores, FTQ scores, self-reported rate of smoking, age started smoking, years smoked, current age, level of education, Life Stress and Support [LSS], and weight). None of these ANOVAs provided evidence of significant differences between Treatment Conditions. Mean, standard deviations, F-values, and p-values for these analyses of pretreatment variables are presented in Table VI.

Of primary importance to this study was the FTND and FTQ scores, which provide an indication of the level of nicotine dependence for the smokers included in this study. Generally, it is believed that smokers with FTQ scores of less than 6 are considered to have a low degree of dependence (Pomerleau, Pomerleau, Majchrzak, Kloska, & Malakuti, 1990). This relates to a score of less than 5 on the FTND because the FTND has been shown to be about one point less than the FTND (Heatherton et. al., 1991; Payne et. al., 1994). As noted in the Table VI, several smokers had FTND scores below 5 and FTQ scores below 6, with a range of scores from 2-10. Of interest is if smokers with FTND scores below 5 were 'serious smokers,' meaning that they smoked regularly and experienced withdrawal symptoms during abstinence. It does appear that several of these smokers were 'light smokers', smoking less than 15 cigarettes per day but all had smoked for many years and had gone through multiple quit attempts. Further, the smokers with FTND scores below 5 were distributed equally across the conditions and were included in the analyses.

Table VI

Means, Standard Deviation, F-values, and p-values for Pretreatment Only Measures

	BS (n =13)		NF (n =11)		ST (n =11)		One-way ANOVAs	
	M	SD	M	SD	M	SD	F-value	p-value
Demographic Variables								
Age (22-76)	52.08	14.22	48.91	14.69	54.64	13.27	0.457	0.637
Education Level (9-20)[a]	14.39	1.94	13.55	2.51	13.00	3.03	0.940	0.401
Employed[b]	10	-------	6	-------	4	-------	-------	-------
Gender[c]	6/7	-------	6/5	-------	4/7	-------	-------	-------
Height (60-74)[d]	68.39	4.17	67.18	4.31	67.73	3.58	0.266	0.768
Weight (66-230)	162.77	45.22	157.36	33.94	146.09	21.35	0.668	0.520
Life Stess and Support[e]	17.46	6.62	16.36	5.78	16.00	6.21	0.181	0.835
Smoking Related Demographics								
Desire to Quit (2-7)	5.92	1.12	5.64	1.21	5.18	1.54	0.993	0.382
Age Began Smoking (11-26)	18.08	3.71	17.27	4.10	18.18	3.97	0.181	0.836
Years Smoked (4-55)[f]	34.00	14.01	31.64	13.00	36.46	12.31	0.368	0.695
Smoking Rate (10-60)	28.08	12.51	30.91	17.44	33.46	19.16	0.323	0.726
FTQ (2-10)	7.15	2.61	7.46	2.12	7.27	1.56	0.058	0.944
FTND (3-11)	6.08	3.07	6.36	2.77	5.46	1.75	0.347	0.709

Note. All Oneway ANOVAs conducted with (2, 32) degrees of freedom. [a] education level in years; [b] number of individuals employed in each group; [c] number of males/females in each group; [d] height in inches; [e] higher scores represent fewer life stressors in the past 6 months, more social support, and generally better coping on a simple level; [f] years smoked calculated by taking current age minus reported age began smoking regularly.

A second important factor of the pretreatment demographic information was that the number of individuals gainfully employed differed across Treatment Conditions (10 in the BS condition, 6 in the NF condition, and 4 in the ST condition were employed). Upon evaluation of this evidence it was noted that one participant in each Treatment Condition was disabled and four individuals in the ST and NF conditions were retired, with two people in the BS condition being retired. This leaves two individuals in the ST condition that were not employed, not retired, and not disabled. Because this variable is a categorical variable and chi-square tests are not found effective at identifying differences in such a small sample, no statistical analyses were performed. However, the difference in employment rates is of note, as one potential difference between the conditions.

Pretreatment Levels of Session 5 and 6 Measures

A One-way ANOVA for the three Treatment Conditions (BS, NF, and ST) were conducted on pretreatment scores on treatment outcome to determine if the Treatment Conditions differed significantly at pretreatment on these measures. A One-way ANOVA for COa pretreatment levels revealed that there was evidence of a significant difference between conditions, F (2, 32) = 3.65, $p<.05$, with a Scheffe post-hoc test revealing that the BS condition had significantly lower COa levels at pretreatment (M = 18.69, SD = 10.3) than did the NF condition (M=35.82, SD = 24.7). The ST condition did not significantly differ from either condition (M=24.73, SD = 10.4). The only other significant difference observed was for a One-way ANOVA for SOC-C, which showed a significant difference between Treatment Conditions, F (2, 32) = 3.80, $p<.05$. A Scheffe post-hoc test revealed that the ST condition had a significantly lower pretreatment score (M = 7.36, SD = 2.8) than the NF condition (M = 9.55, SD = .69). The BS condition did not significantly differ from either condition on pretreatment SOC-C scores (M = 8.54, SD = 1.6). The remaining analyses of primary and secondary hypotheses pretreatment One-way ANOVAs did not evidence significant differences between Treatment Conditions and are presented along with the other pretreatment means and standard deviations of scores by Treatment Condition in Table VII. Although the differences at pretreatment are important (i.e., COa and SOC-C), as discussed earlier, change from pretreatment levels was used to adjust the scores for individual differences at pretreatment.

Participant Ratings

Differences in participant ratings of the Treatment Conditions were assessed by the Rating of Therapy

Table VII

Means, Standard Deviation, F-values, and p-values for Outcome Measure at Pretreatment

	BS (n =13)		NF (n =11)		ST (n =11)		One-way ANOVAs	
	M	SD	M	SD	M	SD	F-value	p-value
BAI	8.23	6.34	8.09	9.78	14.91	10.63	2.137	0.135
BDI	7.08	7.12	11.73	8.57	12.46	8.21	1.652	0.208
COa	18.69*	10.30	35.82*	24.66	24.73	10.36	3.365	0.0472**
NAS								
Craving	1.08	1.19	0.82	0.75	1.73	1.01	2.374	0.109
Total	8.85	6.64	9.55	8.04	12.00	10.88	0.430	0.654
PANAS-X								
Negative Affect	1.56	0.60	1.86	0.84	1.76	0.60	0.593	0.559
Positive Affect	3.23	0.95	2.58	0.67	2.87	0.59	2.165	0.131
QSU								
Factor 1	67.15	14.12	60.36	15.76	54.46	9.00	2.723	0.081
Factor 2	35.31	17.09	24.82	11.12	30.91	12.43	1.672	0.204
SCL-90R: GSI	0.81	0.80	0.91	0.61	1.02	0.61	0.276	0.761
SOC								
Precontemplation	7.54	3.38	8.00	1.61	7.18	2.86	0.242	0.786
Contemplation	8.54	1.56	9.55*	0.69	7.36*	2.77	3.799	0.0331**
Action	5.46	3.07	4.00	3.46	3.82	3.03	0.979	0.387

Note. All Oneway ANOVAs conducted with (2, 32) degrees of freedom.

* Indicates conditions that were significantly different on Scheffe post-hoc analyses.

**Indicates significant One-way ANOVA.

Table VIII

Means and Standard Deviations for Participant Ratings by Question and Condition

Questions	BS (13) M	BS (13) SD	NF (11) M	NF (11) SD	ST (10) M	ST (10) SD
Belief in Treatment Assignment						
I believe I received the best treatment	6.53	0.66	6.36	0.81	6.50	0.71
Benefit of Treatment						
These sessions have helped me quit or cut-down	6.85	0.38	6.82	0.40	6.80	0.42
I believe I am more able to cut-down or quit because of these sessions	6.77	0.44	6.73	0.47	6.70	0.48
I could not have quit smoking without the group's support	5.46	1.66	5.55	1.44	6.00	2.00
I could not have quit smoking without these sessions	6.00	1.16	5.55	1.37	6.10	1.45
It is very likely that I will not smoke (regularly) again	6.00	1.16	6.00	1.34	6.60	0.97
Benefit of Treatment Average	6.22	0.96	6.13	1.00	6.44	1.06
Rating of Consultants and Group						
I felt the consultants were very supportive during the sessions	6.62	0.87	6.64	0.50	6.80	0.42
I believe the consultants were knowledgeable about smoking cessation	6.85	0.38	6.37	0.51	6.80	0.42
The consultants were not very interested in our groups' smoking cessation	6.77	0.60	6.72	0.65	6.60	0.70
The consultants were not at all enthusiastic during our group	6.92	0.28	6.82	0.60	6.50	0.85
The group was very supportive	6.54	0.88	6.64	0.51	6.90	0.32
Rating of Consultants and Group Average	6.74	0.60	6.64	0.55	6.72	0.54

various topics discussed during the session. These brief questionnaires were called the TTRS as noted previously. These questions were meant to identify the topics covered during each session but also identify which topics were not covered or discussed only briefly during the session. A series of 5 to 8 question scales were developed for sessions 1-6 that focused on topics that were discussed in all conditions and those discussed in only one condition. Thus, areas where conditions should differ (e.g., discussion of behavioral topography substitutes or nicotine fading) should be apparent from those ratings to determine if the integrity of the condition differences (BS, NF, and ST) was maintained. In addition, this insured that important topics were discussed in similar depths in all conditions (e.g., self-monitoring).

Statistical analyses were not performed on these ratings due to the small number of ratings but the ratings were averaged to show the differences between topics discussed in the conditions as rated by the consultants. The conditions were expected to differ in how much nicotine fading/brand switching was discussed in the conditions. The average ratings for "Discussed Nicotine Fading/Brand Switching" were 0.0 for the BS and ST conditions and 3.0 for the NF condition during Session 1. The average ratings for "Discussed using Behavioral Topography Substitutes to make not smoking easier" were 0.5 for the ST and NF conditions and 3.0 for the BS condition. Further, the Yes/No questions of "Were Behavioral Topography Substitute bags handed out to group members" was only endorsed for the BS conditions, while "Were group members given Nicotine Fading/Brand Switching sheets" was only endorsed for the NF condition. These data show that the conditions, as rated by the consultants, maintained integrity and differed on the additive variables (i.e., discussion of behavioral topography substitutes and nicotine fading/brand switching) and were similar in levels of discussion on variables that were supposed to be consistent across conditions for session 1. The data was similar for session 2-6 and produced consistent ratings by the consultants that the treatment conditions varied where planned and were similar where desired. Table IX displays the actual ratings by consultants for each question and session. Figures 1-6 display the means of the conditions across questions and sessions.

Results for All Participants

Primary Hypotheses

Abstinence Rates. The percentage of participants who reported successfully 'quitting' (i.e., abstaining) since the quit time until Session 5 was BS (9/13); NF (7/11); and ST (9/11). The percentage of individuals

Table IX.

Consultant Ratings of Therapy Topics by Session and Consultant.

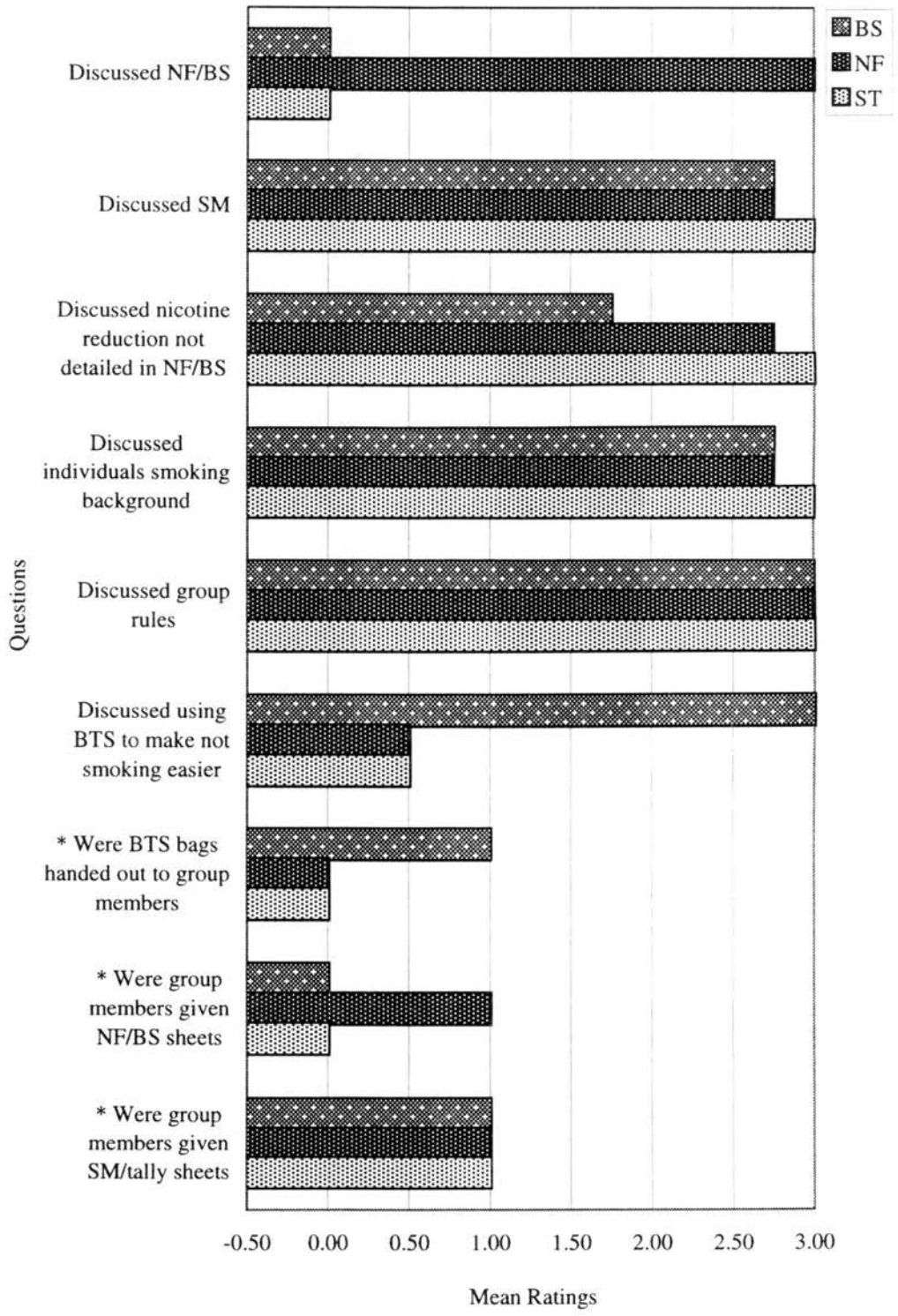
	BS Groups					NF Groups					ST Groups				
	Group 1		Group 4			Group 2		Group 6			Group 3		Group 5		
Session and Questions	M.L.	L.C.	M.L.	D.B.	Avg.	M.L.	L.C.	L.C.	D.B.	Avg.	M.L.	D.B.	D.B.	L.C.	Avg.
Session 1															
Discussed NF/BS	0	0	0	0	0.00	3	3	3	3	3.00	0	0	0	0	0.00
Discussed SM	3	2	3	3	2.75	3	2	3	3	2.75	3	3	3	3	3.00
Discussed nicotine reduction not detailed in NF/BS	2	2	2	1	1.75	3	2	3	3	2.75	3	3	3	3	3.00
Discussed individuals smoking background	3	2	3	3	2.75	3	2	3	3	2.75	3	3	3	3	3.00
Discussed group rules	3	3	3	3	3.00	3	3	3	3	3.00	3	3	3	3	3.00
Discussed using BTS to make not smoking easier	3	3	3	3	3.00	0	1	1	0	0.50	0	1	1	0	0.50
Were BTS bags handed out to group members	1	1	1	1	1.00	0	0	0	0	0.00	0	0	0	0	0.00
Were group members given NF/BS sheets	0	0	0	0	0.00	1	1	1	1	1.00	0	0	0	0	0.00
Were group members given SM/tally sheets	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00
	1.78	1.56	1.78	1.67		1.89	1.67	2.00	1.89		1.44	1.56	1.56	1.44	
Session 2															
Discussed NF/BS	0	0	0	0	0.00	3	2	3	3	2.75	0	0	0	1	0.25
Discussed SM	3	3	2	3	2.75	3	3	3	3	3.00	3	3	3	3	3.00
Discussed nicotine reduction not detailed in NF/BS	2	3	3	3	2.75	3	3	2	3	2.75	3	3	2	3	2.75
Discussed 3 ingredients of habit change	3	3	3	3	3.00	3	3	3	3	3.00	3	3	3	3	3.00
Discussed self-management strategies	3	3	3	3	3.00	3	3	2	3	2.75	3	3	3	3	3.00
Discussed using BTS to make not smoking easier	3	3	3	3	3.00	1	1	1	1	1.00	1	1	1	1	1.00
Discussed ways to disrupt your smoking habit	3	3	3	3	3.00	3	3	3	3	3.00	3	3	3	3	3.00
	2.43	2.57	2.43	2.57		2.71	2.57	2.43	2.71		2.29	2.29	2.14	2.43	2.29
Session 3															
Discussed NF/BS (switch 2)	0	0	0	0	0.00	3	3	3	3	3.00	1	1	0	0	0.50
Discussed SM	3	3	2	1	2.25	3	3	3	2	2.75	3	1	2	3	2.25
Discussed tolerance and opponent-process	3	3	3	3	3.00	3	3	3	3	3.00	3	3	3	3	3.00
Discussed self-talk and cognitive coping strategies	3	3	2	2	2.50	3	3	3	3	3.00	3	3	3	3	3.00
Discussed using BTS to make not smoking easier	3	3	3	3	3.00	0	0	1	1	0.50	0	1	1	1	0.75
Discussed plans for quit day	3	2	2	2	2.25	3	2	2	3	2.50	3	3	3	3	3.00
	2.50	2.33	2.00	1.83		2.50	2.33	2.50	2.50		2.17	2.00	2.00	2.17	

Table IX. (continued)

Consultant Ratings of Therapy Topics by Session and Consultant.

	BS Groups					NF Groups					ST Groups				
	Group 1		Group 4			Group 2		Group 6			Group 3		Group 5		
Session and Questions	M.L.	L.C.	M.L.	D.B.	Avg.	M.L.	L.C.	L.C.	D.B.	Avg.	M.L.	D.B.	D.B.	L.C.	Avg.
Session 4															
Discussed NF/BS (switch 3)	0	0	0	0	0.00	3	2	3	3	2.75	1	1	0	0	0.50
Discussed SM	2	2	1	1	1.50	2	3	3	2	2.50	2	1	2	3	2.00
Reviewed tolerance and opponent-process	2	1	3	3	2.25	1	1	2	1	1.25	3	2	1	1	1.75
Reviewed self-talk and cognitive coping strategies	1	3	2	3	2.25	2	3	2	2	2.25	3	2	2	2	2.25
Discussed using BTS to make not smoking easier	3	3	3	2	2.75	1	1	2	1	1.25	1	1	1	1	1.00
Discussed lifestyle balance	3	3	3	3	3.00	3	3	3	3	3.00	2	3	3	3	2.75
Discussed plans for quit day	3	3	3	3	3.00	3	3	3	3	3.00	3	3	3	3	3.00
	2.00	2.14	2.14	2.14		2.14	2.29	2.57	2.14	2.29		1.86	1.71	1.86	
Session 5															
Discussed SM	1	1	1	1	1.00	0	0	1	1	0.50	0	0	1	1	0.50
Discussed withdrawal symptoms	2	3	3	2	2.50	2	3	3	3	2.75	2	2	3	2	2.25
Reviewed self-talk and cognitive coping strategies	2	2	2	2	2.00	2	2	2	2	2.00	1	1	1	1	1.00
Discussed using BTS to make not smoking easier	2	2	2	2	2.00	1	0	1	1	0.75	0	0	1	1	0.50
Discussed activity planning	1	2	2	2	1.75	1	2	2	2	1.75	2	3	3	3	2.75
Discussed quit day events	2	3	3	3	2.75	2	3	3	3	2.75	2	3	3	3	2.75
	1.67	2.17	2.17	2.00		1.33	1.67	2.00	2.00	1.75		1.50	2.00	1.83	
Session 6															
Discussed continued SM of thoughts about smoking	2	3	2	2	2.25	2	3	2	2	2.25	2	2	2	2	2.00
Discussed relapse prevention	3	3	3	3	3.00	3	3	3	3	3.00	3	3	3	3	3.00
Identified high risk situations for each group member	3	3	2	3	2.75	3	3	3	3	3.00	3	3	3	3	3.00
Discussed the use of BTS to decrease cravings	2	3	3	2	2.50	2	2	3	3	2.50	2	2	3	3	2.50
Discussed how to identify high risk situations	2	3	2	2	2.25	2	3	3	3	2.75	3	3	3	3	3.00
Discussed implementing coping strategies	2	3	2	3	2.50	2	3	3	3	2.75	3	3	3	3	3.00
	2.33	3.00	2.33	2.50		2.33	2.83	2.83	2.83	2.71		2.67	2.83	2.83	

Figure 1. Session 1 Mean Consultant Ratings of Topic Coverage.



* Indicates Yes-No question where 1=Yes and 0=No.

Figure 2. Session 2 Mean Consultant Ratings of Topic Coverage.

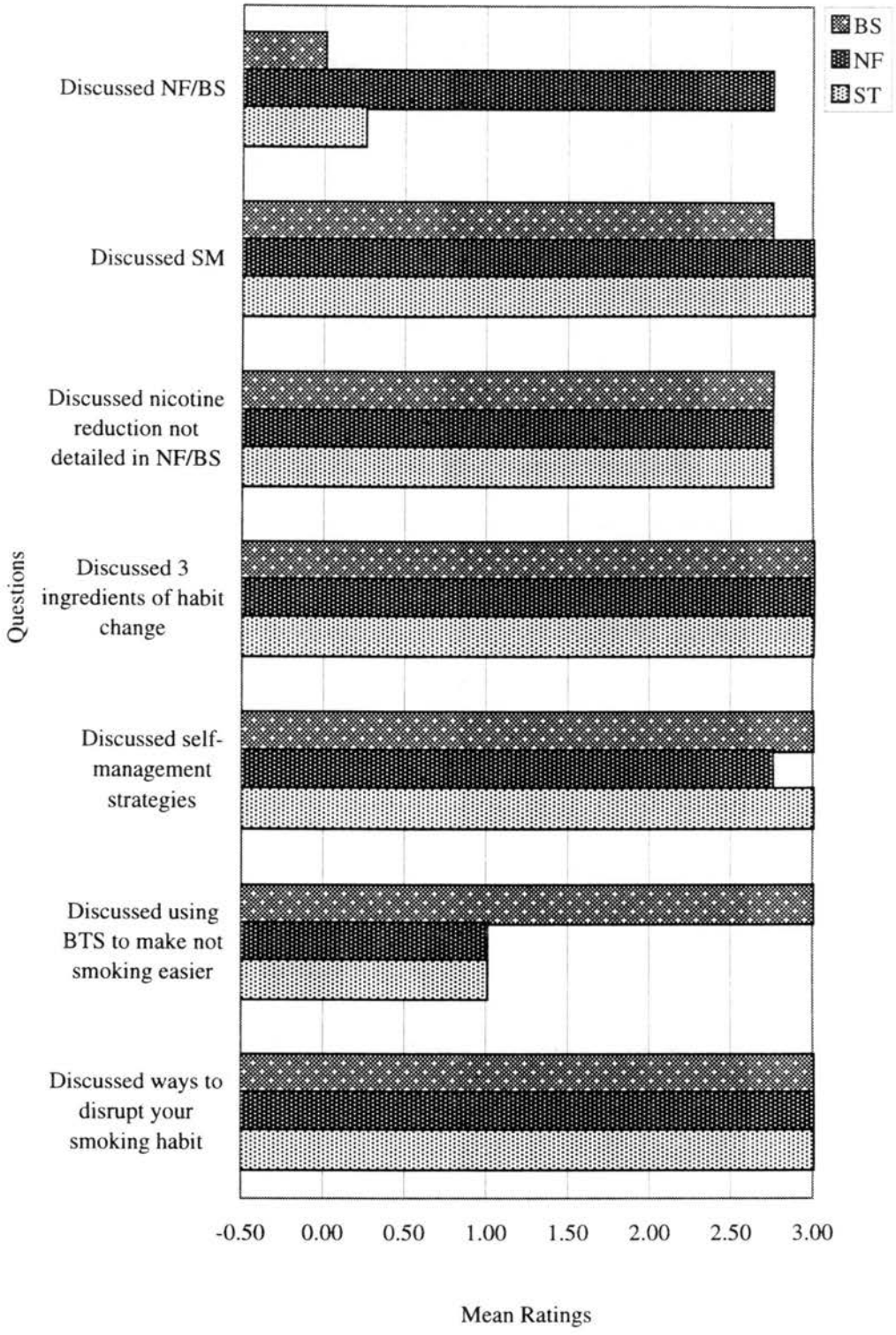


Figure 3. Session 3 Mean Consultant Ratings of Topic Coverage.

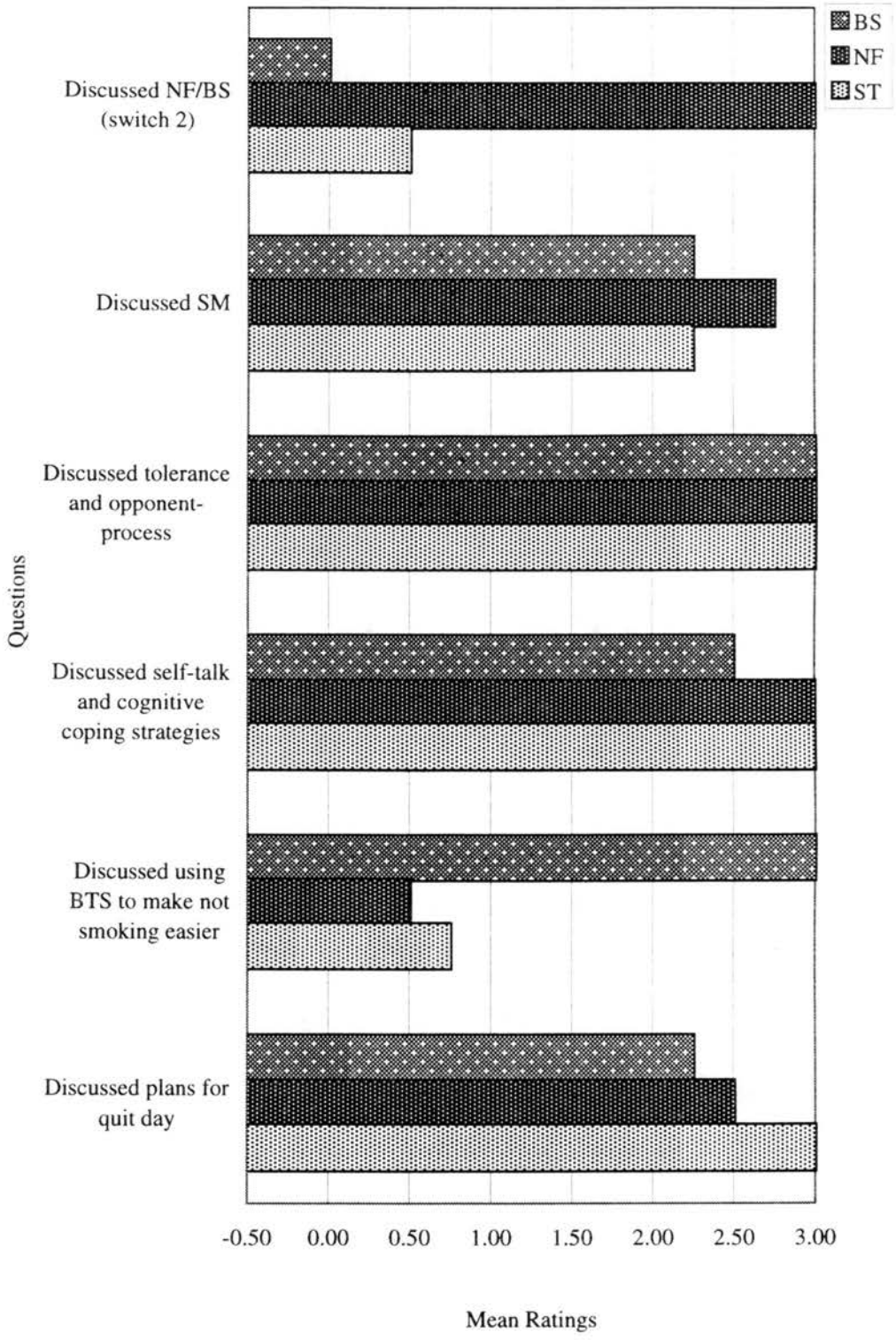


Figure 4. Session 4 Mean Consultant Ratings of Topic Coverage.

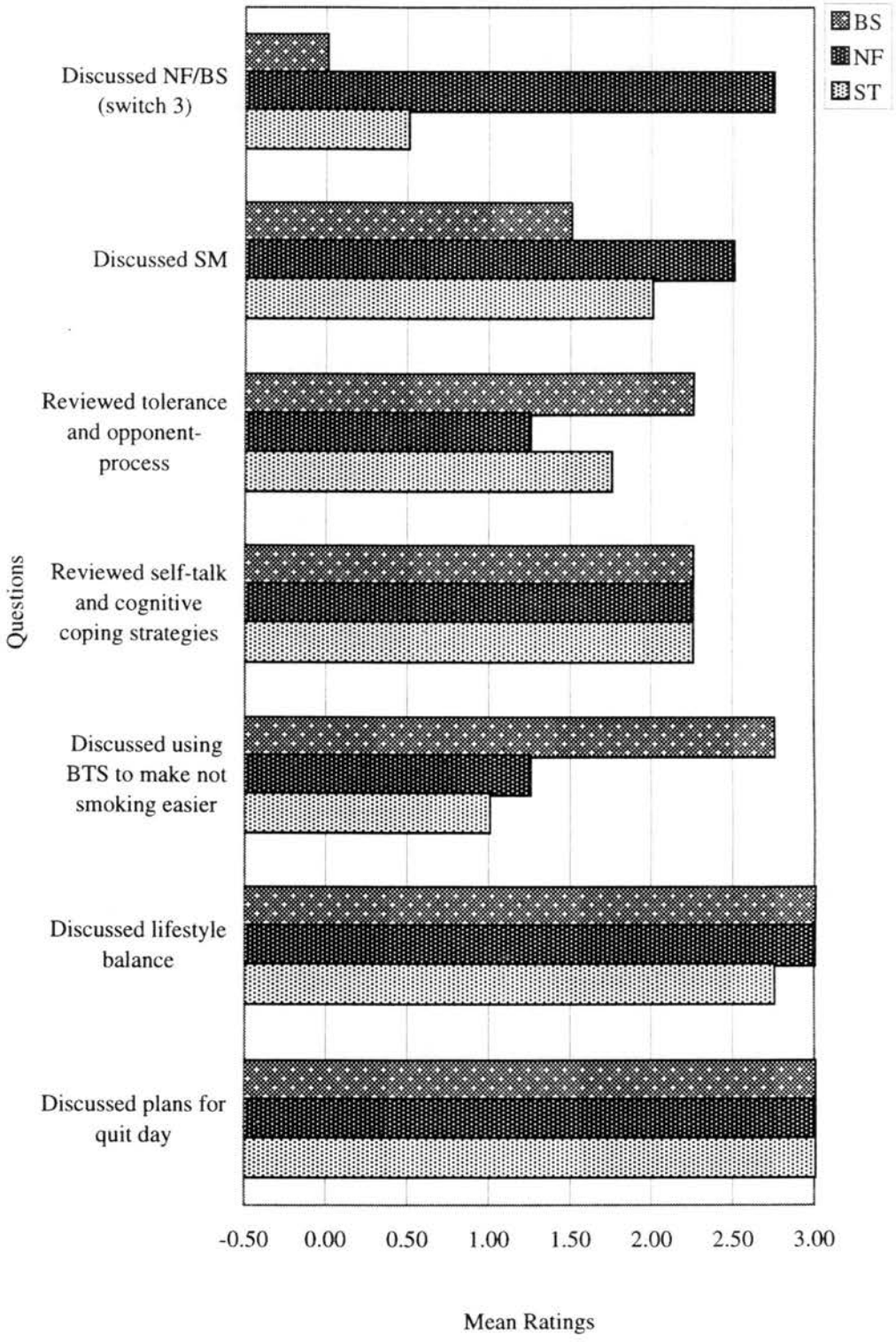


Figure 5. Session 5 Mean Consultant Ratings of Topic Coverage.

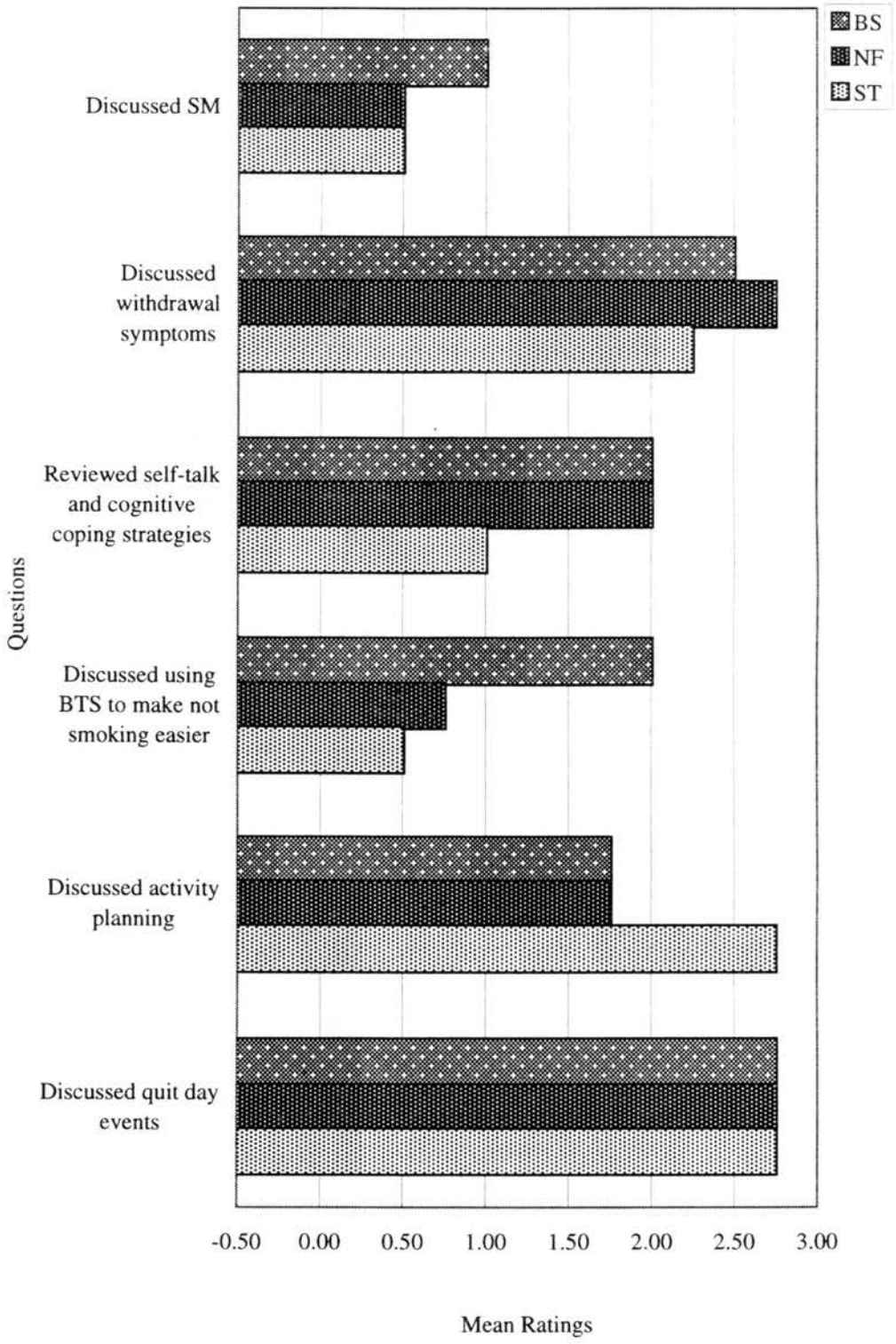
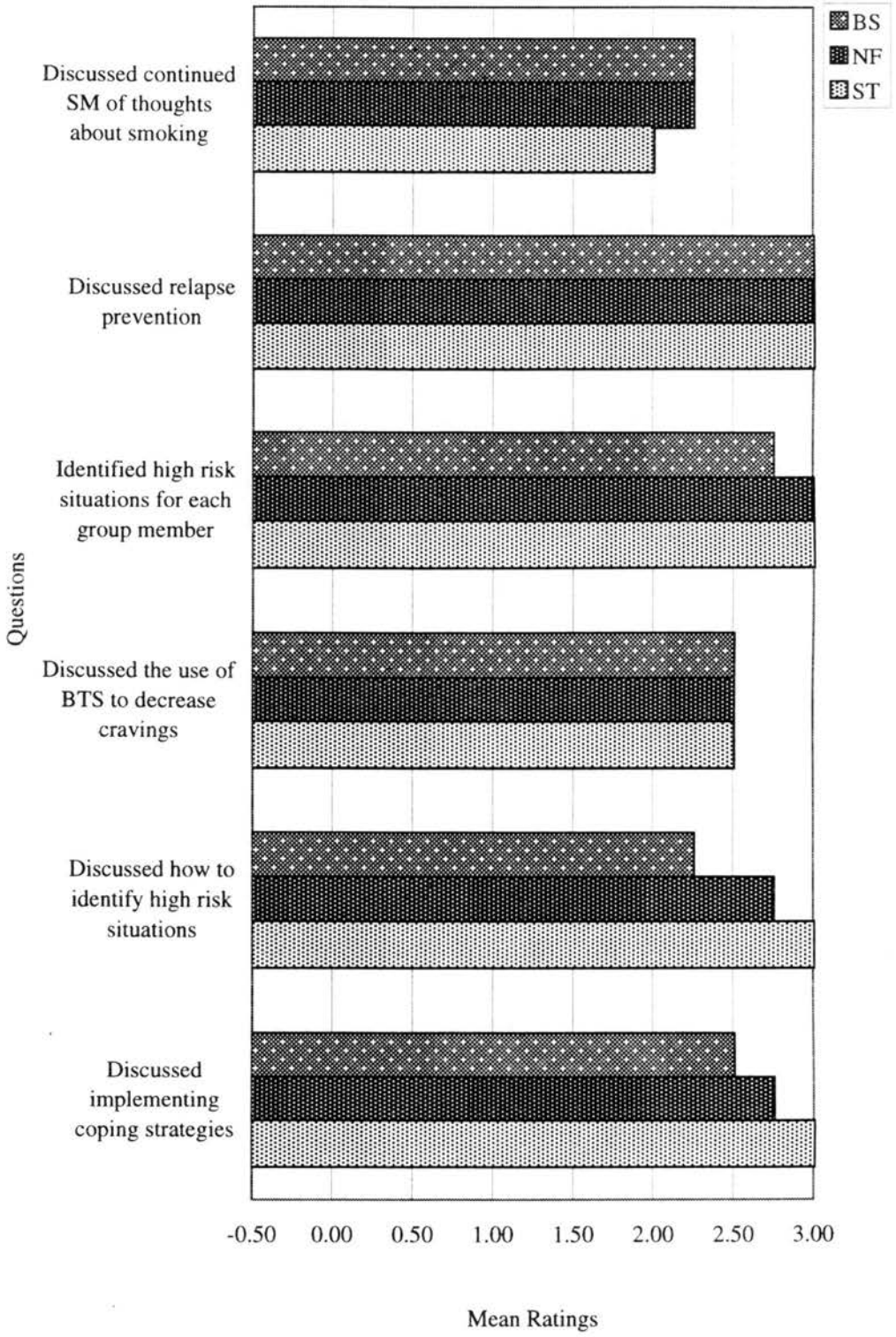


Figure 6. Session 6 Mean Consultant Ratings of Topic Coverage.



who were abstinent at Session 6 was BS (9/13); NF (8/11); and ST (9/11). Thus, 69% of the BS condition, 73% of the NF condition, and 82% of the ST condition were smoke-free for at least 18 hours at Session 6. Due to the limited number of subjects tests of significant of proportions of categorical variables were not performed (i.e., chi-square analyses) because these tests are considered unreliable for samples of this size.

A more powerful measure of successful abstinence is how many individuals in each condition were abstinent from the quit day through Session 6, a total of 4 days (12 midnight on Sunday through group time on Thursday late afternoon or evening). All 9 of the individuals in the BS condition who were abstinent at Session 5 remained abstinent through Session 6. While 6 of the 7 individuals in the NF condition who were abstinent at Session 5 remained abstinent through Session 6. Compared to 7 of the 9 individuals in the ST condition who were abstinent at Session 5 and remained abstinent through Session 6. Thus, 69% of the BS condition, 55% of the NF condition, and 64% of the ST condition remained abstinent from quit day through Session 6, a total of four days. Again, tests of significance for proportions were not conducted due to the small samples size and the poor reliability of such analyses with small sample sizes. Abstinent rates are presented in Table X. Figure 7 displays the percentages of participants abstinent at each time and across both times by condition.

Alveolar Carbon Monoxide (COa). COa, a biochemical measure of smoking behavior, was used to measure the amount of participant smoking behavior. A 3 x 2 (Condition x Time) Repeated Measures ANOVA was performed on COa scores that were corrected for baseline levels (i.e., change scores). This analyses did not evidence a significant Condition x Time interaction, F (2, 32) = 1.08, or a main effect Time, F (1, 32) = 1.43, but did evidence a significant main effect for Condition, F (2, 32) = 4.82, $p<.05$. A post-hoc Scheffe test revealed that the NF condition had a larger reduction in COa scores from pretreatment levels than did the BS condition at session 5, with the ST condition not significantly different from the other conditions. A post-hoc Scheffe test on session 6 scores revealed that the NF condition had a larger reduction in COa scores from pretreatment levels than did the BS condition, while the ST condition not significantly different from either condition. Means and standard deviations for the actual COa scores at pretreatment, session 5, and session 6 are presented in Table XI. Means and standard deviations for COa pretreatment adjusted Z-scores are presented in Table XII. Figure 8 displays the session 5 and 6 COa adjusted Z-scores.

Symptoms of Nicotine Deprivation. The NAS is a measure that focuses on symptoms associated with

Table X

Abstinent Rates by Condtion

	Session 5	Session 6
Abstinent at Session*		
BS	9 (69%)	9 (69%)
NF	7 (64%)	8 (73%)
ST	9 (82%)	9 (82%)
Abstinent from Quit Day-Session 6**		
BS	-----	9 (69%)
NF	-----	6 (55%)
ST	-----	7 (64%)

* Indicates reported abstinence from midnight the night before the session.
** Indicates reported abstinence from midnight the night before session 5 through session 6 with no slips (no smoking of any kind).

Figure 7. Percentage of Participants Abstinent by Treatment Condition at Session 5, Session 6, and from Quit Day to Session 6

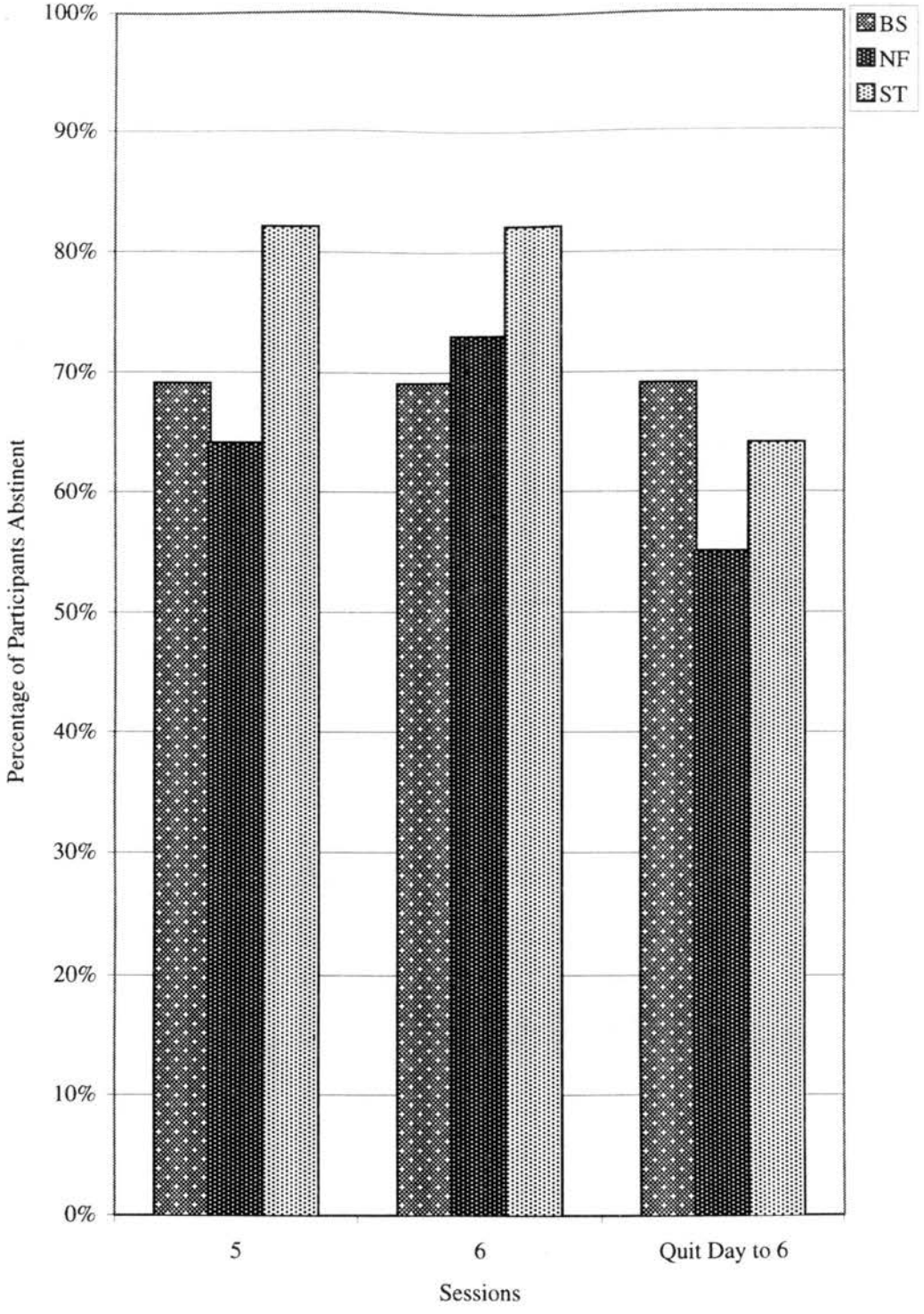


Table XI

Means and Standard Deviations for Smoking Outcome Measures by Treatment Condition and Session

	Pretreatment		Session 5		Session 6	
	M	SD	M	SD	M	SD
COa (0-97)						
BS	18.69	10.30	8.23	6.72	9.31	12.76
NF	35.82	24.66	10.64	13.29	6.64	9.52
ST	24.73	10.36	10.55	8.50	8.18	7.15
NAS: Craving (0-3)						
BS	1.08	1.19	1.39	0.96	1.00	1.00
NF	0.82	0.75	1.64	1.12	1.46	1.04
ST	1.73	1.01	1.18	0.87	1.00	1.00
NAS: Total (0-39)						
BS	8.85	6.64	12.15	10.74	10.15	8.33
NF	9.55	8.04	14.91	8.07	14.18	7.14
ST	12.00	10.88	12.27	9.09	10.18	9.94
QSU-Factor 1						
BS	67.15	14.12	57.31	18.40	56.23	19.70
NF	60.36	15.76	58.73	14.58	61.46	13.97
ST	54.46	9.00	58.82	15.04	57.55	19.55
QSU-Factor 2						
BS	35.31	17.09	38.23	21.22	32.92	21.36
NF	24.82	11.12	28.73	13.12	28.18	12.33
ST	30.91	12.43	28.91	12.85	27.27	15.10
SOC Precontemplation						
BS	7.54	3.38	9.85	0.56	-----	-----
NF	8.00	1.61	9.64	1.21	-----	-----
ST	7.18	2.86	9.00	2.41	-----	-----
SOC Contemplation						
BS	8.54	1.56	9.69	0.75	-----	-----
NF	9.55	0.69	9.46	0.82	-----	-----
ST	7.36	2.77	8.73	2.05	-----	-----
SOC Action						
BS	5.46	3.07	9.39	0.96	-----	-----
NF	4.00	3.46	8.82	2.36	-----	-----
ST	3.82	3.03	8.55	2.02	-----	-----

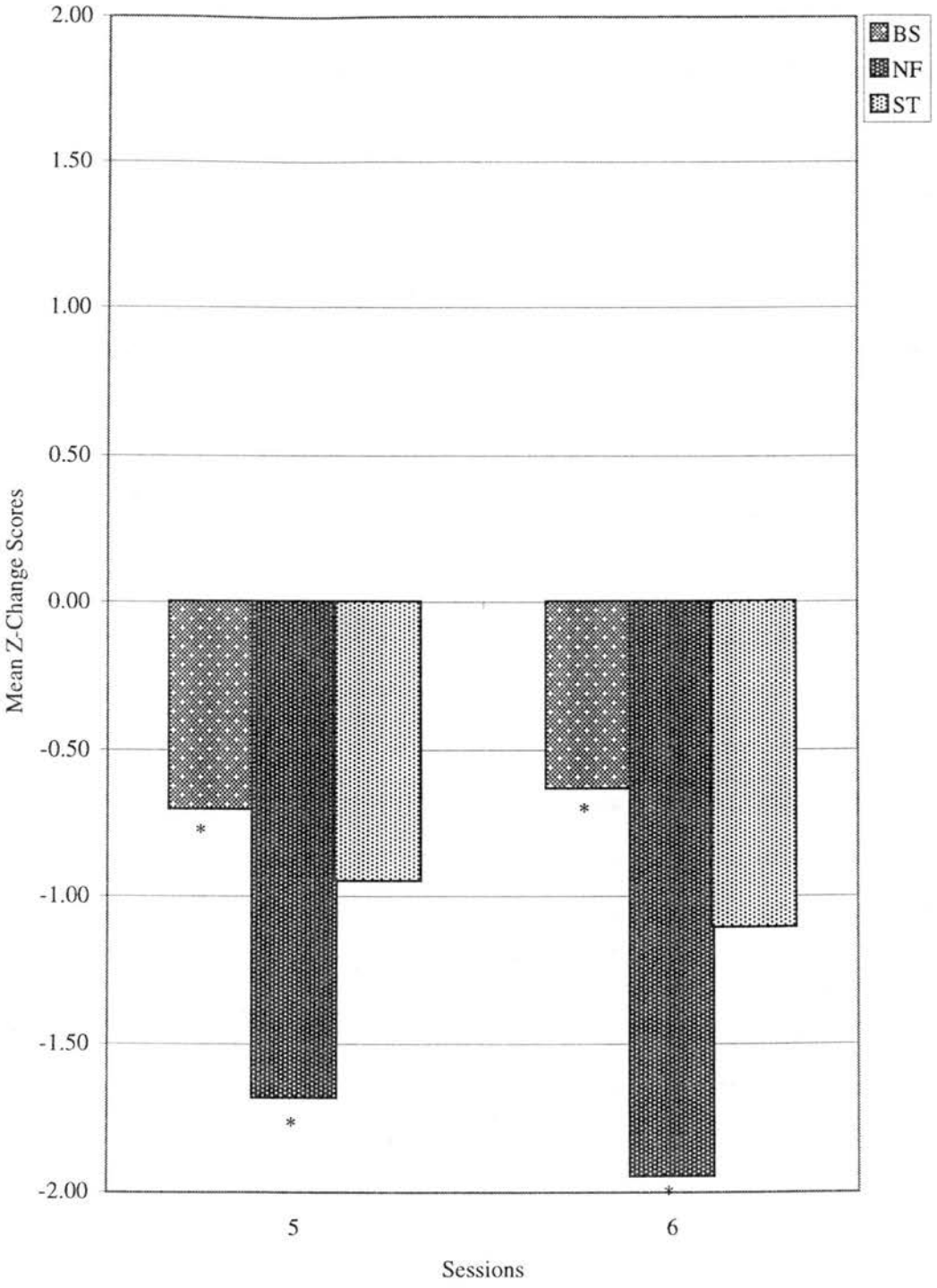
Table XII

Means and Standard Deviation for Smoking Outcome Measure Z-scores Adjusted for Pretreatment Levels by Treatment Condition and Session

	Session 5		Session 6	
	M	SD	M	SD
COa (0-97)				
BS	-0.70	0.56	-0.62	0.77
NF	-1.67	1.22	-1.94	1.64
ST	-0.94	0.58	-1.10	0.51
NAS: Craving (0-3)				
BS	0.31	1.24	-0.08	1.37
NF	0.81	1.32	0.63	1.35
ST	-0.54	1.21	-0.72	1.34
NAS: Total (0-39)				
BS	0.38	0.77	0.15	0.66
NF	0.61	0.85	0.53	1.06
ST	0.03	1.44	-0.21	1.47
QSU-Factor 1				
BS	-0.82	1.18	-0.89	1.35
NF	-0.13	1.12	0.04	1.27
ST	0.39	0.74	0.31	1.20
QSU-Factor 2				
BS	0.18	0.99	-0.15	1.13
NF	0.25	0.57	0.21	0.78
ST	-0.13	0.68	0.23	0.85
SOC Precontemplation				
BS	0.96	1.40	-----	-----
NF	0.68	0.65	-----	-----
ST	0.76	0.72	-----	-----
SOC Contemplation				
BS	0.66	1.04	-----	-----
NF	-0.05	0.54	-----	-----
ST	0.78	1.15	-----	-----
SOC Action				
BS	1.15	0.97	-----	-----
NF	1.41	1.13	-----	-----
ST	1.38	0.92	-----	-----

----- Indicates that data was not collected for this measure at this time.

Figure 8. Means for COa Z-scores Adjusted for Pretreatment Levels by Condition and Session



* Indicates significant condition differences by Scheffe post-hoc test

nicotine deprivation. This measure was used to determine if participants from different conditions would differ in the level of their self-reported symptoms of nicotine deprivation. A 3 x 2 (Condition x Time) Repeated Measures ANOVA was performed on NAS scores that were corrected for baseline levels (i.e., change scores). This analyses did not evidence a significant Condition x Time interaction, F (2, 32) = .22, main effect Time, F (1, 32) = 3.01, or main effect for Condition, F (2, 32) = 1.15. Means and standard deviations for the actual NAS scores at pretreatment, session 5, and session 6 are presented in Table XI. Means and standard deviations for NAS pretreatment adjusted Z-scores are presented in Table XII. Figure 9 displays the session 5 and 6 NAS adjusted Z-scores.

Reported Craving. Included in the NAS is a question that focuses on how much the participant craves a cigarette at that moment. Craving scores are generally negatively correlated with abstinence, meaning that higher scores are related to lower levels of successful abstinence. This measure was used to determine if participants from different conditions would differ in the level of their self-reported symptoms of nicotine deprivation. A 3 x 2 (Condition x Time) Repeated Measures ANOVA was performed on NAS-Craving scores that were corrected for baseline levels (i.e., change scores). This analyses did not evidence a significant Condition x Time interaction, F (2, 32) = .24, or a main effect Time, F (1, 32) = 3.10, but did evidence a trend toward a significant main effect for Condition, F (2, 32) = 3.30, p=.05 (Note: actual p-value reported to display accurately its trend toward significance). A post-hoc Scheffe test revealed that no two conditions were significantly different at session 5 or at session 6. Means and standard deviations for the actual NAS-Craving scores at pretreatment, session 5, and session 6 are presented in Table XI. Means and standard deviations for NAS-Craving pretreatment adjusted Z-scores are presented in Table XII. Figure 10 displays the session 5 and 6 NAS-Craving adjusted Z-scores.

Urges to Smoke. The QSU was used as a self-report measure of urges to smoke. The two factor totals were analyzed, with Factor 1 (QSU-Factor 1) addressing the individuals' intention and desire to engage in smoking behavior that is anticipated as pleasant, enjoyable, and satisfying. Factor 1 is made up of 15 items. Factor 2 (QSU-Factor 2) consists of 11 items and reflects the individuals' anticipation of relief from withdrawal or negative affect. The QSU factors were analyzed separately. A 3 x 2 (Condition x Time) Repeated Measures ANOVA was performed on QSU-Factor 1 scores that were corrected for baseline levels (i.e., change scores). This analyses did not evidence a significant Condition x Time interaction, F (2, 32) =

Figure 9. Means for NAS Z-scores Adjusted for Pretreatment Levels by Condition and Session

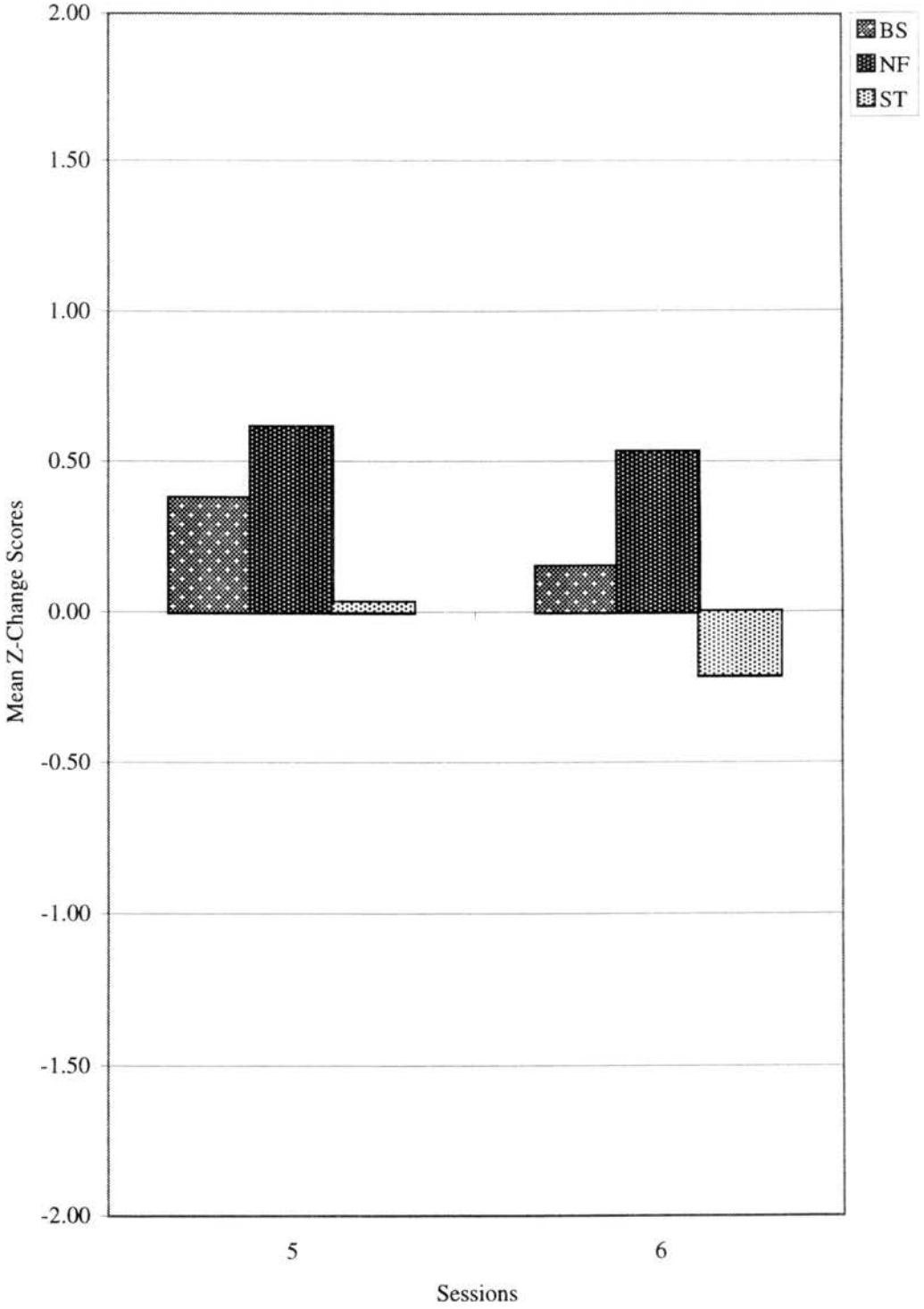
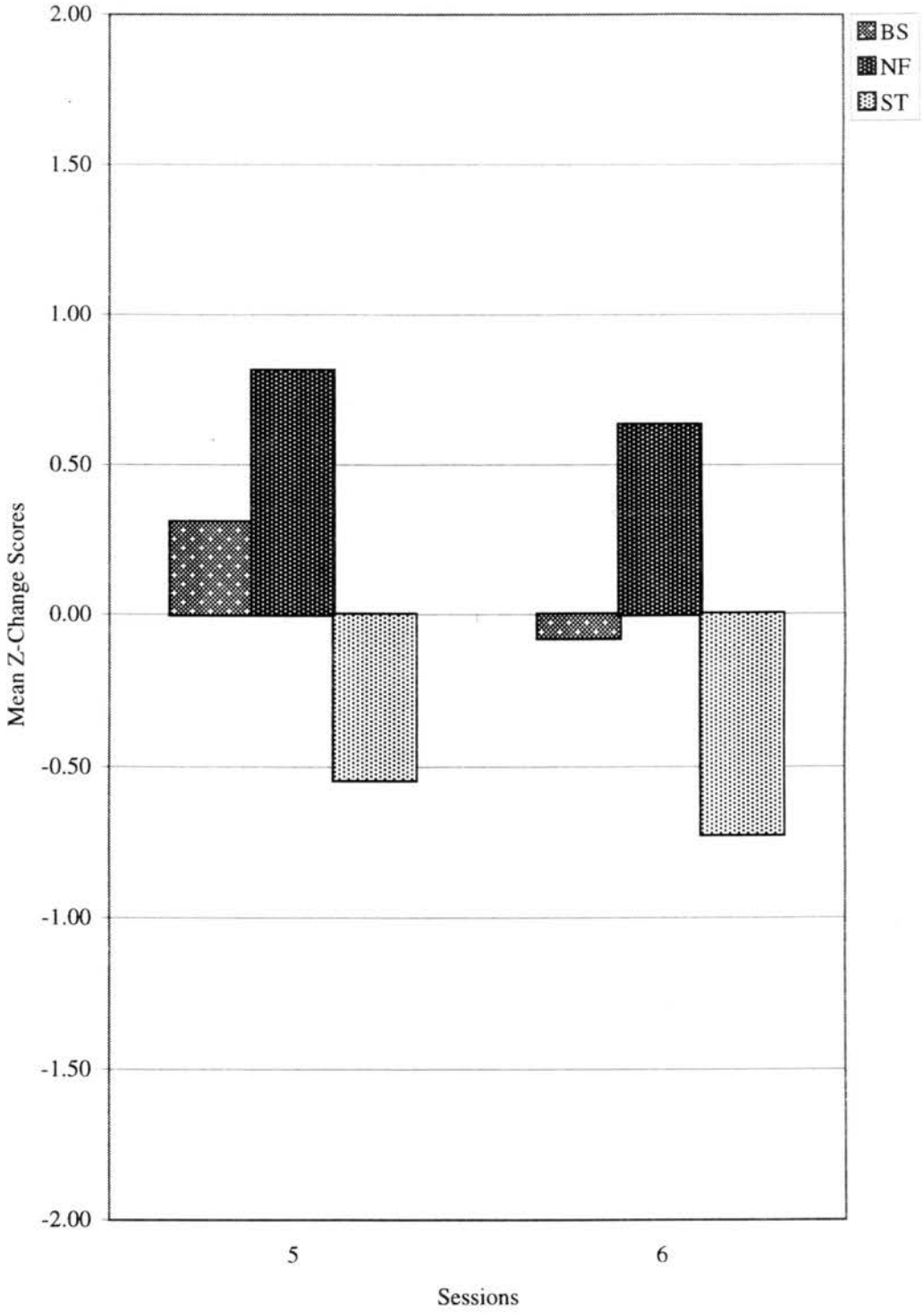


Figure 10. Means for NAS-Craving Z-scores Adjusted for Pretreatment Levels by Condition and Session



.39, or a main effect Time, F (1, 32) = .00, but did evidence a significant main effect for condition, F (2, 32) = 3.75, p<.05. A Scheffe post-hoc test revealed that the BS condition had a larger reduction in QSU-Factor 1 scores from pretreatment levels than did the ST condition at session 5. The NF condition did not significantly differ from either condition at session 5. A Scheffe post-hoc test revealed that no two conditions significantly differed from each other at session 6. Means and standard deviations for the actual QSU-Factor 1 scores at pretreatment, session 5, and session 6 are presented in Table XI. Means and standard deviations for QSU-Factor 1 pretreatment adjusted Z-scores are presented in Table XII. Figure 11 displays the session 5 and 6 QSU-Factor 1 adjusted Z-scores.

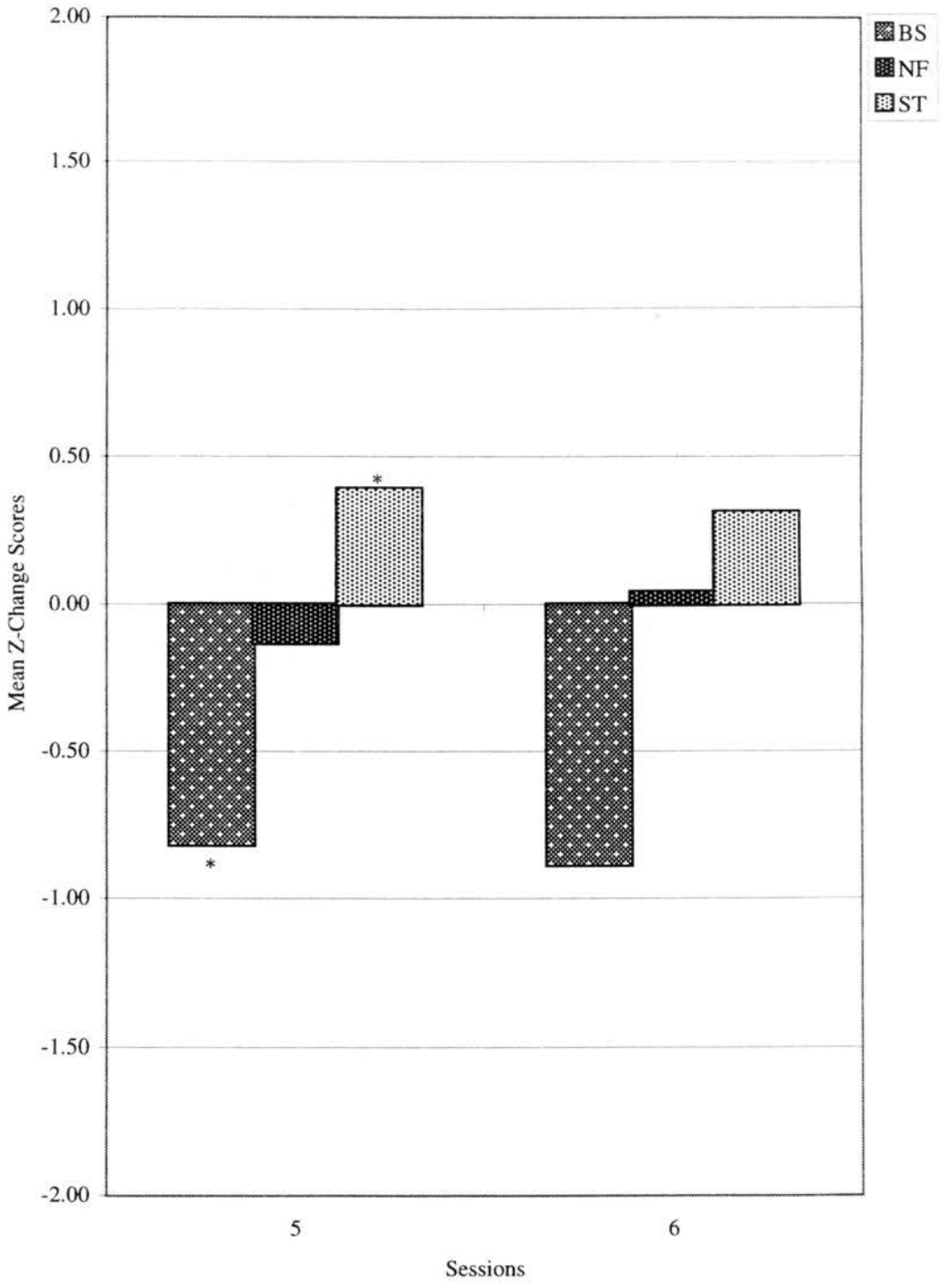
A 3 x 2 (Condition x Time) Repeated Measures ANOVA was performed on QSU-Factor 2 scores that were adjusted for pretreatment levels (i.e., change scores). This analyses did not evidence a significant Condition x Time interaction, F (2, 32) = 1.00, main effect Time, F (1, 32) = 2.85, or main effect for Condition, F (2, 32) = .68. Means and standard deviations for the actual QSU-Factor 2 scores at pretreatment, session 5, and session 6 are presented in Table XI. Means and standard deviations for QSU-Factor 2 pretreatment adjusted Z-scores are presented in Table XII. Figure 12 displays the session 5 and 6 QSU-Factor 2 adjusted Z-scores.

Stages of Change. One-way ANOVAs for the three Treatment Conditions (BS, NF, and ST) was conducted on each of the SOC ladders (precontemplation [SOC-P], contemplation [SOC-C], and action [SOC-A]). The analysis of the SOC-P scores did not reveal a significant condition difference, F (2, 32) = 2.49. Analysis of SOC-C scores also did not evidence a significant condition difference in change from pretreatment levels, F (2, 32) = 2.48. Additionally, analysis of SOC-A scores did not evidence a significant condition difference in change from pretreatment levels, F (2, 32) = .25. Means and standard deviations for actual SOC-P, SOC-C, and SOC-A pretreatment and session 5 scores are presented in Table XI. Means and standard deviations for SOC pretreatment adjusted Z-scores are presented in Table XII. Figure 13 displays the session 5 SOC adjusted Z-scores.

Secondary Hypotheses

Anxiety. A 3 x 2 (Condition x Time) Repeated Measures ANOVA was performed on BAI scores that were corrected for pretreatment levels (i.e., change scores). This analysis did not evidence a significant Condition x Time interaction, F (2, 32) = .37, main effect Time, F (1, 32) = 1.46, or main effect for

Figure 11. Means for QSU-Factor 1 Z-scores Adjusted for Pretreatment Levels by Condition and Session



* Indicates significant condition differences by Scheffe post-hoc test

Figure 12. Means for QSU-Factor 2 Z-scores Adjusted for Pretreatment Levels by Condition and Session

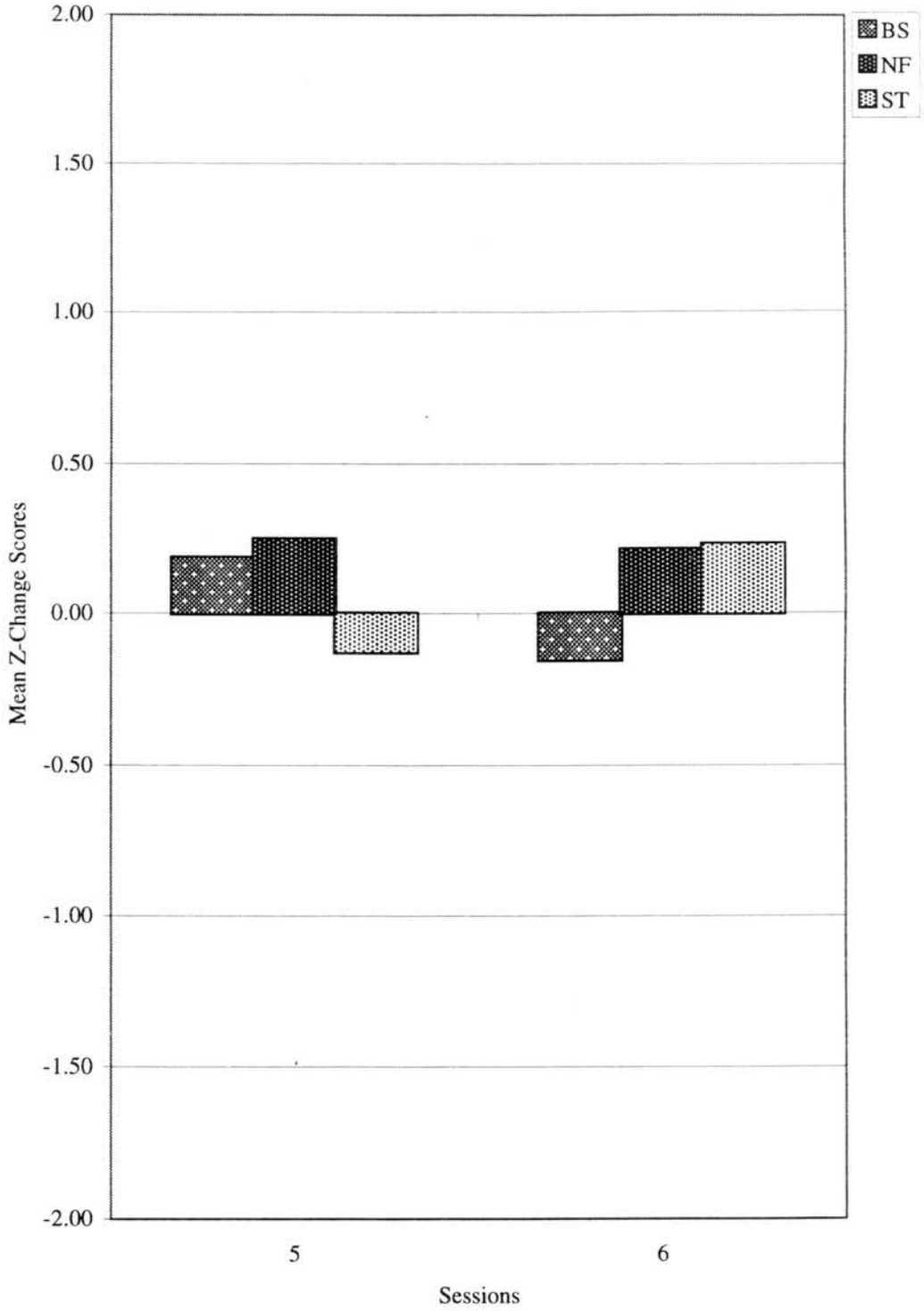
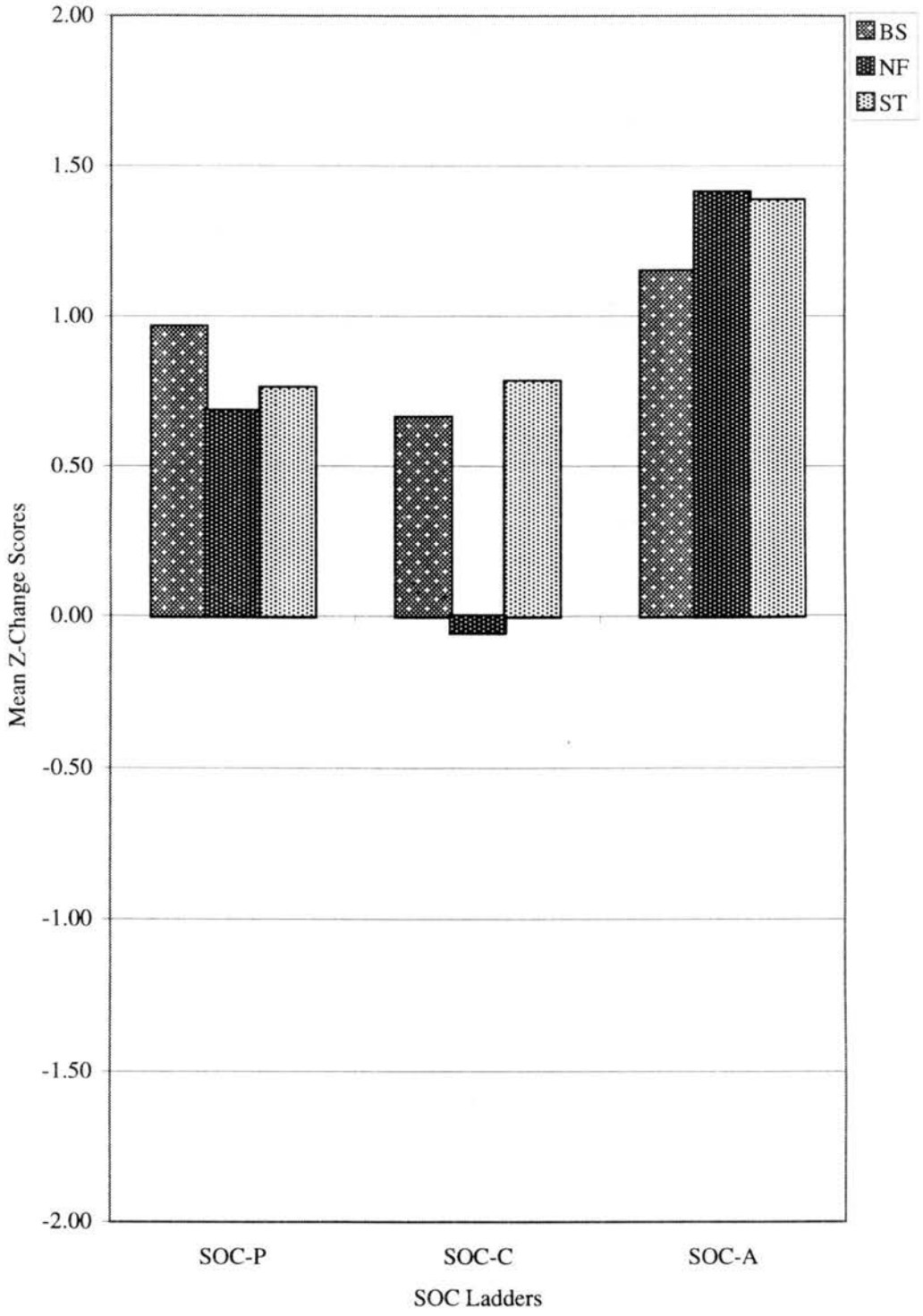


Figure 13. Means for SOC Ladder Z-scores Adjusted for Pretreatment Levels by Condition and Session



Condition, F (2, 32) = 2.34. Means and standard deviations for the actual BAI scores at pretreatment, session 5, and session 6 are presented in Table XIII. Means and standard deviations for BAI pretreatment adjusted Z-scores are presented in Table XIV. Figure 14 displays the session 5 and 6 BAI adjusted Z-scores.

Mood/Depression. A 3 x 2 (Condition x Time) Repeated Measures ANOVA was performed on BDI scores that were corrected for pretreatment levels (i.e., change scores). This analyses did not evidence a significant Condition x Time interaction, F (2, 32) = 1.26, or the main effect Time, F (1, 32) = .56, but did evidence a trend toward a significant main effect for Condition, F (2, 32) = 3.28, p=.051 (Note: actual p-value reported to display accurately its trend toward significance). A Scheffe post-hoc test on session 5 adjusted scores revealed that no two conditions significantly differed from each other. However, a Scheffe post-hoc test revealed a significant difference between the BS and ST conditions, with the ST condition showing significant greater reduction in BDI scores from pretreatment levels to session 6 levels than the BS condition. The NF condition did not significantly differ from either condition. Means and standard deviations for the actual BDI scores at pretreatment, session 5, and session 6 are presented in Table XIII. Means and standard deviations for BDI pretreatment adjusted Z-scores are presented in Table XIV. Figure 15 displays the session 5 and 6 BDI adjusted Z-scores.

Affect. One-way ANOVAs for the three Treatment Conditions (BS, NF, and ST) were conducted on PANAS-X Negative Affect scores (PANAS-X NA) and PANAS-X Positive Affect scores (PANAS-X PA) that were corrected for pretreatment levels (i.e., change scores). The analysis of the PANAS-X NA scores did not reveal a significant condition difference, F (2, 32) = .58. Analysis of PANAS-X PA scores also did not evidence a significant condition difference in change from pretreatment levels, F (2, 32) = .70. Means and standard deviations for actual PANAS-X NA and PANAS-X PA pretreatment and session 5 scores are presented in Table XIII. Means and standard deviations for PANAS-X pretreatment adjusted Z-scores are presented in Table XIV. Figure 16 displays the session 5 PANAS-X adjusted Z-scores.

General Physical and Psychological Symptoms. A One-way ANOVA for the three Treatment Conditions (BS, NF, and ST) was conducted on SCL-90R GSI scores that were corrected for pretreatment levels (i.e., change scores). The analysis of SCL-90R GSI scores did not reveal a significant condition difference, F (2, 32) = 2.54. Means and standard deviations for actual SCL-90R pretreatment and session 5

Table XIII

Means and Standard Deviations Nonsmoking Outcome Measures by Treatment Condition and Session

	Pretreatment		Session 5		Session 6	
	M	SD	M	SD	M	SD
BAI						
BS	8.23	6.34	10.15	13.78	8.39	12.37
NF	8.09	9.78	9.91	6.63	9.46	8.47
ST	14.91	10.63	10.00	10.72	9.55	9.77
BDI						
BS	7.08	7.12	7.23	7.36	7.23	7.56
NF	11.73	8.57	11.18	8.66	11.55	9.94
ST	12.46	8.21	7.09	6.07	5.64	6.61
SCL-90R GSI						
BS	0.81	0.80	0.72	0.79	-----	-----
NF*	0.91	0.61	0.90	0.73	-----	-----
ST	1.02	0.61	0.61	0.49	-----	-----
PANAS-X: NA						
BS	1.56	0.60	1.64	0.73	-----	-----
NF	1.86	0.84	2.11	1.03	-----	-----
ST	1.76	0.60	1.73	0.60	-----	-----
PANAS-X: PA						
BS	3.23	0.95	2.99	0.75	-----	-----
NF	2.58	0.67	2.14	0.65	-----	-----
ST	2.87	0.59	2.72	0.69	-----	-----

Note. One individual in the NF Group did not complete the SCL-90R, therefore those means represent n=10.
----- Indicates that data was not collected for this measure at this time.

Table XIV

Means and Standard Deviation for Nonsmoking Outcome Measure Z-scores Adjusted for Pretreatment Levels by Treatment Condition and Session

	Session 5		Session 6	
	M	SD	M	SD
BAI				
BS	0.19	0.99	0.02	1.03
NF	0.18	0.65	0.14	0.49
ST	0.49	0.83	-0.54	0.90
BDI				
BS	0.02	0.79	0.02	0.70
NF	-0.07	0.66	-0.02	0.65
ST	-0.68	1.04	-0.86	1.09
SCL-90R GSI				
BS	-0.13	0.75	-----	-----
NF*	-0.01	0.32	-----	-----
ST	-0.60	0.72	-----	-----
PANAS-X: NA				
BS	0.10	0.61	-----	-----
NF	0.34	0.99	-----	-----
ST	-0.04	0.88	-----	-----
PANAS-X: PA				
BS	-0.31	0.90	-----	-----
NF	-0.57	0.67	-----	-----
ST	-0.20	0.62	-----	-----

* One individual in the NF Group did not complete the SCL-90R, therefore those means represent n=10.

----- Indicates data was not collected for this measure at this time.

Figure 14. Means for BAI Z-scores Adjusted for Pretreatment Levels by Condition and Session

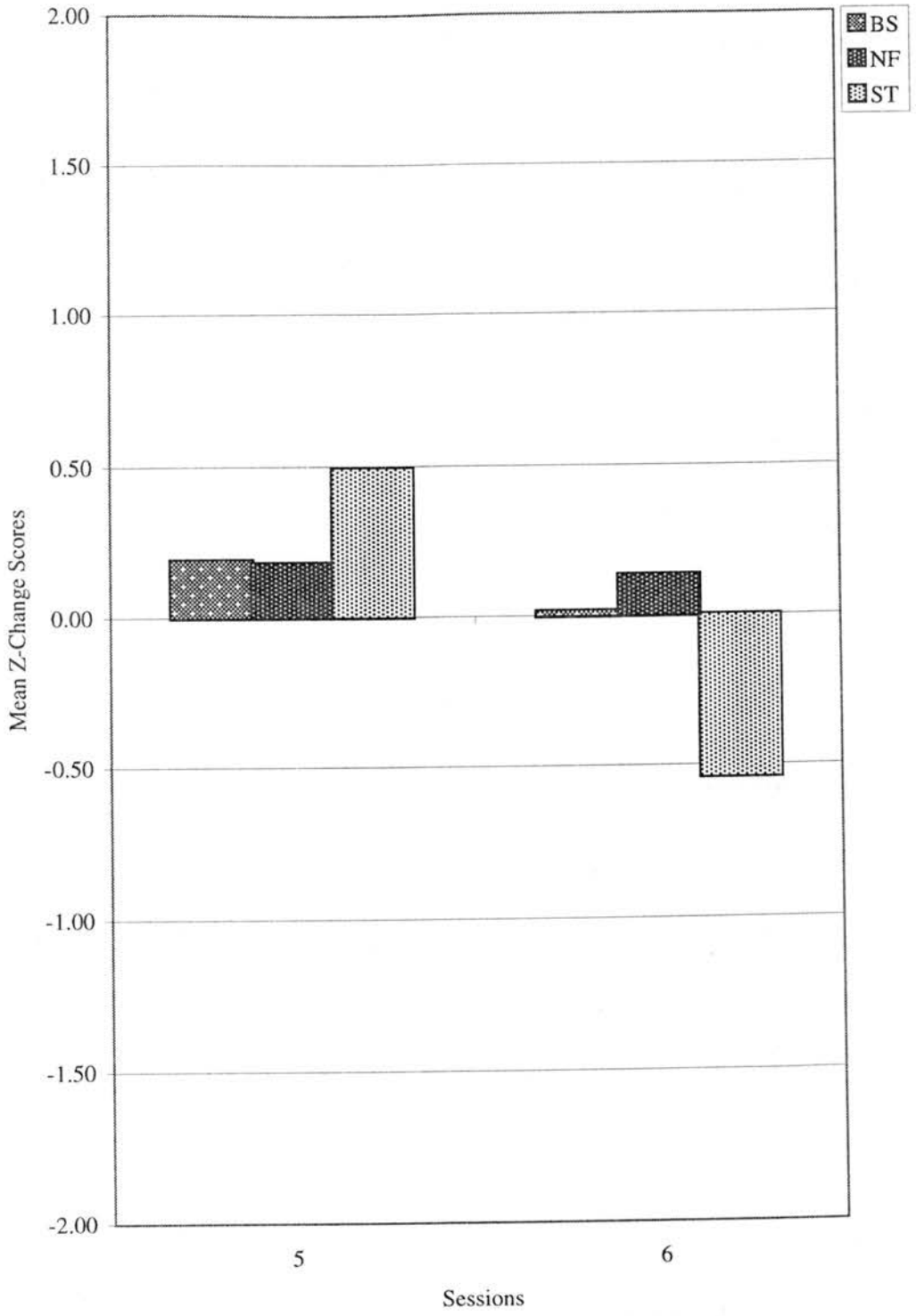
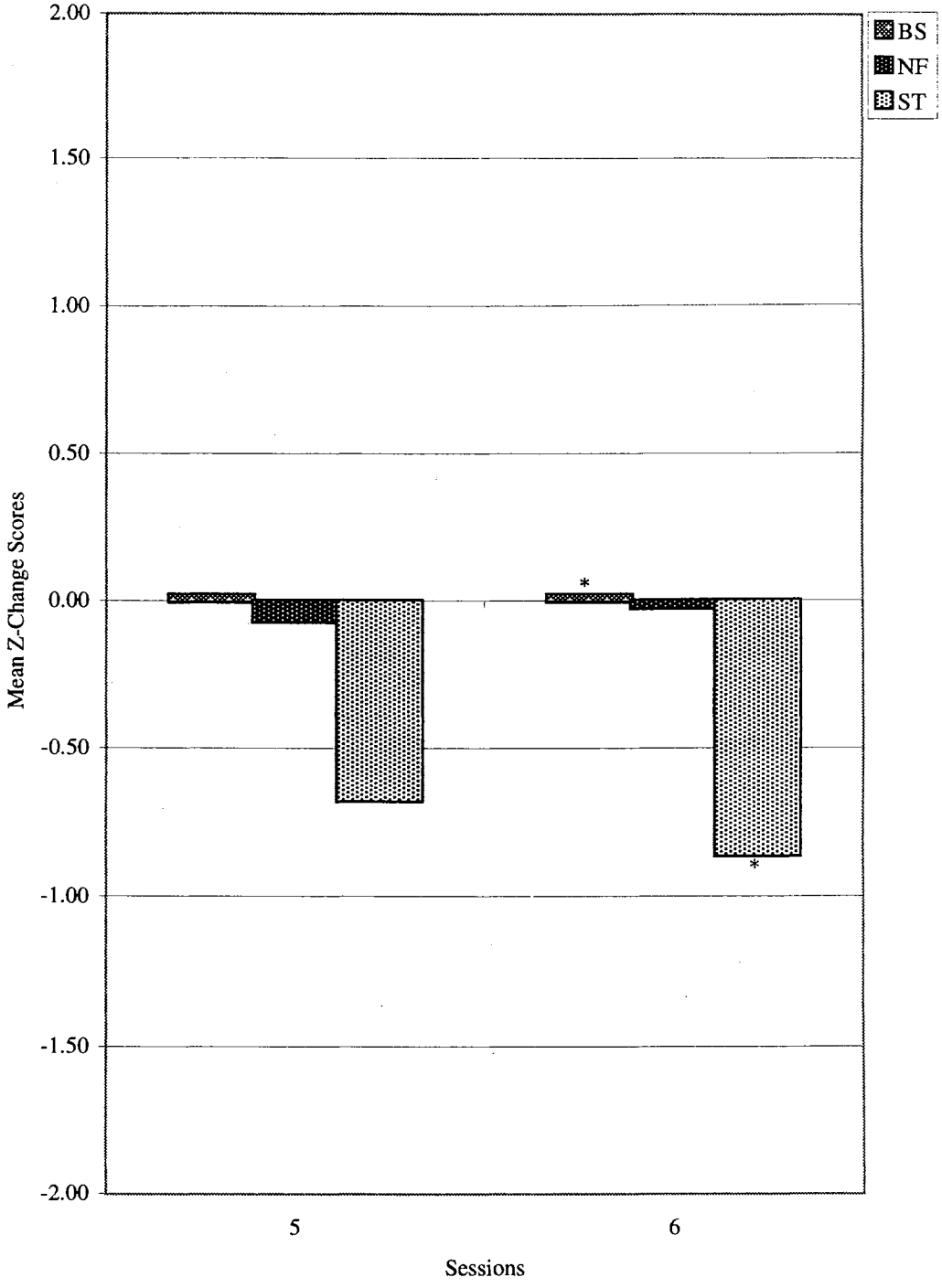
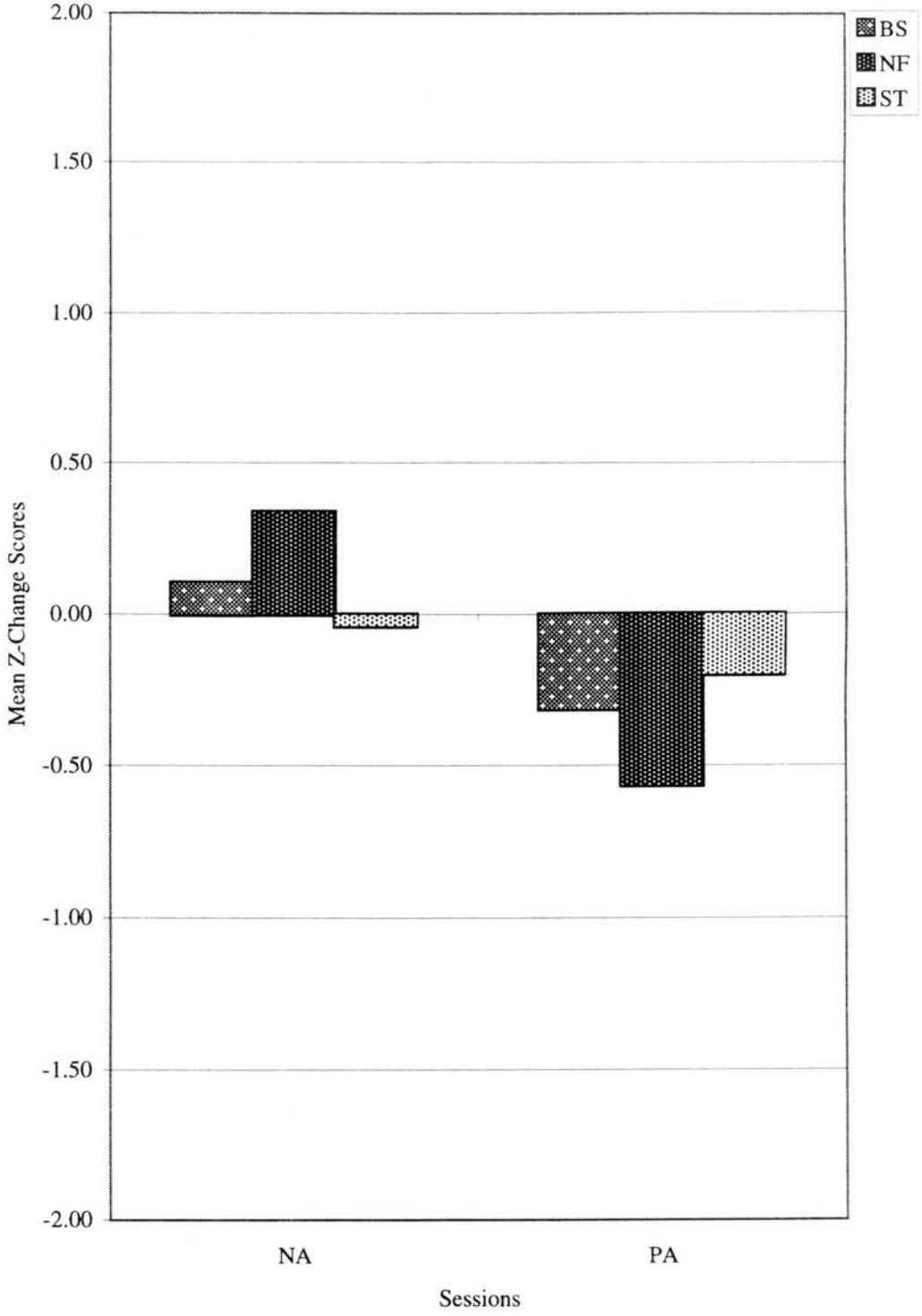


Figure 15. Means for BDI Z-scores Adjusted for Pretreatment Levels by Condition and Session



* Indicates significant condition differences by Scheffe post-hoc test

Figure 16. Means PANAS-X Negative and Positive Affect Z-scores Adjusted for Pretreatment Levels by Condition



scores are presented in Table XIII. Means and standard deviations for SC-90R pretreatment adjusted Z-scores are presented in Table XIV. Figure 17 displays the session 5 SCL-90R adjusted Z-scores.

Comparison of Successful Abstainers vs. Others

The following analyses focus on the differences between participants who were able to successfully abstain from smoking from quit day to session 6 (SUC-Abs) and those who were not abstinent at session 5, session 6, or reported not being abstinent between the two sessions (NON-Abs). The purpose of these analyses was to determine what factors, if any, made these post-hoc groups different, which should illuminate the findings for treatment conditions. The same analyses conducted for the overall Treatment Conditions will be conducted in an exploratory fashion for these post-hoc groups.

Demographics and Smoking Measures

To determine if session attendance differed among SUC-Abs and NON-Abs the mean number of sessions attended through Session 6 by participants was 5.68 (S.D. = 0.57) for SUC-Abs and 5.23 (S.D. = 0.60) for NON-Abs. A One-way ANOVA for sessions attended by abstinent group (SUC-Abs, NON-Abs) there was evidence that SUC-Abs attended significantly more session than did NON-Abs, F (1, 33) = 4.95, $p<.05$. One-way ANOVAs for the two post-hoc abstinent groups (SUC-Abs and NON-Abs) were conducted on pretreatment scores (i.e., desire to quit smoking, FTND scores, FTQ scores, self-reported rate of smoking, age started smoking, years smoked, current age, level of education, Life Stress and Support [LSS], and weight). Several of these analyses revealed significant differences, present at pretreatment, between SUC-Abs and NON-Abs. The two abstinent groups did not significantly differ on: age, desire to quit, level of education, height, Life Stress and Support (LSS), weight, number of years they have smoked regularly, or age they began smoking. SUC-Abs and NON-Abs did differ significantly on several key measures. SUC-Abs had significantly lower FTND scores than NON-Abs, F (1, 33) = 13.95, $p<.05$, with the means for SUC-Abs was 4.91 and NON-Abs was 7.77. SUC-Abs had significantly lower FTQ scores than NON-Abs, F (1, 33) = 9.03, $p<.05$, with the means for SUC-Abs was 6.55 and NON-Abs was 8.54. Also, SUC-Abs reported smoking significantly fewer cigarettes per day than NON-Abs, F (1, 33) = 12.30, $p<.05$, with the means for SUC-Abs was 24.32 and NON-Abs was 41.39. These mean, standard deviations, F-values, and p-values for these analyses of pretreatment variables are presented in Table XV.

One-way ANOVAs for the two post-hoc abstinent groups (SUC-Abs and NON-Abs) were conducted

Figure 17. Means for SCL-90R GSI Z-scores Adjusted for Pretreatment Levels by Condition

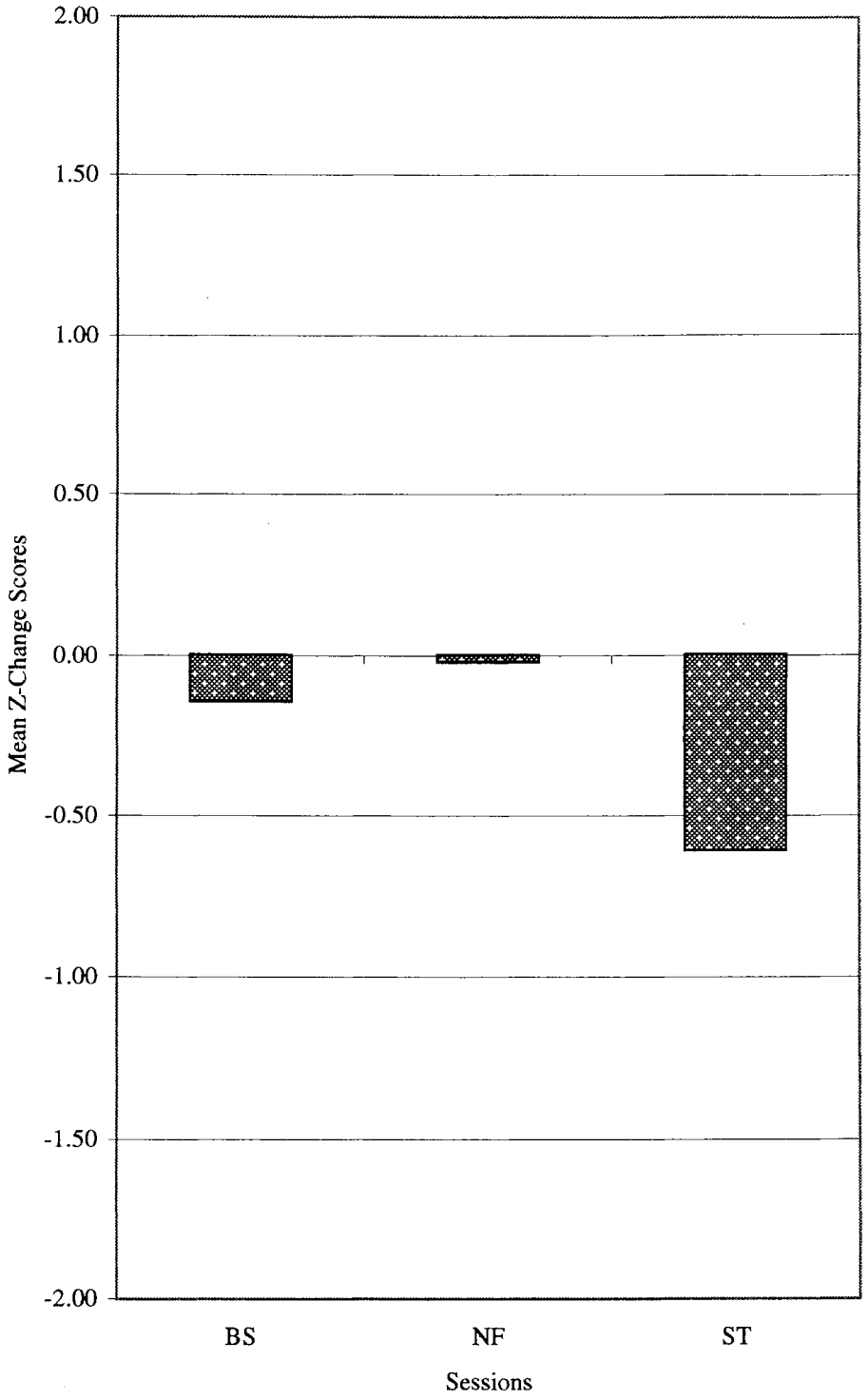


Table XV

Means, Standard Deviations, and One-way ANOVAs for Pretreatment Only Measures by Abstinent Group

	SUC-Abs (n =22)		NON-Abs (n =13)		One-way ANOVAs	
	M	SD	M	SD	F-value	p-value
Demographic Variables						
Age (22-76)	53.05	12.83	49.92	15.78	0.408	0.527
Education Level (9-20)[a]	14.18	2.82	12.85	1.57	2.442	0.532
Employed[b]	14	-------	6	-------	-------	-------
Gender[c]	11/11	-------	8/5	-------	-------	-------
Height (60-74)[d]	67.3182	3.83	68.6154	4.17	0.876	0.356
Weight (66-230)	154.59	33.65	157.92	39.20	0.071	0.792
Life Stess and Support[e]	18.09	6.32	14.23	5.00	3.530	0.069
Smoking Related Demographics						
Desire to Quit (2-7)	5.82	1.18	5.23	1.42	1.737	0.197
Age Began Smoking (11-26)	18.41	3.47	16.92	4.33	1.245	0.273
Years Smoked (4-55)[f]	34.64	12.56	33.00	14.00	0.128	0.723
Smoking Rate (10-60)	24.32	13.83	41.38	14.05	12.303	0.001*
FTQ (2-10)	6.55	2.11	8.54	1.45	9.025	0.005*
FTND (3-11)	4.91	2.43	7.77	1.69	13.950	0.001*

Note. All Oneway ANOVAs conducted with (1, 33) degrees of freedom. [a] education level in years; [b] number of individuals employed in each group; [c] number of males/females in each group; [d] height in inches; [e] higher scores represent fewer life stressors in the past 6 months, more social support, and generally better coping on a simple level; [f] years smoked calculated by taking current age minus reported age began smoking regularly. * Indicates significant One-way ANOVA.

on pretreatment measures for treatment outcome measures to determine if pretreatment differences were present between SUC-Abs and NON-Abs. A One-way ANOVA for COa pretreatment levels revealed a significant difference between abstinence groups, F (1, 33) = 6.95, $p<.05$, with the SUC-Abs having a significantly lower mean COa (M = 20.5) as compared to NON-Abs (M = 35.23). A One-way ANOVA for NAS-Craving pretreatment levels revealed that there was evidence of a significant difference between abstinent groups, F (1, 33) = 7.16, $p<.05$, with the SUC-Abs having a significantly lower mean NAS-Craving scores (M = .86) as compared to the NON-Abs (M = 1.77). A One-way ANOVA for SCL-90R GSI pretreatment levels revealed that there was evidence of a significant difference between abstinent groups, F (1, 32) = 11.27, $p<.05$, with the SUC-Abs having a significantly lower mean SCL-90R GSI (M = .66) as compared to the NON-Abs (M = 1.36). The following measures were not shown to be significantly different between SUC-Abs and NON-Abs at pretreatment by One-way ANOVAs, they were: BAI, BDI, NAS, QSU-Factor 1, QSU-Factor 2, SOC-P, SOC-C, and SOC-A. Means and standard deviations for these pretreatment scores, along with F and p-values are presented in Table XVI.

Ratings of Treatment

Differences in participant ratings of the Treatment Conditions were assessed by the Rating of Therapy and Consultants Questionnaire (RTCQ) using One-way ANOVAs for the two post-hoc abstinent groups (SUC-Abs and NON-Abs). The first analysis was for the question "I believe I received the best treatment" scored on a 7-point Likert scale 1=Strongly Disagree to 7=Strongly Agree. There was not evidence of a significant difference between the conditions, F (1, 32) = .105 (Note: One participant from the post-hoc NON-Abs group did not fill out the Rating of Sessions). The next analysis focused on the combination of five questions that looked at the participants' rating of the benefit of the treatment and group to them. There was not evidence of a significant difference between conditions, F (1, 32) = .400. The final analysis of the participants' rating on the combination of five questions of the therapists knowledge, enthusiasm, interest, support, and general supportive nature of the group. On this analysis there was not evidence of a significant difference between conditions, F (1, 32) = .071.

Smoking Related Measures

Alveolar Carbon Monoxide (COa). A 2 x 2 (Abstinent Group x Time) Repeated Measures ANOVA was performed on COa scores that were corrected for baseline levels (i.e., change scores). This analyses did

Table XVI

Means, Standard Deviations, F-values, and p-values for Treatment Outcome Measures at Pretreatment by post-hoc Abstinence Group

	SUC-Abs (n =22)		NON-Abs (n =13)		One-way ANOVAs	
	M	SD	M	SD	F-value	p-value
BAI	9.27	9.02	12.00	9.75	0.704	0.408
BDI	9.32	8.16	11.77	8.06	0.744	0.395
COa	20.50	9.67	35.23	23.21	6.945	0.013*
NAS						
Craving	0.86	0.89	1.77	1.09	7.157	0.012*
Total	9.09	7.88	11.69	9.42	0.770	0.386
PANAS-X						
Negative Affect	1.56	0.61	1.98	0.72	3.321	0.078
Positive Affect	2.77	0.72	3.16	0.87	2.084	0.158
QSU						
Factor 1	59.91	14.02	62.92	14.29	0.372	0.546
Factor 2	29.32	11.72	32.85	18.16	0.491	0.489
SCL-90R: GSI	0.66	0.54	1.36	0.67	11.270	0.002*
SOC						
Precontemplation	7.82	2.36	7.15	3.26	0.486	0.491
Contemplation	8.68	1.43	8.15	2.76	0.559	0.460
Action	4.36	2.87	4.69	3.77	0.085	0.773

Note. All Oneway ANOVAs conducted with (1, 33) degrees of freedom.
*Indicates significant One-way ANOVA.

not evidence a significant Group x Time interaction, F (1, 33) = .51, main effect Time, F (1, 33) = .74, or main effect for abstinent Group, F (1, 33) = .20. Means and standard deviations for the actual COa scores for SUC-Abs and NON-Abs at pretreatment, session 5, and session 6 are presented in Table XVII. Means and standard deviations for COa pretreatment adjusted Z-scores for SUC-Abs and NON-Abs are presented in Table XVIII. Figure 18 displays the session 5 and 6 COa adjusted Z-scores for SUC-Abs and NON-Abs.

Symptoms of Nicotine Deprivation. A 2 x 2 (Abstinent Group x Time) Repeated Measures ANOVA was performed on NAS scores that were corrected for baseline levels (i.e., change scores). This analyses did not evidence a significant Group x Time interaction, F (1, 33) = .02, main effect Time, F (1, 33) = 2.83, or main effect for abstinent Group, F (1, 33) = 1.30. Means and standard deviations for the actual NAS scores for SUC-Abs and NON-Abs at pretreatment, session 5, and session 6 are presented in Table XVII. Means and standard deviations for NAS pretreatment adjusted Z-scores for SUC-Abs and NON-Abs are presented in Table XVIII. Figure 19 displays the session 5 and 6 NAS adjusted Z-scores for SUC-Abs and NON-Abs.

Reported Craving. A 2 x 2 (Abstinent Group x Time) Repeated Measures ANOVA was performed on NAS-Craving scores that were corrected for baseline levels (i.e., change scores). This analyses did not evidence a significant Group x Time interaction, F (1, 33) = .32, main effect Time, F (1, 33) = 2.67, or main effect for abstinent Group, F (1, 33) = 1.72. Means and standard deviations for the actual NAS-Craving scores for SUC-Abs and NON-Abs at pretreatment, session 5, and session 6 are presented in Table XVII. Means and standard deviations for NAS-Craving pretreatment adjusted Z-scores for SUC-Abs and NON-Abs are presented in Table XVIII. Figure 20 displays the session 5 and 6 NAS-Craving adjusted Z-scores for SUC-Abs and NON-Abs.

Urges to Smoke. A 2 x 2 (Abstinent Group x Time) Repeated Measures ANOVA was performed on QSU-Factor 1 scores that were corrected for baseline levels (i.e., change scores). This analyses did not evidence a significant Group x Time interaction, F (1, 33) = .68, main effect Time, F (1, 33) = 2.83, or main effect for abstinent Group, F (1, 33) = .42. Means and standard deviations for the actual QSU-Factor 1 scores for SUC-Abs and NON-Abs at pretreatment, session 5, and session 6 are presented in Table XVII. Means and standard deviations for QSU-Factor 1 pretreatment adjusted Z-scores for SUC-Abs and NON-Abs are presented in Table XVIII. Figure 21 displays the session 5 and 6 QSU-Factor 1 adjusted Z-scores for SUC-Abs and NON-Abs.

Table XVII

Means and Standard Deviations for Smoking Outcome Measures by post-hoc Abstinence Group and Session

	Pretreatment		Session 5		Session 6	
	M	SD	M	SD	M	SD
COa (0-97)						
SUC-Abs	20.50	9.67	5.55	4.89	3.14	2.75
NON-Abs	35.23	23.21	16.77	11.35	16.54	12.20
NAS: Craving (0-3)						
SUC-Abs	0.86	0.89	1.32	0.95	1.00	0.98
NON-Abs	1.77	1.09	1.54	1.05	1.38	1.04
NAS: Total (0-39)						
SUC-Abs	9.09	7.88	10.82	7.85	9.09	8.27
NON-Abs	11.69	9.42	16.85	10.50	15.38	7.59
QSU-Factor 1						
SUC-Abs	59.91	14.02	55.73	17.17	54.50	18.95
NON-Abs	62.92	14.29	62.46	12.61	64.69	13.57
QSU-Factor 2						
SUC-Abs	29.32	11.72	31.00	13.65	27.14	14.13
NON-Abs	32.85	18.16	34.54	21.38	33.92	20.27
SOC Precontemplation						
SUC-Abs	7.54	3.38	9.85	0.56	-----	-----
NON-Abs	8.00	1.61	9.64	1.21	-----	-----
SOC Contemplation						
SUC-Abs	8.68	1.43	9.64	0.79	-----	-----
NON-Abs	8.15	2.76	8.77	1.88	-----	-----
SOC Action						
SUC-Abs	7.82	2.36	9.86	0.47	-----	-----
NON-Abs	7.15	3.26	8.92	2.40	-----	-----

----- Indicates data for this measure was not collected at this time.

Table XVIII

Means and Standard Deviation for Smoking Outcome Measure Z-scores Adjusted for Pretreatment Levels by post-hoc Abstinent Group and Session

	Session 5		Session 6	
	M	SD	M	SD
COa (0-97)				
SUC-Abs	-0.99	0.59	-1.15	0.61
NON-Abs	-1.23	1.30	-1.24	1.81
NAS: Craving (0-3)				
SUC-Abs	0.45	1.25	0.14	1.35
NON-Abs	-0.23	1.41	-0.38	1.55
NAS: Total (0-39)				
SUC-Abs	0.20	1.02	0.00	1.19
NON-Abs	0.59	1.06	0.42	0.90
QSU-Factor 1				
SUC-Abs	-0.28	1.10	-0.36	1.34
NON-Abs	-0.12	1.23	0.02	1.39
QSU-Factor 2				
SUC-Abs	0.11	0.64	-0.14	0.85
NON-Abs	0.11	1.00	0.07	1.08
SOC Precontemplation				
SUC-Abs	0.85	0.94	-----	-----
NON-Abs	0.74	1.05	-----	-----
SOC Contemplation				
SUC-Abs	0.55	0.98	-----	-----
NON-Abs	0.35	1.06	-----	-----
SOC Action				
SUC-Abs	1.48	0.88	-----	-----
NON-Abs	1.01	1.11	-----	-----

Note. ** Indicates all individuals who were abstinent for at least 18 hours before the session (night before).

*Indicates only individuals that had not smoked since quit day, if they reported smoking, even one cigarette.

----- Indicates data for this measure not collected at this time.

Figure 18. Means for COa Z-scores Adjusted for Pretreatment Levels by Abstinent Group and Session

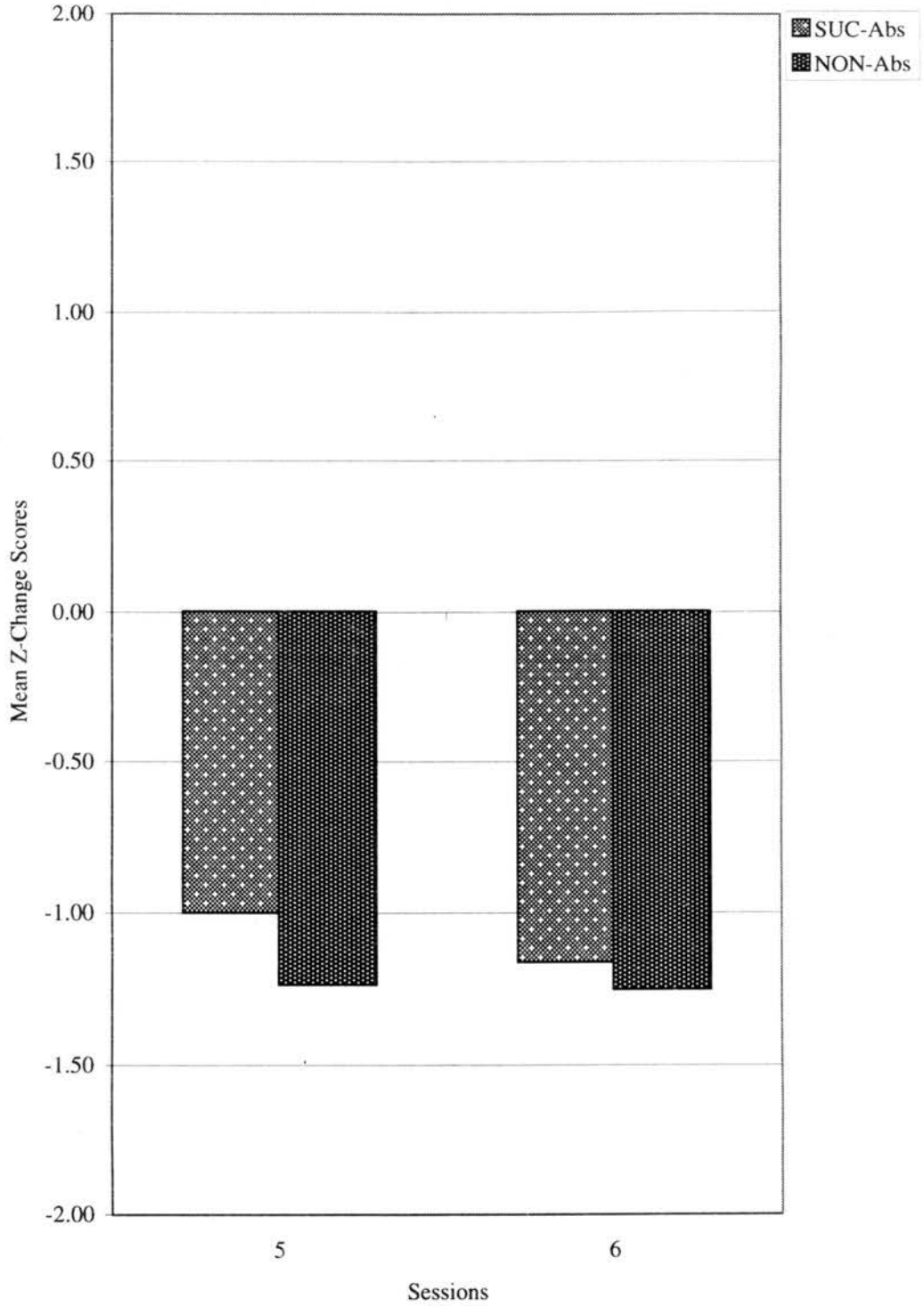


Figure 19. Means for NAS Z-scores Adjusted for Pretreatment Levels by Abstinent Group and Session

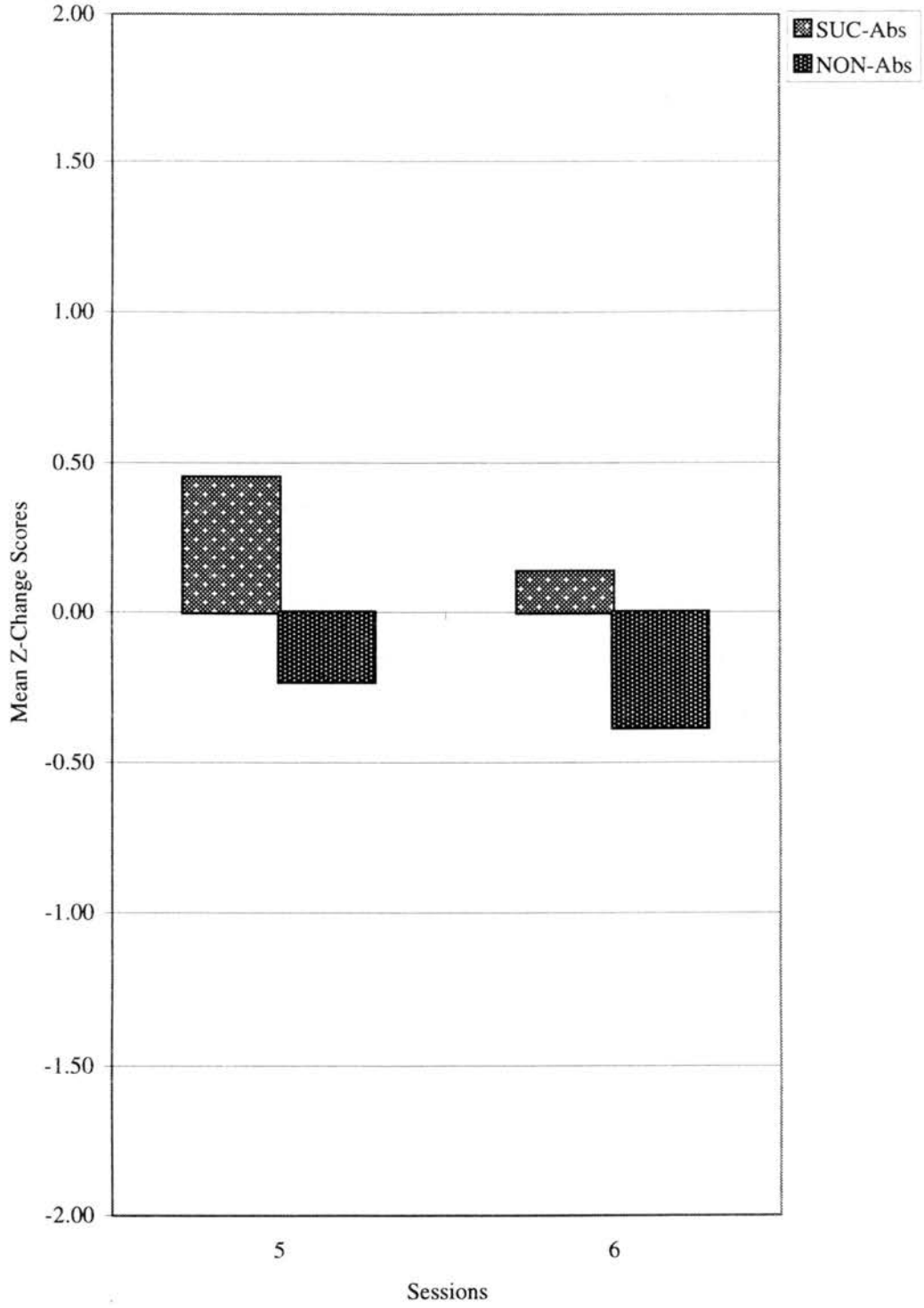


Figure 20. Means for NAS-Craving Z-scores Adjusted for Pretreatment Levels by Abstinent Group and Session

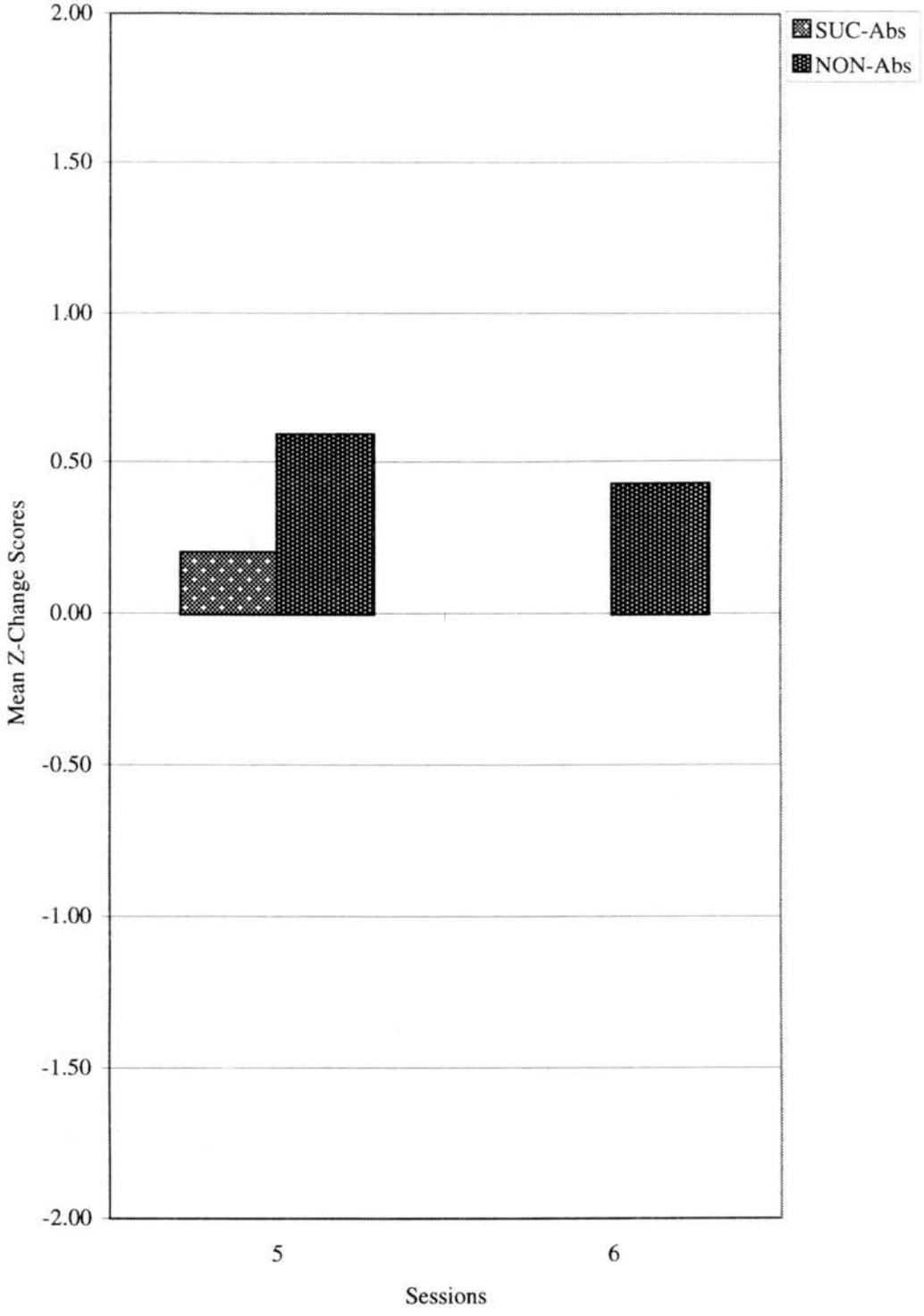
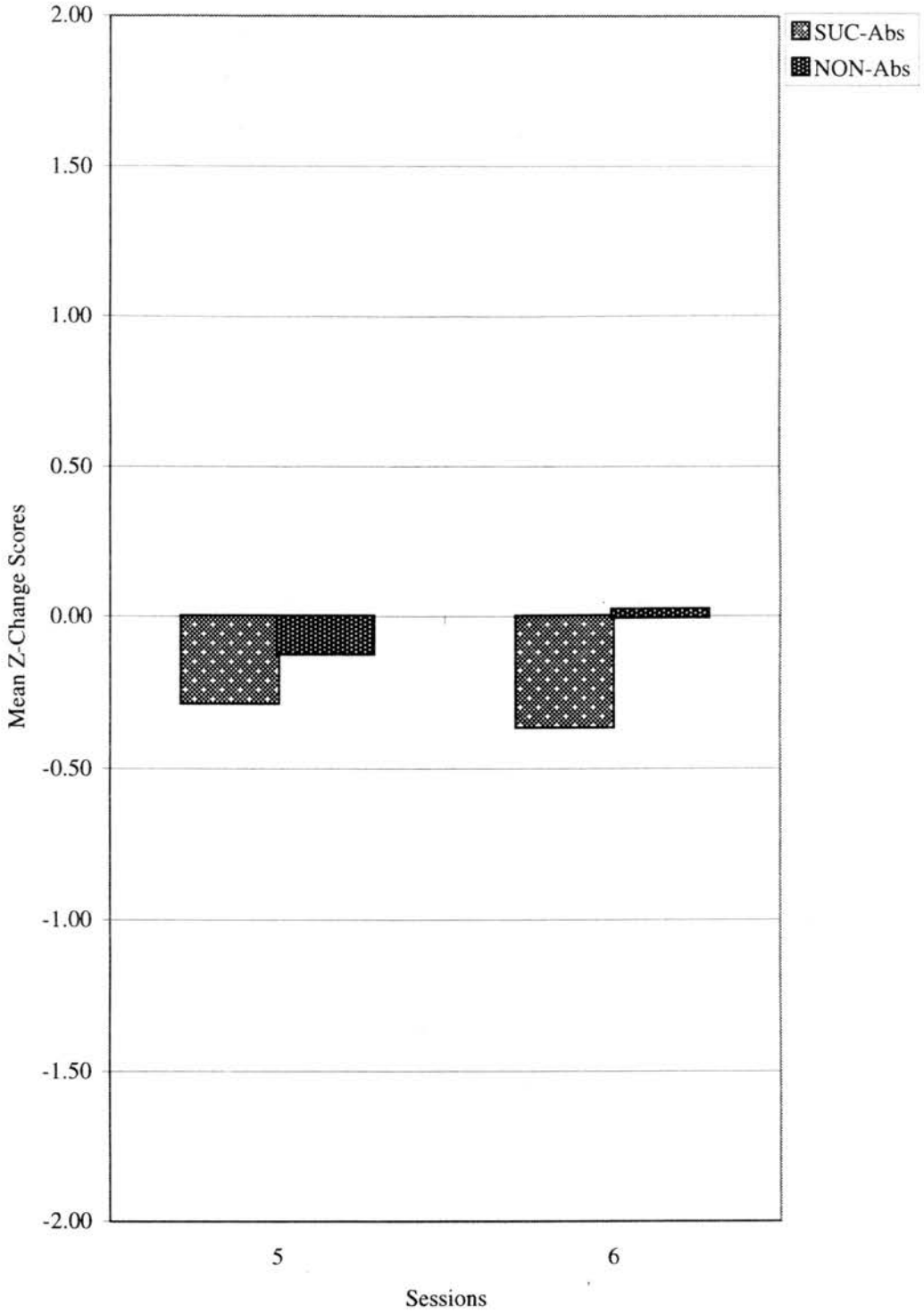


Figure 21. Means for QSU-Factor 1 Z-scores Adjusted for Pretreatment Levels by Abstinent Group and Session



A 2 x 2 (Abstinent Group x Time) Repeated Measures ANOVA was performed on QSU-Factor 2 scores that were corrected for baseline levels (i.e., change scores). This analyses did not evidence a significant Group x Time interaction, $\underline{F}$ (1, 33) = 1.14, main effect Time, $\underline{F}$ (1, 33) = 2.16, or main effect for abstinent Group, $\underline{F}$ (1, 33) = .13. Means and standard deviations for the actual QSU-Factor 2 scores for SUC-Abs and NON-Abs at pretreatment, session 5, and session 6 are presented in Table XVII. Means and standard deviations for QSU-Factor 2 pretreatment adjusted Z-scores for SUC-Abs and NON-Abs are presented in Table XVIII. Figure 22 displays the session 5 and 6 QSU-Factor 2 adjusted Z-scores for SUC-Abs and NON-Abs.

Stages of Change. A two group (SUC-Abs and NON-Abs) One-way ANOVA was performed on each of the SOC ladders (i.e., SOC-P, SOC-C, SOC-A) that were corrected for baseline levels (i.e., change scores). The analysis of the SOC-P scores did not reveal a significant abstinent group difference, $\underline{F}$ (1, 33) = .11. Analysis of SOC-C scores also did not evidence a significant abstinent group difference in change from pretreatment levels, $\underline{F}$ (1, 33) = .30. Additionally, analysis of SOC-A scores did not evidence a significant abstinent group difference in change from pretreatment levels, $\underline{F}$ (1, 33) = 1.86. Means and standard deviations for the actual SOC ladders for SUC-Abs and NON-Abs at pretreatment, and session 5 are presented in Table XVII. Means and standard deviations for SOC pretreatment adjusted Z-ladders for SUC-Abs and NON-Abs are presented in Table XVIII. Figure 23 displays the session 5 and 6 SOC adjusted Z-scores for SUC-Abs and NON-Abs.

Non-Smoking Measures

Anxiety. A 2 x 2 (Abstinent Group x Time) Repeated Measures ANOVA was performed on BAI scores that were corrected for pretreatment levels (i.e., change scores). This analyses did not evidence a significant Group x Time interaction, $\underline{F}$ (1, 33) = .77, or the main effect Time, $\underline{F}$ (1, 33) = 2.19, but did show a significant main effect for abstinent Group, $\underline{F}$ (1, 33) = 6.09, $\underline{p}<.05$. To further explore these differences, two One-way ANOVAs were conducted at session 5 and session 6 with both showing significant abstinent group differences with session 5, $\underline{F}$ (1, 33) = 7.00, $\underline{p}<.05$, and session 6, $\underline{F}$ (1, 33) = 4.52, $\underline{p}<.05$. Means and standard deviations for the actual BAI scores for SUC-Abs and NON-Abs at pretreatment, session 5, and session 6 are presented in Table XIX. Means and standard deviations for BAI pretreatment adjusted Z-scores for SUC-Abs and NON-Abs are presented in Table XX. Figure 24 displays

Figure 22. Means for QSU-Factor 2 Z-scores Adjusted for Pretreatment Levels by Abstinent Group and Session

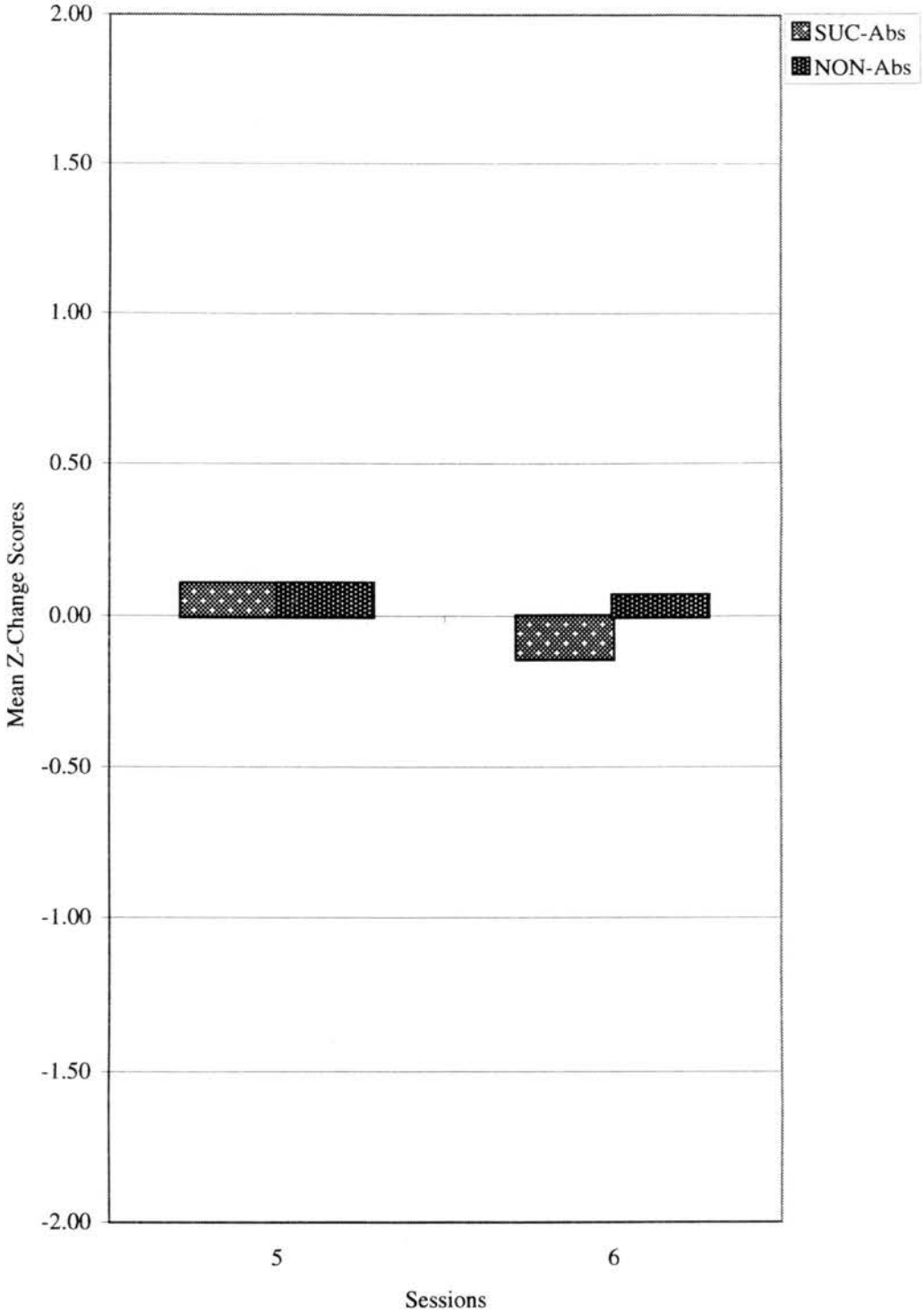


Figure 23. Means for SOC Ladder Z-scores Adjusted for Pretreatment Levels by Abstinent Group and Session

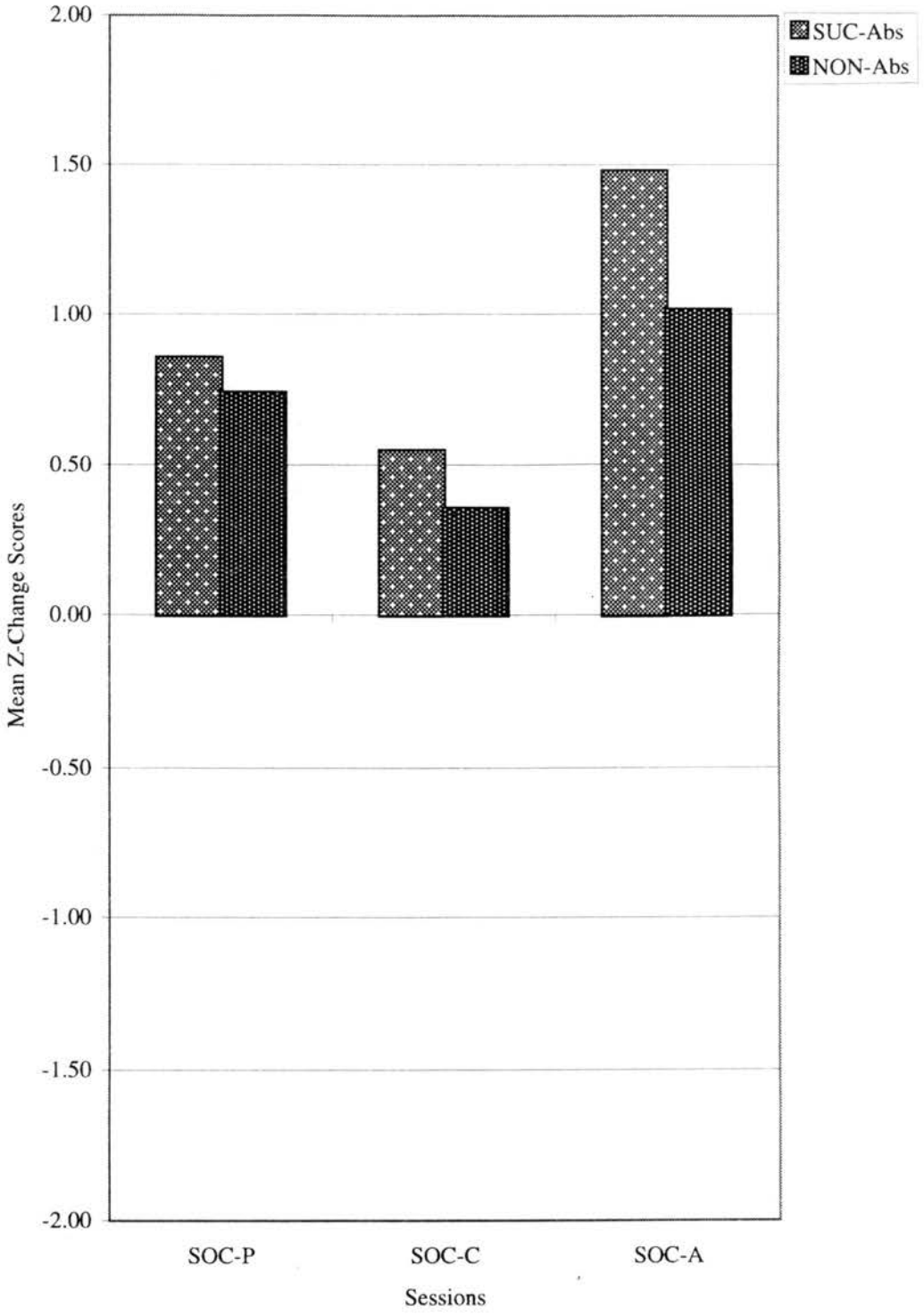


Table XIX

Means and Standard Deviations for Nonsmoking Outcome Measures by post-hoc Abstinence Group and Session

	Pretreatment		Session 5		Session 6	
	M	SD	M	SD	M	SD
BAI						
SUC-Abs	9.27	9.02	6.23	6.72	5.77	6.76
NON-Abs	12.00	9.75	16.46	13.11	14.69	12.61
BDI						
SUC-Abs	9.32	8.16	6.05	6.10	5.50	7.28
NON-Abs	11.77	8.06	12.46	8.03	12.46	8.21
SCL-90R GSI						
SUC-Abs	0.66	0.54	0.44	0.47	-----	-----
NON-Abs*	1.36	0.67	1.29	0.69	-----	-----
PANAS-X: NA						
SUC-Abs	1.56	0.61	1.56	0.66	-----	-----
NON-Abs	1.98	0.72	2.24	0.88	-----	-----
PANAS-X: PA						
SUC-Abs	2.77	0.72	2.57	0.81	-----	-----
NON-Abs	3.16	0.87	2.75	0.72	-----	-----

Note. One individual in the NF Group did not complete the SCL-90R, therefore those means represent n=10.
----- Indicates data for this measure not collected at this time.

Table XX

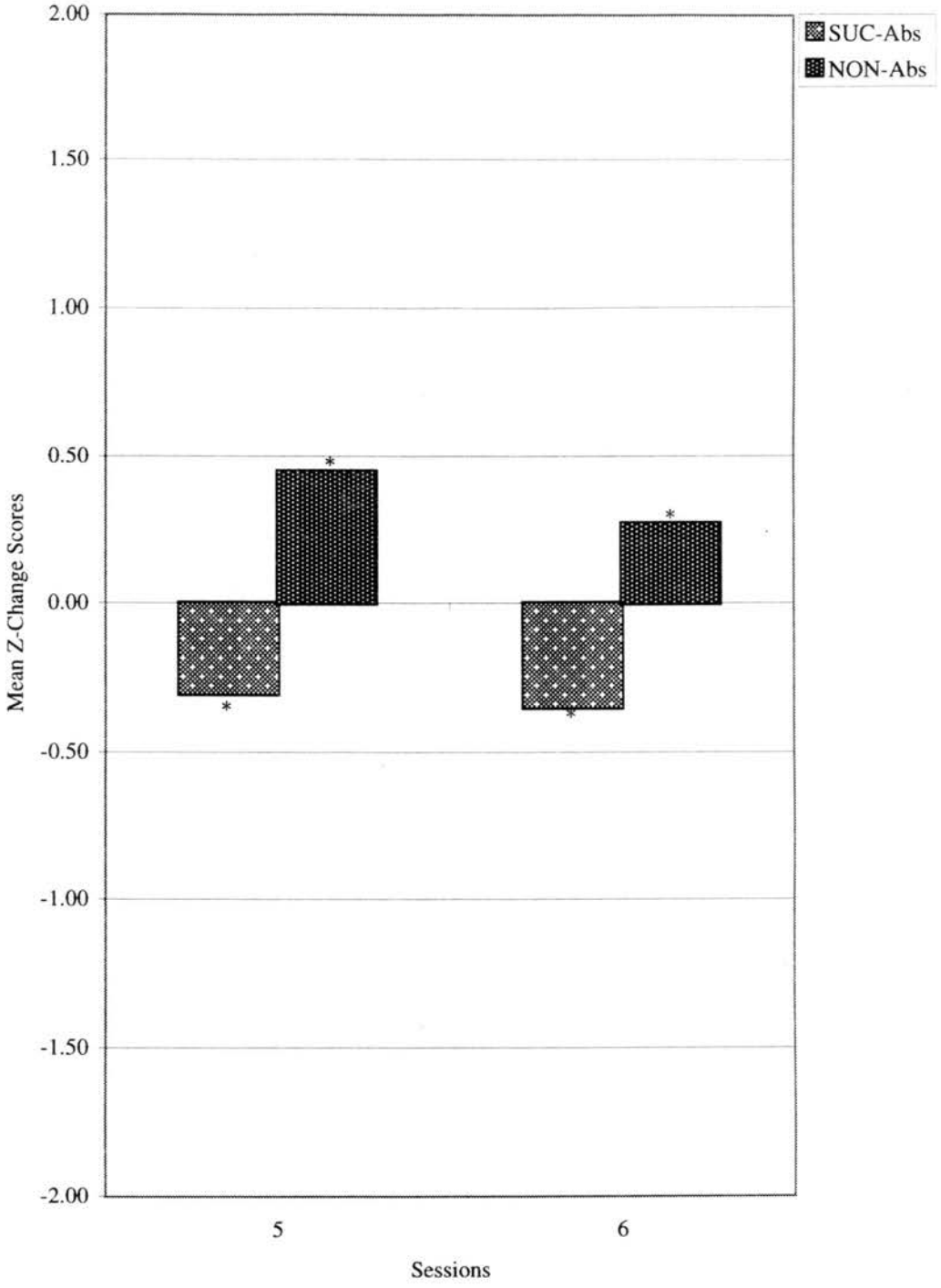
Means and Standard Deviation for Nonsmoking Outcome Measure Z-scores Adjusted for Pretreatment Levels by post-hoc Abstinent Group and Session

	Session 5		Session 6	
	M	SD	M	SD
BAI				
SUC-Abs	-0.31	0.73	-0.35	0.76
NON-Abs	0.45	0.94	0.27	0.95
BDI				
SUC-Abs	-0.41	0.85	-0.48	0.89
NON-Abs	0.09	0.85	0.09	0.84
SCL-90R GSI				
SUC-Abs	-0.33	0.59	-----	-----
NON-Abs*	-0.11	0.81	-----	-----
PANAS-X: NA				
SUC-Abs	0.00	0.80	-----	-----
NON-Abs	0.35	0.84	-----	-----
PANAS-X: PA				
SUC-Abs	-0.25	0.62	-----	-----
NON-Abs	-0.53	0.92	-----	-----

Note. One individual in the NF Group did not complete the SCL-90R at Session 5, therefore those means represent n=10.

----- Indicates data for this measures was not collected at this time.

Figure 24. Means for BAI Z-scores Adjusted for Pretreatment Levels by Abstinent Group and Session



* Indicates significant difference between groups at that time.

the session 5 and 6 BAI adjusted Z-scores for SUC-Abs and NON-Abs.

Mood/Depression. A 2 x 2 (Abstinent Group x Time) Repeated Measures ANOVA was performed on BDI scores that were corrected for pretreatment levels (i.e., change scores). This analyses did not evidence a significant Group x Time interaction, F (1, 33) = .29, p>.05, main effect Time, F (1, 33) = .29, p>.05, but did evidence a trend toward a significant main effect for abstinent Group, F (1, 33) = 3.31, p=.078 (Note: actual p-value reported to accurately identify the trend toward significance). Exploratory analyses to investigate this trend toward a significant main effect for group was conducted on BDI scores. One-way ANOVAs at session 5 and session 6 did not reveal evidence for a significant difference between abstinent groups, F (1, 33) = 2.81 and F (1, 33) = 3.51. Means and standard deviations for the actual BDI scores for SUC-Abs and NON-Abs at pretreatment, session 5, and session 6 are presented in Table XIX. Means and standard deviations for BDI pretreatment adjusted Z-scores for SUC-Abs and NON-Abs are presented in Table XX. Figure 25 displays the session 5 and 6 BDI adjusted Z-scores for SUC-Abs and NON-Abs.

Affect. A One-way ANOVA for the two abstinent groups (SUC-Abs and NON-Abs) was performed on PANAS-X NA scores that were corrected for baseline levels (i.e., change scores). This analyses did not evidence a significant abstinent group difference, F (1, 33) = 1.52. A One-way ANOVA for the two abstinent groups (SUC-Abs and NON-Abs) was performed on PANAS-X PA scores that were corrected for baseline levels (i.e., change scores). This analyses did not evidence a significant abstinent group difference, F (1, 33) = 1.11. Means and standard deviations for the actual PANAS-X scores for SUC-Abs and NON-Abs atpretreatment, session 5, and session 6 are presented in Table XIX. Means and standard deviations for PANAS-X pretreatment adjusted Z-scores for SUC-Abs and NON-Abs are presented in Table XX. Figure 26 displays the session 5 and 6 PANAS-X adjusted Z-scores for SUC-Abs and NON-Abs.

General Physical and Psychological Symptoms. A One-way ANOVA for the two abstinent groups (SUC-Abs and NON-Abs) was performed on SCL-90R scores that were corrected for baseline levels (i.e., change scores). This analyses did not evidence a significant abstinent group difference, F (1, 33) = .75. Means and standard deviations for the actual SCL-90R scores for SUC-Abs and NON-Abs at pretreatment, session 5, and session 6 are presented in Table XIX. Means and standard deviations for SCL-90R pretreatment adjusted Z-scores for SUC-Abs and NON-Abs are presented in Table XX. Figure 27 displays the session 5 and 6 SCL-90R adjusted Z-scores for SUC-Abs and NON-Abs.

Figure 25. Means for BDI Z-scores Adjusted for Pretreatment Levels by Abstinent Group and Session

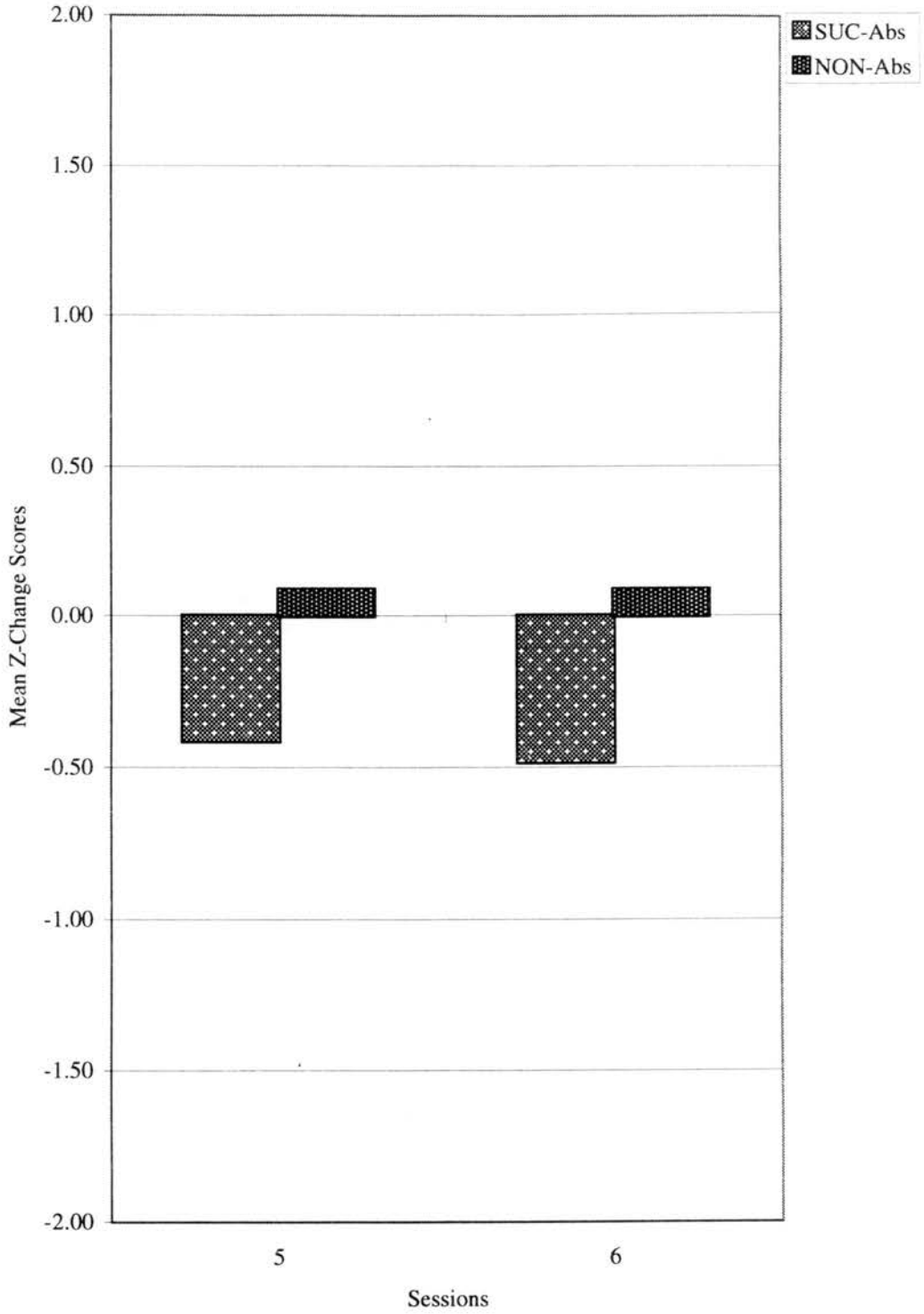


Figure 26. Means for PANAS-X Positive and Negative Affect Z-scores Adjusted for Pretreatment Levels by Abstinent Group

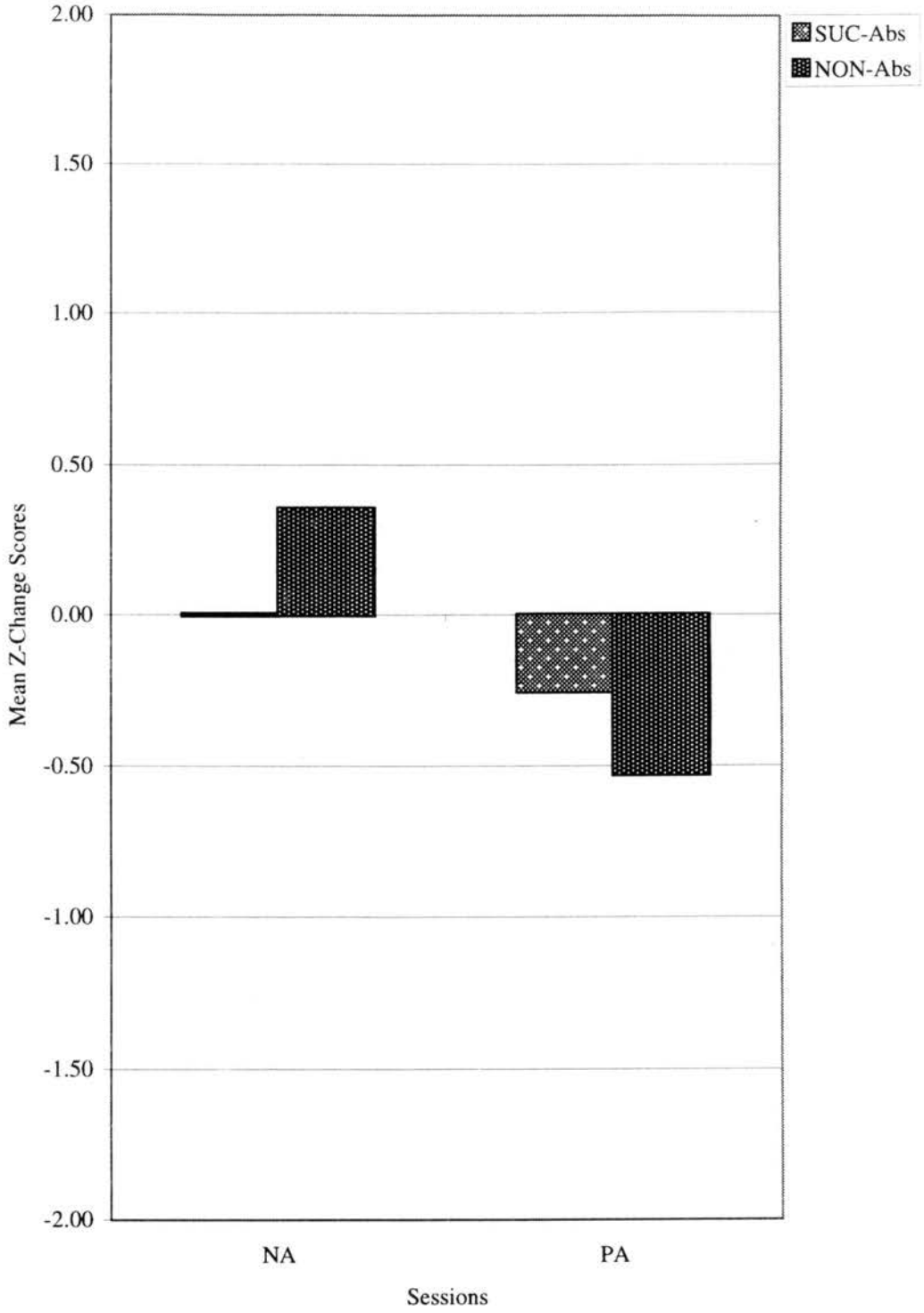
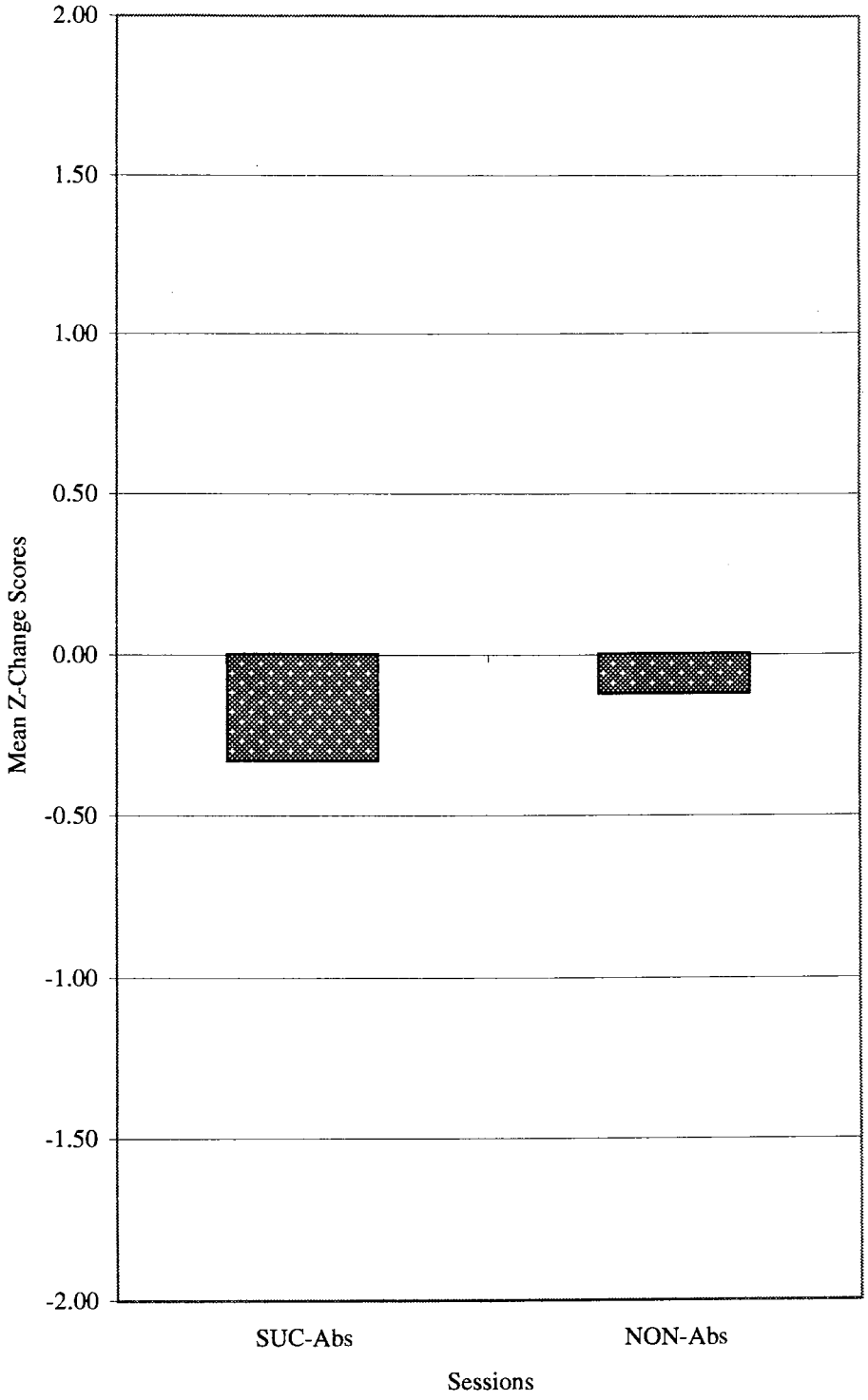


Figure 27. Means for SCL-90R GSI Z-scores Adjusted for Pretreatment Levels by Abstinent Group



CHAPTER 4

DISCUSSION

Summary of Results

The discussion will start with a brief review of the results. The results show that the Treatment Conditions were relatively similar before treatment began, with the exception of COa levels and SOC-C scores. All three conditions showed similar percentages of participants able to abstain during session 5 and 6, and similar percentages of participants able to abstain from quit day forward. When scores were adjusted for pretreatment levels there were three significant differences between treatment conditions. First, the NF condition showed a significantly larger decrease in COa rates from pretreatment levels than did the BS condition. This difference between conditions was present at session 5 and 6. Second, the BS condition showed a significantly larger decrease in QSU-Factor 1 scores from pretreatment to session 5 than did the ST condition. There was no difference apparent between conditions at session 6 on QSU-Factor 1 change scores. Third, The ST condition showed a significantly larger decrease in BDI scores from pretreatment to session 6 than did the BS condition. There was no difference apparent between conditions at session 5 on BDI scores. These results suggest that no treatment condition was shown superior across treatment outcome measures nor did any treatment condition separate itself from the others on the treatment measures consistently.

The post-hoc formed abstinent groups that divided participants into those who were able to abstain from quit day forward and those not able to abstain at all or those who had only partial abstinence, the results were more clear. First, the participants who were able to abstain came from each of the treatment conditions in similar numbers, suggesting it was not the specific treatment condition that led to successful abstinence but some pretreatment variable levels. Individuals who were able to abstain showed significantly different pretreatment levels on several smoking related variables, suggesting that these were the important variables for successful abstinence. The variables that successful abstainers were significantly lower on were measures of nicotine dependence (i.e., FTQ and FTND) and reported smoking significantly fewer cigarettes per day. Further, complete abstainers had significantly lower pretreatment COa levels, which is highly correlated with FTQ and FTND scores and reported cigarette intake (Payne et al., 1994). Additionally, the complete abstainers had significantly lower pretreatment NAS-Craving levels, a measure

of their psychological craving for cigarettes. Finally, the complete abstainers reported fewer general physical and psychological symptoms than did the nonabstainers, as measured by the SCL-90R-GSI scale before treatment. Also, successful abstainers attended significantly more sessions than did those who were not able to abstain. From this information it appears clear that the treatment conditions and their slight differences were not related to participant change due to the treatments; rather, those who were successful at maintaining their abstinence differed significantly from those who were not able to maintain abstinence in a specific way at pretreatment and were much more likely to quit smoking based on those pretreatment characteristics.

General Discussion

The results do not suggest the superiority of one treatment condition and require a consistent discussion for solid information to be gained about what these results mean for the study at hand and for smoking cessation in general. There are four important areas to discuss that will assist in producing a meaningful understanding of this study, they are: did the treatment conditions actually receive different treatments; were there consistent differences between the treatment conditions on the primary and secondary hypotheses; was there sufficient power to detect differences; and what other factors could have explained the effects in the study. First, the findings related to treatment integrity then progressing through the remaining three areas.

Treatment Integrity

Discussion of the results must begin with the questions, "did individuals receive different treatments" and "did participants believe they received a viable treatment." The answer to both those questions according to the results is yes. First, the consultants ratings, which followed each session, showed that the conditions received consistent components as planned (e.g., self-monitoring, opponent-process discussion) and different components as planned (i.e., discussion of behavioral topography substitutes only in the BS condition and discussion of nicotine fading/brand-switching only in the NF condition). The ratings showed that the consultants followed the treatment manual as planned and discussed topics in appropriate levels. Further, when topics inconsistent with the Treatment Condition were brought up by participants, as can be the case, the consultants allowed discussion but reverted to appropriate planned topics as quickly as possible. In summary, from a treatment integrity view, the Treatment Conditions did receive different

treatments according to the consultant ratings of depth of topics discussed in the conditions.

The second component of interest, did the participants believe that they received a viable treatment and did they believe that the consultants treated them appropriately (i.e., were the consultants perceived differently across conditions). The ratings of the consultants and the treatments suggest that participants did believe they received a viable treatment. Further, there was no evidence of one condition believing more or less strongly that they received the 'best' treatment. Additionally, participants were positive about their belief that the consultants were interested and knowledgeable about smoking cessation. Finally, there were equal levels of belief of benefit of the sessions across conditions. In summary, the participants reacted equally positive to the sessions and did not report evidence that one of the treatments was presented in a poor or unsuccessful manner.

Treatment Conditions

Pretreatment Measures

The second level of discussion is to determine if the conditions were equivalent at pretreatment and, if not, would that result in differences during quit week. Although there is no way to unequivocally report that random assignment to conditions was effective, evidence to support that the conditions were equivalent at pretreatment can be produced. For example, the conditions did not significantly differ on any pretreatment demographic measures (e.g., age), smoking demographic measures (e.g., number of cigarettes smoked per day), or measures of common measures of nicotine dependence (e.g., FTND) at pretreatment. This is suggestive that the conditions were reasonably equivalent at pretreatment.

However, there were significant condition differences at pretreatment on the biochemical measure of smoking behavior (COa). This differences, although certainly not planned, was dealt with in a consistent fashion by using difference scores adjusting for pretreatment levels, as were all the repeated measures. Further, the conditions differed at pretreatment on SOC-C scores, an indication of the participants stage in terms of determining that they have made a decision to quit smoking. This again was adjusted for pretreatment levels. In this way pretreatment levels were factored into the study and the measures were adjusted accordingly to insure that significant results would be due to the treatments, as opposed to differences present at pretreatment. In summary, the conditions appeared equivalent at pretreatment on the large majority of measures and those measures that the treatment conditions significantly differed on were

adequately adjusted to insure that the difference would not lead to erroneous results.

Primary Hypotheses

The primary hypotheses that focused on smoking related measures or symptoms produced mixed results. First, the NF condition showed greater reduction in COa scores than the BS condition at sesssion 5 and session 6. Although it was anticipated that NF participants would show greater reductions in COa because they smoked cigarettes with lower tar and nicotine levels as they approached quit day, it was not expected that the BS condition would show the smallest reduction in COa levels because they had the largest number of individuals that were abstinent. Further, it was expected that the BS condition would be effective at reducing COa levels because they were providing participants with substitutes for smoking and were encouraging participants to bypass smoking before the actual quit day by using the substitutes. It is important to note that because of pretreatment differences and the adjustment for those differences, the BS condition had less room for improvement. While the NF condition, which had the largest pretreatment COa levels, had the most room for reduction in COa levels. This represents one of the problems of using change scores. That being noted it was clear that the NF condition reduced in COa levels more than did the BS condition.

The different treatments had showed no differential effect on reduction or change of symptoms associated with nicotine abstinence as measured by the NAS. This is one area where it was anticipated that the proven treatment of NF and the substitutes included in the BS condition would have resulted in significant differences between those two conditions and the ST condition. This potentially could be related to the fact that individuals were not in a state of nicotine deprivation during the pretreatment period and, thus, adjusting the scores for those pretreatment values incorrectly adjusted the values. However, exploratory analyses of unadjusted NAS session 5 and 6 scores did not produce results that were any closer to significance than the adjusted scores. Based on these results one of three reasons (or a combination) are likely to explain the results. First, the NAS instrument was not sufficiently sensitive to identify differences produced by the treatments. This is unlikely because the basic NAS components are commonly used in smoking cessation literature as key outcome measures (Hughes & Hatsukami, 1986). Secondly, there was insufficient power given the small effect size and limited numbers of participants to identify differences given the participants were in a severe state of withdrawal. This may also implicate a ceiling effect. Finally,

the treatment differences may not have been powerful enough to produce differences or were not specific enough to withdrawal symptoms to produce differences. This topic will be discussed more later. One component of the NAS, the craving item, did show a trend toward a significant difference between the treatment conditions. However, this trend, possible due to the just mentioned limitation, did not display actual differences in the conditions.

The conditions did show a significant difference in urges to smoke as measured by the QSU-Factor 1 score. The QSU-Factor 1, according to Tiffany and Drobes (pg. 1471, 1991) measures the "clear intention and desire to engage in smoking behavior that is anticipated as pleasant, enjoyable, and satisfying". The BS condition showed a significantly larger reduction in this score than did the ST condition at session 5 but no differences between conditions were found at session 6. The graphs show that the BS condition showed a large reduction from pretreatment levels in session 5 and showed a slight further reduction at session 6. The ST condition showed higher levels at both sessions 5 and 6 than pretreatment levels but did show some reduction in the difference between sessions 5 and 6, which resulted in the loss of a significant differences at session 6 as compared to the BS Condition. There were no other significant differences present, which might have been due to the large similarity across Treatment Conditions. This is likely the best reason for the lack of significant findings, which also shows itself in terms of small effect sizes and limited power. This factor will be discussed extensively later in this chapter.

Secondary Hypotheses

The secondary hypotheses had one trend toward significance but no clear significant results. There was a trend toward significant main effect treatment condition differences between mean BDI scores. There was a significant difference at session 6 with the ST condition showing larger reductions in BDI scores from pretreatment levels as compared to the BS condition. This effect and the lack of a significant effects in the secondary hypotheses is disconcerting. The efficacy of behavioral topography substitutes was expected and hypothesized to be apparent in terms of anxiety, depression, and general physical and psychological symptoms for several reasons. First, because BS are often used as stress management techniques (e.g., squeeze "stress" ball) it was expected that measures of anxiety would show a reduction in levels of anxiety due to the use of BS. Secondly, because the use of physical anxiety (e.g., gum chewing, fine motor movement) is often associated with distraction it was expected that this would help defray thoughts from an

individuals' mood and physical symptoms, thereby reducing BDI and SCL-90R GSI scores.

The reason that these measure did not show significant differences can be attributed to one of two factors. First, the addition of the 'special treatment' (i.e., BS condition and NF condition) added so little beyond the base treatment. Another way to explain this is that the base treatment components were responsible for much of the variance or treatment effect and little, if any, treatment effect was available for change associated with the additive treatment components. If this were true, the base treatment was too powerful to detect difference between conditions due to the additional treatment components (i.e., BS and NF). Given that the base treatment package included all the standard components generally used in smoking cessation programs, this is a fairly logical assumption. The second possible reason is that there was not enough power in the study to adequately identify condition differences or differences due to the additive treatments. The power analysis results reflect that this was the case, there was not adequate power to detect condition differences given the small effect sizes and limited sample size. The fact remains that the effect sizes were consistently small and not of the size predicted.

Discussion of Successful Abstinence

These analyses were done to investigate potential confounding factors that may have contributed to differences between treatment conditions or to determine if specific pretreatment factors may have led to the successful outcome. These post-hoc groups were developed by selecting all participants from the treatment conditions who were completely abstinent from midnight of the quit day to session 6, and comparing them to participants who were not able to maintain complete abstinence during that time frame. In this way the abstinent groups consist of individuals who were successful at abstinence and those who were not. By comparing these groups after treatment, information about relevant factors that contribute to smoking cessation may be discovered.

Pretreatment Measures

The two abstinent groups differed significantly on several pretreatment measures that have been associated with successful smoking cessation treatment (Hajek, 1991). SUC-Abs differed from NON-Abs significantly on pretreatment measures, those measure were: lower FTQ scores, lower FTND scores, reported a lower rate of daily cigarette intake, had lower COa levels, lower levels of craving, and reported fewer general physical and psychological symptoms. Additionally, SUC-Abs attended more treatment

session which has also been associated with more successful smoking cessation outcome. These differences at pretreatment clearly are important in successful abstinence and smoking cessation. The successful abstainers did show a significantly larger reduction in BAI scores from pretreatment levels at both session 5 and 6 than did the nonsuccessful abstainers. Although this effect occurred there were no other differences between these post-hoc groups during session 5 and 6, probably because there were such large differences present at pretreatment. In summary, individuals who were successful at abstinence during quit week were not as significantly dependent smokers and were functioning somewhat better than those individuals who were not able to abstain during quit week before treatment began. It is clear that these factors contributed significantly to their ability to abstain during quit week and likely added to the inconsistent differences between the treatment conditions.

Limitations

Power

As noted previously, the power of the analyses in the study was, in most cases, far from desirable. There are two reasons for the limited power, the small number of participants and the small effect sizes. It can be suggested that the inclusion of more subjects up to or beyond the proposed amount would make a difference in the results. This is not reasonable or feasible if all the results are considered. First, the results from analyses of the treatment conditions produce inconsistent and inconclusive results. No treatment condition showed superiority; rather, all three conditions showed one area (measure) that they were "better" than the other conditions on. Second, even if adding 10 more participants moved the BDI and NAS-Craving analyses to significance, what would that mean. Again, it would not have added significantly to the understanding of the results. Finally, the most important results were the clear differences at pretreatment in the participants who were successful at abstinence and those who were not. These results suggest that the treatment condition assignment was not the important or relevant variables in the study; rather, pretreatment levels were the important variables that determined who would be successful in the treatments. This certainly leads to the next important factor, that is, the similarity between treatments.

Treatment Similarity and Matching

There is good evidence to suggest that the treatments may have been too similar and that the base treatment was "too good." In analyzing the results of differences between conditions, as noted above, there

was no consistently better treatment. It is reasonable that the treatments were too similar and therefore did not produce reliable differences. The base treatment condition, meant to be a control condition, actually had many viable and important smoking cessation methods incorporated into it. This was done so that if significant between condition differences were found it could be said that the added components (e.g., BS) added significantly to a solid base treatment package. The base treatment package was not just a "contact control condition" it was a viable treatment. From the results it appears that the viable base treatment package was responsible for much of the treatment gains, with the added treatment components (e.g., BS and NF) adding little beyond what the base treatment was responsible for. It is likely that little area for change was left for these added components to make a substantial difference on the outcome measures.

In retrospect, the treatment conditions differed, in terms of actual time of discussion of the additive factors, by only about 5-10 minutes per session. Only about 5-10 minutes per session were spent discussing either NF or BS with the participants in those conditions. That suggests that between 84 and 92% of the time spent in the sessions was spent discussing the base treatment components. This is one of the likely reasons for small effect sizes and low power. Further, the percentage of time estimates are probably too high because as the session progressed (i.e., sessions 4, 5, and 6) even less time was spent discussing the additive treatment components because the participants had been drilled on them and their importance earlier. For example, in session 4 the discussion of NF consisted of handing out the new "switch 3" sheets and making sure that everyone had been switching properly, perhaps a total of 2-3 minutes depending on the group members.

Discussion of group members is the final reason why the treatments are likely to be similar. Because these groups were not purely educational groups and required group discussion, this added variability to the treatment conditions. This is another reason for the low power and effect sizes. Group treatment outcome research is just "more messy." It should be noted that even if the consultants had an outline to follow, the group discussion did not always follow it to perfection. As noted by the consultant ratings of therapy topics, the additive components did come up in discussion in the other treatment conditions. Certainly, this is reasonable because these were individuals who had attempted to quit smoking before and had learned some valuable lessons over the years. Participants were quite open about what was or had been useful for them. Several participants in all groups had a history of using nicotine fading for smoking cessation. Several

participants in all the groups new that if they chewed gum, sucked on a lollipop, or chewed hard candy it helped them with their cravings. For these reasons, the treatment conditions were likely too similar to show measurable differences.

An additional consideration for explaining the results was that the behavioral substitutes may not have been used by the participants in that treatment condition. There is no specific data collected that show individuals used behavior substitutes other than anecdotal reports of behavior during sessions. Participants did use substitutes during sessions, as part of the modeling and practicing of behavioral substitutes. Also, participants verbally reported using the substitutes outside of the session to help control cravings. So it appears that participants used the substitutes that did not lead to a significant effect. It could be that the use of substitutes was too aggressively pushed on the participants. This may have led to some participants not using the substitutes outside of the sessions but reporting use. It also could have led to the belief that the substitutes would help but when in a craving state they may not have helped, which could have led to a decrease in belief that these substitutes help. There has been discussion of treatment matching in smoking cessation, mostly in terms of matching high and low dependent smokers with nicotine replacement or self-help programs (Niaura, Goldstein, & Abrams, 1994). This type of treatment matching also may be helpful in terms of using behavioral substitutes. From the anecdotal data from the participants it appears that some individuals were very interested in the use of substitutes, while others fit well with the biochemical explanation of nicotine fading. Certainly there are individuals who believe nicotine replacement therapies are the only thing that will help them. Perhaps the suggestion is that treatment matching should be emphasized, which may lead to improved rates of abstinence.

Change Scores and Study-Wise Error

The use of change scores is somewhat controversial because in because changes scores can limit findings produce different results from other analyses (i.e., ANCOVA) if ceiling or floor effects are present in the dependent measures. Further, regression to the mean of multiple measure scores could contribute to this problem. The use of change scores in this project occurred because they provided the best alternative given the combination of the data. Further, the results found in this study and exploratory analysis with ANCOVA procedures showed that change scores provided a consistent explanation of the data that fit the data well and did not affect the integrity of the data. A second important consideration was the correction of

study-wise error. This type of correction is typical when multiple of analyses are performed on the same data set. However, because this project was considered a pilot treatment study, study-wise error correction may have inappropriately negated the limited results of the study. For this reason, study-wise error correction was not performed and this lack of correction could have led to some erroneous results but it is unlikely that these results would have led to a different interpretation of the data.

Long-term Outcome and Abstinence

One of the most important factors is long-term outcome for the participants in this study. Long-term outcome, that is, successful abstinence for one year, is the outcome of interest for smoking cessation programs. Because this study was a dissertation, waiting an extra year for the "real outcome measure" was not feasible. For this reason, short-term measures were used to determine if the conditions differed as participants were going through their most severe symptoms of nicotine deprivation. This may or may not be related to long-term success rates. These experiences during quit week have been associated with long-term abstinence rates in the literature (Hajek, 1994). However, there may have been ceiling effects on the treatment measures, meaning that the participant scores were too bunched together at the higher levels of the outcome measures. This was likely the case for QSU and NAS scores, where both showed participants scores consistently in the upper ranges during quit week. The long-term outcome for these treatments will be analyzed but that was not the focus of this study. It may be that the treatments show differential effects over time but given the inconsistency of results during quit week that is not likely.

One of the unexpected results in this study was the lower than expected abstinence rates. Anecdotal abstinence rates during quit week are generally near 100% of participants are able to abstain from quit day to the end of the active treatment phase. There are no specific references for this because quit week abstinence rates are generally not considered outcome measures and are not reported in the literature. In this study it was expected that 90-100% of the individuals would be abstinent for the entire quit week. There may be several reasons for the lower abstinent rates in this study. First, the base smoking cessation program extensively discussed the abstinence violation effect and relapse prevention that may have put less pressure on the participants to "maintain abstinence." Second, the consultants and participants, consistent with relapse prevention, role-played and discussed slipping, perhaps in a way that did not properly express the importance of maintaining abstinence. Perhaps, by discussing relapse prevention this way, the participants

were able to report their lack of abstinence and returned to group after smoking, something the consultants preached, but did not receive the important message of maintaining abstinence. This is all speculation because there are no measures that were collected that would capture why the abstinent rates were lower than expected. The abstinent rates, because they were lower than the anecdotal rates during quit week, are one problem area of the project and have not been properly accounted for.

Pretreatment Factors

Clearly, the most important factor of these results were the clear differences between individuals who were able to abstain and those who were not. These two groups showed significant differences across nearly all smoking measures at pretreatment. Because abstinence appeared to be so clearly based on pretreatment levels (i.e., clear differences between those who abstained and those who did not) and because individuals who were successful abstainers were spread across the three conditions in relatively equal percentages (i.e., 55% to 69%) it is likely that these pretreatment factors were responsible for the lack of treatment effects. Put another way, individuals differed on certain variables before treatment and those variables were responsible for how successful they were in any of the three treatments. It would have been possible to control for these pretreatment differences by using covariance procedures but too many factors would have to have been in the covariance equations. This would have likely led back to the previous problems, that is, the treatments were too similar to produce meaningful differences.

Future Directions

There are several aspects that are exciting for smoking cessation research considering future directions. First, analysis of long-term outcome measures and abstinent data on the participants in this study will be important. Although this was not part of this dissertation project it could provide information about the quitting process and relevant factors in cessation. Long-term data could provide even more information in terms of pretreatment factors that make it more or less likely that individuals will be successful at abstinence. It also will provide information about how the treatments may produce differential benefits over time. For example, BSs provides people with a life long treatment, options that they can continue to use. The NF treatment is done once they quit smoking. These differences may lead to more beneficial outcomes for one treatment over the other in the long-term.

This research project had a significant amount of variance present because it was a group treatment

study. Perhaps a return to more controlled situations would help clear up the benefits of behavioral substitutes for smoking cessation. Current projects are ongoing at this time investigating how chewing gum affects symptoms of nicotine deprivation and craving to smoke. Further, BE studies that look at how individuals respond to different UPs when gum is available. These studies will help provide more information about the potential power of behavioral substitutes in different situations for smoking and smoking cessation. At this time it appears that behavioral substitutes do not add significantly or are not sufficiently powerful to change treatment outcome. Given the variance present in this study, a laboratory study could provide more specific answers to these questions.

A final area of research that would provide meaningful additions to the literature is how the combination of behavioral substitutes with nicotine replacement therapies affects treatment outcome. This combination of treatments might be effective at addressing both the behavioral withdrawal symptoms of smoking and the withdrawal symptoms due to nicotine deprivation. This combination could add meaningfully to the treatment program.

Contribution to the Literature

The results of this study makes several contributions to the literature. One contribution consistent with recent reports (Skaar et al.,1997) was that no one treatment was shown to be overwhelmingly or even significantly superior. The results of this study suggest, as has been the trend the last few years, that any treatment contact is somewhat effective at helping individuals quit smoking but none are shown to be considerably better than others in a consistent fashion. Next, this study does answer the question of whether the aggressive addition of behavioral substitutes to a standard comprehensive smoking cessation group program does not significantly improve the outcome rates and decrease the symptoms of withdrawal from nicotine that individuals experience. Finally, this study does suggest strongly that less dependent smokers are significantly more likely to be successful in a smoking cessation program. This finding is clearly consistent with previous reports on nicotine dependence (Hajek, 1991).

Summary and Conclusions

From this dissertation project it appears that the aggressive addition of behavioral substitutes to a standard smoking cessation program does not produce meaningful or consistent differences in treatment outcome. Although the rationale for the efficacy of substitutes is sound and supportive across several

theories (e.g., behavioral economics, learning theory) it was not shown to increase success rates or make the quitting experience easier as compared to a base smoking cessation program or a base program with nicotine fading. There are several possible explanations for this lack of findings. First, it is likely that the base treatment group was responsible for much of the treatment success and little was added by behavioral substitutes or nicotine fading. Second, pretreatment variables were largely responsible for individuals being able to abstain successfully during quit week. Finally, the variance that is inherent in group treatments was too great and contributed to low power and small effect sizes. In conclusion, it is clear that the aggressive addition of behavioral substitutes to this type treatment program did not significantly change treatment outcome. It is suggested that indivduals who are going through smoking cessation continue to use behavioral substitutes as one way to reduce the experience of withdrawal symptoms but the aggressive use of these substitutes does not add to smoking cessation programs.

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APPENDIX A

Smoking Cessation Manual

A 10-session, 5-week, group program to stop smoking

For Behavioral Topography Substitutes Dissertation Project

SESSION 1

Brief Session Outline:

I. Welcome/Introduction
II. Program Overview
- Structure of Program
- 3 Phases of Quitting
  -preparing to quit
  -target quit date
  -relapse prevention
- Group Rules & Guidelines

III. Get Acquainted Exercise.
IV. Self-monitoring
- wrap sheets
- general ways to reduce nicotine (all groups)

V. Special Group Topics
- Behavioral Substitutes - hand out bags
- Nicotine Fading - Switch 1

VI. Homework - Pep Talk

Measures: NAS, QSU, BAI, BDI, PANAS/POMS, Weight, & CO

I. Welcome/Introduction

A. Hand out name tags as clients come in.

B. Introduce yourself. Make sure you put your name and phone number on the board!

C. Let the clients know that you are glad they came and that it is important to take the first step which they have just done by coming to the group.

II. Program Overview

A. There is no magic to quitting, but many people have made this program work for them.

B. Structure of the program includes:

1. 10 sessions (9 beyond today), that take place two times a week for five weeks, plus phone contacts throughout the year to followup
2. Make sure you write out the dates that you will meet on the board, each occurs at the same time each week.
3. Note the quit date by putting a star next to it.

C. The program has **3 phases:**

1. **Preparing to quit** -- the first two weeks/4 sessions.
   a) This program deals with both the physiological and psychological aspects of smoking.
   b) Psychological aspects -- Smoking is a Habit
      1) Smoking is a learned habit that needs to be "unlearned."
      2) Emphasize skills training -- for both the short and long term. In essence there will be a retraining of habits.
      3) In order to change any habit, it takes learning and active planning, not just willpower. Therefore, throughout all aspects of the program, we will emphasize skills and techniques, readings, and homework.
2. **Target Quit Date** -- The next 4 weeks.
3. **Relapse Prevention** -- Second half of the program.
   a) Many people can quit for very short periods of time, but the important thing is to stay quit.

b. We will teach you ways to prevent relapse

D. Our program takes a commitment from you and a willingness towork.
   1. We offer a variety of techniques -- It is <u>your</u> responsibility to sample the techniques and practice the skills.
   2. Our more successful clients are the ones who have been willing to try our suggestions and practice.

E. The role of the counselor is that of a <u>consultant</u>, a person who works with you to find the most effective technique.

F. The role of the group is both unique and important.
   1. <u>Group Support:</u> means being constructive, caring, and noncoercive -- that is, you should learn from the others in the group.
   2. <u>The Ground Rules:</u>
      a) There will be equal time for all.
      b) ***You should call if you can't make the session.
      c) You should be on time.
      d) Things discussed/said in the group should remain confidential.
      e) In the sessions, there will be **NO SMOKING**!

III. Get Acquainted Exercise.

A. Facilitate support.

B. Get some background.

IV. Self-monitoring

A. <u>Baselining -- Wrap Sheets</u>.
   1. The first step in quitting is to learn about your habit. The best way to do this is to observe and keep a record of your smoking.
   2. Explain how to baseline using the wrap sheets.
      a) Need rating is optional.
      b) Go over problems with using the form, asking the group for suggestions (e.g. embarrassing, when driving) reframe comments.

B. <u>Reduction of Nicotine</u> (All Groups)
   1. reduce the number of cigarettes smoked
   2. leave longer butts on the cigs smoked
   3. Take fewer drags
   4. Inhale less deeply

Group Differences

Group 1: **(Standard Group)** Continue with discussion of educational aspects - group support
   1) Discuss the importance of self-monitoring in evaluating the individual's smoking habit.
   2) Self-monitor smoking until next session - this will provide us information about the individuals habit.

NF Group: Physiological aspects -- (Nicotine Fading/Brand Switching).

1) An important component to any addiction (and nicotine can be addicting) is the withdrawal that one experiences when he/she stops smoking. The symptoms associated with withdrawal might cause new ex-smokers to relapse and smoke again.
2) Nicotine fading is one way to lessen these withdrawal symptoms.
3) Nicotine fading involves the gradual withdrawal from nicotine. This is accomplished by having you switch to progressively lower tar and nicotine cigarettes each week.
4) Switch brands tommorrow - explain and determine each person nicotine level and explain the switch process.
5) Self-monitor
6) Explain Nicotine Fading in more depth
    1. An important component of any addiction (and nicotine can be addicting) is withdrawal symptoms when the addiction is stopped. Withdrawal symptoms often cause new exsmokers to go back to smoking.
    2. N.F. is one way to try to lessen withdrawal symptoms.
    3. N.F. involves the gradual withdrawal from nicotine.
        a) This is accomplished by having you switch to progressively lower tar and nicotine cigarettes each week.
        b) We want to have your nicotine intake at the lowest possible level just before your quit date.
        c) For some people, withdrawal may be unpleasant, and it's better to decrease nicotine intake in small steps.
    4. Decrease in steps:
        a) 30% reduction
        b) 60% reduction
        c) 90% reduction
    5. Give Example of how nicotine intake declines.
        a) Two parts of nicotine intake
            1) Number of cigarettes smoked
            2) Nicotine level of cigarettes smoked
        b) Even by smoking same number of cigarettes, but by switching amount of nicotine in each cigarette, intake declines.
    6. Some of you may already be smoking the lowest possible nicotine brand -- that's good.
        a) You may also want to try some of these suggestions (e.g., leave longer butts)
        b) You may also want to switch brands to one of the same level -- this changes taste and the smoking experience.
    7. Hand out Nicotine Fading Sheet and explain how to use them. They should start this week with Switch 1.

Sub Grp: **Introduce Substitutes (substitute Group)**: discuss one way to control urges is through providing substitutes

1) Hand out substitute bags
2) Discuss behavioral substitutes - one of the reinforcers of smoking - manipulation - mouth activity - deep breathing - gum chewing
3) Use these activities when you have the urge to smoke - these will help reduce the urges over the next two weeks.
    a) helpful to think of what purpose smoking has in each situation and then find an appropriate, functional substitute.
    b) e.g., if smoke to relax: substitute deep breathing; if smoke to have something to fiddle with; substitute worry beads, etc.
4) Self-monitor

All Groups

V. Homework.

A. This is an important step that is essential to quitting.
    1. If you don't do anything, you probably won't be successful.
    2. Each week we'll give you suggestions for what we would like you to do.
B. Self-monitor

VI. CO Testing - Important Reasons

A. For you -- to make you aware of byproducts -- see concrete evidence of improvements before and after.
B. For us -- important for us to be accountable about your success rates.
C. This verifies your smoking status. Reliably distinguishes between smokers and nonsmokers. Will do pre and post tests.
D. **Weigh-Ins.**
    1. Keeps track of your weight
    2. Helps us monitor you to preventweight gain.
E. **Send Off.**
    1. Thank clients for cooperation with tests.
    2. Good luck. See you all next week.

SESSION 2

Brief Session Outline:

I. Welcome/Introduction - go over wrap sheets as they enter
II. Brief Review of Session I
- Self-monitoring
- Small steps
- Review of Special Tasks
  -Nicotine Fading
  -Behavioral Substitutes
- Techniques to Reduce Nicotine

III. Habit Change
- belief and desire
- skill to change
- plan of action

VI. Self-management
- signal --> urge --> smoking
- common signals
- strategies for self-management (avoid and alter)

V. Small group task - identify signals from wrap sheets
VII. Homework - Pep Talk

Measures: NAS, QSU, & SCID-II Questionnaire

I. New Business

A. Give out name cards as clients come in
B. Collect weekly tally sheets
   1. Notice whether clients completed wrap sheets
   2. compliment them individually tally sheets are collected
   3. Tell them each week you'll be collecting the tally sheets
   4. Remind them that it is useful/helpful if they have them completed before group

II. Brief Review fo Session I

A. Quitting takes skill, planning, managing your environment; not willpower
B. There are many small steps to take before quitting to ensure your success.
   1. We'll be working on preparing you well
   2. You've already started the first major step -- learning about your smoking patterns
   3. We'll talk about the wrap sheets a little later
C. For this session strategies for change will be the focus
D. Discuss Each Groups **Special Task -** Nicotine Fading; Substitutes
   1. Nicotine Fading - check sheets to make sure people have switched cigarettes - Next switch will occur during the next group
   2. Substitutes - complement people on bringing their bags to session - have extras available
E. Number of ways to reduce your nicotine intake - leave longer butts - inhale less deeply - smoke fewer cigarettes - timed puffs - change the topography of your smoking

III. Getting Started -- Habit Change.

A. Any habit change has 3 critical ingredients:

1. Belief and desire that you can change.
2. Skill -- desire is not enough, you need to know how.
   a) You will learn skills for not smoking.
   b) You will examine your smoking pattern and learn ways to change them.
3. Devise action plan
   a) Small steps -- most people just see the end goal of quitting, but it is important that you see the steps that are in between.
   b) Self reward.

IV. Self-Management: Devising Strategies

A. First step in changing your habits, is finding out more specific information about it. You did this with the wrap sheets.

B. Signals - tie in wrap sheets

1. urges to smoke don't come out of thin air but are associated with specific situations and events.
2. Everyone has unique smoking patterns, and we'll start to identify the patterns
3. **Signals ------> Urge ------> Smoking**
4. Signals could be
   a) social situations - at a bar or party
   b) physical circumstances - driving in a car
   c) behaviors or other people - you are with a friend who you always smoke with
   d) feeling or thoughts - you feel tired, stressed, or depressed
5. Generate a list of signals on board - - have group look at their wrap sheets and come up with some signals
6. Next - Generate a list of nonsmoking signals. May want to capitalize on nonsmoking signals

C. Strategies - to help disrupt pattern and to put smoking under you control.

1. Avoid situations
   a) e.g., avoid smoking friends, bars, drinking coffee, etc.
   b) problably the most powerful strategy, but may not always be the most practical (e.g., if you smoke at work, can't avoid work).
2. Alter signal
   a) rearrange environment
   b) alter availability of smoking paraphernalia
3. Give examples of each and group generate examples
4. Refer back to list of signals and give examples (have group suggest) of strategies for coping with some of the signals

V. Small Group Task: Identifying Signals and Strategies

1. Tasks
   a. Identify 2 situations in which you smoke (look at wrap sheets)
   b. Come up with strategies for disrupting/changing those situations.
2. Reconvene and Debrief. Have each client pick a signal and corresponding strategy to report to the group.

VI. Wrap-Up and Homework

A. Next session: we'll continue to work on strategies for not smoking.

B. Goal for this week - - to experiment with disrupting your smoking pattern; be creative ; these are only temporary changes; come up with some fun ideas

C. Homework - - Keep wrap sheets - - Need to see if smoking patterns change

D. Good Bye Pep Talk

SESSION 3

Brief Session Outline:

I. Welcome/Introduction - go over wrap sheets as they enter
II. Review of Special Tasks
   - Behavioral Substitutes
   - Nicotine Fading: Switch 2
III. Brief Review of Self-management & habit change
   - signals
   - strategies
   - discuss plans of action
   - Discuss Opponent Process explanation of craving to highly the importance of changing the signals
VI. Cognitive Coping Strategies
   - self-talk advantages
   - common coping thoughts
   - getting a new perspective (cognitive restructuring)
V. Homework & pep talk
   - Start discussing quit day

Measures: NAS, QSU, & SOC

I. Business

Collect tally sheets

II. Review Group Topics

A. Substitutes - are they using them - replentish their supply - balls, straws, toothpicks, etc.

B. Nicotine Fading - Go to switch 2

1. Hand out switch 2 sheets
2. Are they smoking at least 3 different brands
3. emphasize smoking different brands

III. Review of Self-Management -- Habit Change.

A. Briefly review concepts of signals (e.g. urges to smoke associated with specific situations, feelings, thoughts) and strategies (avoid, alter, substitute, use nonsmoking signals).

B. Go over clients self-management forms and the situations and strategies they worked on during the week.

C. Have good discussion -- more brainstorming -- and problem solving; basic idea is for clients to gain control over situations by planning and being prepared.

D. Discuss / Explain - Opponent process theory and tolerance and why cravings may continue

IV. Cognitive Coping Skills -- Introduction

A. So far most of the strategies we've talked about involve things you can do to avoid smoking or to change signals.

B. Another useful strategy involves things you tell yourself (self-talk).

1. Advantages of "thought" strategies: they're portable, always with you, can be used in a variety of situations, and are covert (no one else knows what you are doing) -- so they are appropriate to use in many social situations, that you cannot avoid or alter.
2. Self-talk can include anything people might say to themselves to keep from smoking.

C. Go over common coping thoughts -- Ask group.
   1. Reasons for quitting
   2. Benefits of being abstinent
   3. Statements of determination ("I can do it!")
   4. Delay statements ("I don't need a cigarette now, I can wait 5 more minutes!")

D. Other kinds of self-talk involve getting a new perspective on the situation (i.e. cognitive restructuring).
   1. One way to get a new perspective on a situation in which the urge to smoke is strong is to redefine the craving.
   2. Steps to getting a new perspective:
      a) Identify source of stress or evaluate situation associated with the craving.
      b) Reevaluate the situation ("What's really going on? Is my problem or urge really that bad? What will smoking a cigarette do for me?").
      c) Redefine the situation and your reaction ("I don't want to smoke, I want to relax.")

VI. Wrap-Up and Homework

A. Nicotine Fading -- Switch 2

B. Hand out wrap sheets and tally sheets.

C. ***Talk about planning for quit date.

SESSION 4

Brief Session Outline:

I. Welcome/Introduction - go over wrap sheets as they enter
II. General Review of Strategies
- wrap sheets
- signals
- habit change
- opponent process - craving
- cognitive strategies
- special tasks
  - Behavioral Substitutes
  - Nicotine Fading: Switch 3

III. Lifestyle Balance
- Positive Addictions
- Scheduling pleasant activities
- change of routine

VI. Quit Day Discussion
- Quit day rituals
- Plan activities
- Plan rewards
- Small Group: plan the day

V. Wrap UP
- Be positive: show up whether you quit or not

Measures: NAS, QSU, BDI, BAI, LSS, & CO

I. Business

- Collect weekly tally sheets from everyone (even if they've quit)

II. General Review of Strategies

A. Over the past two weeks you've had practice implementing strategies, becoming aware of your habit, disrupting your pattern, and gradually getting used to lower levels of nicotine in your system. Remind People of basic strategies they've been using -- idea here is to start showing people progress they've made.

1. Keeping track of smoking -- wrap sheets
2. self-talk
3. Discuss **each conditions special technique**

III. Lifestyle Balance

A. Introduce idea of positive addictions as yet another strategy; particularly useful if stress is a smoking trigger.

B. Basic notion: when people are stressed out, tense, hassled, they tend to overindulge -- in eating, drinking, and in smoking -- one way of trying to achieve more of a balance or realize.

1. Important to develop alternatives to smoking; develop "positive addictions" that are rewarding, pleasant to do and provide balance.
2. Quitting smoking can be stressful -- if you have other pleasant activities to ease tension, you will have less of a need to smoke.
3. For others, smoking is a rewarding pleasant activity -- so it is important to replace with other pleasant activities.

C. Need to plan and schedule in pleasant activities; try to do so regularly

D. Changing life -- long habits in small steps. Don't want clients making too many changes at one time, but see if they can increase the frequency of pleasant activities they are already doing.

E. Ask group if any of them already have regular, positive addictions (e.g. exercise, time alone, recreation, etc...).

IV. Discussion of Quit Date - Motivating Clients for Quitting

A. Remind everyone that Quit Date is next week -- also remind them of small steps -- although we hope they're making the decision to quit for a long time, need only to think now about the first day, first week.

B. What clients have done in past to mark Quit Date -- give them normative information

1. Day varies for everyone, for some may seem easy; but for most, can be quite difficult -- change in energy level, irritability, thinking a lot about smoking, but also self-satisfaction
2. Night before rituals -- ritualistic burning, cleaning house, get rid of all smoking items, celebration, big smoke
3. Quit Day -- change routine, lots of substitutes, rewards, celebration

C. Ask group if they have any ideas for plans.

D. Rewards - this is a big lifestyle change -- need to be good to yourself; need heavy-duty rewards for making it through the day

E. Group Task: To devise a plan for each person for Quit Date

1. Have them think about what times will be hardest; what to do then; specific activities; planning
2. Positive self-statements and praise
3. Break day into small steps
4. Have group share plans, make public commitment

V. Wrap-Up

A. Next Week - work on getting you through first week of quitting - making sure you know how to stay quit

B. This week - HOMEWORK - keep working on smoking situations - getting practice at not smoking; firm up plans for Quit Date

C. N.F. -- Switch Level 3

D. Quit Date -- remember small steps; coach yourself through the day

E. GOOD LUCK!!!

F. Stress to come early next week -lots of questionnaires to fill out!

SESSION 5

Brief Session Outline:

I. Welcome/Introduction - collect wrap sheets - how did they do?
II. Quit Day Discussion
   - Rituals
   - Rewards
   - how do they feel
III. Go through the benefits of not smoking
   - health, self-esteem, aesthetics, and economics
IV. Discuss Withdrawal Sx - answer questions
   - common withdrawal sx
   - cravings - how long will they last (opponent process)
V. Wrap-up
   - Give them a pep-talk

Measures: NAS, QSU, SOC, BDI, BAI, IDD, SCL-90R, PANAS/POMS, CO, & Weight
Handout packets to take home: NAS, QSU, BDI, BAI, & PANAS/POMS

I. Business

A. As clients come in, greet them, ask how their day went to find out if they quit.
B. Collect tally sheets; note if the client has quit
C. Must get COs and Weight from everyone
D. Get people started on questionnaires

II. Quit Date Discussion

A. Quit Date rituals, celebrations. Did clients carry out plans? Have everyone report on how the day went thus far.
B. How past member have dealt with Quit Date:
   1. Rewards: lots of things for mouth (e.g., lots of water, celery, carrots, fresh ginger, cloves, cinnamon, toothpicks)
   2. Start Exercising
   3. Go to lots of nonsmoking places with nonsmokers
   4. Use your lungs
   5. Have your teeth cleaned
   6. After meals use mouthwash or go for long walks
C. General Discussion of Quit Date - How has it gone for group members

III. Benefits of Not Smoking

A. Health Benefits: Improved general health; avoid lung and other cancers; heart disease; emphysema; bronchitis; increased stamina; lungs do clear out after several years; health benefits to partners/friends/children/co-workers; fewer teeth and mouth problems; fewer accidents, especially fires
B. Self-esteem: I'm free / I can do it
C. Aesthetics: food tastes better, smell better, clothes smell better
D. Economics

IV. Withdrawal

A. Symptoms are temporary, vary individual by individual. Not everyone has withdrawal symptoms. They can monitor what they might be feeling.

B. Don't use withdrawal symptoms as an excuse to go back to smoking. Smoking a cigarette will not ease the symptoms, but only make them worse at this point.

C. Warn people that they are now more sensitive to changes in their life. Tendency to attribute everything to stopping smoking -- but not true. Give people framework for anticipating things they are going through.

D. Common misconception -- Craving goes on forever!!!

1. One possible resumption thought -- "All I think about is cigarettes or trying not to smoke. It's taking up all of my time. In need to get on with my life, I can't keep this up."
2. Combat this thought.
3. Actually, withdrawal symptoms subside after the first 2 weeks. Sometimes the intensity of cravings may remain constant, but their frequency diminishes. Craving is not an indication of no progress. Cravings occasionally return, but for very brief duration.
4. Cravings are not constant. They last only about 3-5 minutes.

V. Wrap-Up

A. Remind clients to take one day at a time (or even smaller steps); use thought cards

B. Congratulate everyone!!!!

C. Next week we'll work on individual high risk situations

D. Stress importance of attending final 5 sessions - for everyone!

E. **For individuals who did not quit --- set new quit date.**

F. Questionnaires

SESSION 6

Brief Session Outline:

I. Welcome/Introduction - UP BEAT
II. Review of Strategies
- what strategies are people using
- how are they working
- tie them into a discussion of the week

III. Relapse Prevention
- Planning
- High-risk situations discussion
- Identify some high risk situations (small groups?)

IV. Implementing Cognitive Coping Strategies
- covert rehearsal
- fire escape analogy
- small group discussion of individual strategies

V. Wrap-up
- think ahead and prepare - don't give in

Measures: NAS, QSU, BDI, BAI, PANAS/POMS, & CO

I. Business

A. Have clients complete tally sheets.

B. Overall tone of session should be up. Give pep talk. This is a big effort. Exciting time. Positive things are happening. It may seem difficult now, but remember to take things in small steps. Encourage clients to hang in there.

C. Provide all groups with Substitutes - to help them through the withdrawals, etc.

II. Review

A. takes active planning

B. important to think preventatively

C. skills from before - need then now - keep using them

D. Have general discussion about the week.

1. What were your successful with? Hard spots?
2. If someone slipped, problem-solve around the incident.

III. Relapse Prevention (RP): How to remain an ex-smoker

A. RP is useful to <u>all</u> (even for those who haven't actually quit - these are additional strategies to help you now and for when you do quit)

B. Quitting is a big achievement, but the battle isn't over yet; staying quit will take a lot of work, active coping and especially <u>planning</u>; prevention is the key idea here.

C. Brief Introduction to High Risk Situations

1. Similar principles as in first half of program:
   a) Planning is the key
   b) Your urges to smoke do not come out of thin air, but there are certain situations (used to call these signals), where you are at high risk for giving in to the urge and smoking.
   c) We'll be practicing dealing with these high risk situations.
   d) Today we'll just briefly touch on high risk situations and will spend more time on them next week.
2. First Step: identifying high risk situations. (they're experts on this)
   a) where they've relapsed in past - ask group
   b) from wrap sheets - most difficult situations / signals
   c) from our research findings of common high risk situations
      1) situations involving negative emotional states (anger, depression, and frustration)
      2) alcohol
      3) when others are smoking (smoking cues)
   d) From Introspection:
      1) How would you answer this question: "If I were to start smoking again on the spur of the moment..."
      2) Be specific: where? when? with whom? feeling how? thinking? doing?
      3. This week, keep using the same strategies you've used to deal with high risk situations, but plan for them each day. Ask group if they know of a high risk situation that's coming up this week and want help with.

IV. Implementing Coping Strategies

A. Knowing what to do is not enough; need to know how to use strategies Covert rehearsal

B. Dry run in your head - think of task like a movie; you're the director and the finale should be what you want (cigarette is not the director - DON'T let cigarettes control you).

C. In using covert rehearsal, emphasize the importance of imagining detail: where, when, with whom, what will be happening, how they will cope, being successful.
   1. If you use detail, when you're in the situation, it will seem like you've been there before.
   2. Coping is more automatic.

D. Fire escape analogy. Find exits in your mind. Imagine yourself walking route to safety.

V. Wrap-Up

A. Plan to use strategies; be prepared; think ahead

B. Importance of next week. Must come. Support from group and wrap up of skills. Get commitment from people that they'll be there.

C. Reward yourself. Good luck this week!

SESSION 7

Brief Session Outline:

I. Review of Past Week and Strategies
   - How have people done
   - What strategies have they used
   - What's worked

II. Managing your thoughts
   - Resumption Thoughts
   - Have group identify common resumption thoughts
   - How to control your thoughts
   - How to use these strategies
   - Handout of Resumption Thoughts and Strategies

III. Wrap Up

Measures: NAS, QSU, SOC, & CO

I. General Review of Strategies and Check-in

A. Has anyone smoked

B. How have they dealt with their nonsmoking status

C. Have they slipped

II. Managing Your Thoughts

1. Sometimes strong urges and high risk situations do seem to come out of thin air - not ones that you would have predicted -- At these times, strong urge due to the culmination of thoughts about smoking ("resumption thoughts") can undermine your behavior and put you in a high risk situation (thoughts can be signals).
2. Have group identify their resumption thoughts - put on board. (Ask people who have slipped what they were thinking about before the slip).
   a) nostalgia
   b) testing self
   c) crisis
   d) unwanted changes
   e) self-doubts
   f) irrational "I'll die anyway"
3. Strategies for Controlling Thoughts (willpower - managing your thoughts in a critical situation)
   a) challenge - confront logic (good for nostalgic thoughts)
   b) benefits of nonsmoking
   c) remember unpleasant / embarrassing times smoking
   d) distractions and pleasant thoughts
   e) self-rewarding thoughts
   f) for unwanted changes - some may occur - some irrational - most go away with time
   g) as soon as thought pops up - confront it - don't let them build up

4. How to Use Strategies
   a) priming
   b) cues
   c) index cards with positive thoughts posted around
   d) although you are now sensitive to your resumption thoughts and hopefully can combat them as they come up, some may still build up, so good strategy is to tip balance in favor of nonsmoking thoughts - each day/hour remind yourself of positive, nonsmoking thoughts
   e) hand out index cards for clients to write down their own personal positive thoughts and benefits. Anyone have suggestions for others?

Common Resumption Thoughts and Strategies

Thought	Stategy
One won't hurt.	Admit the challenge.
I can have just one.	I don't need to test myself - one can hurt.
I really enjoy smoking.	Remember unpleasant / embarrassing times.
It used to be so nice to smoke and relax / be with friends / have a beer.	Confront logic. Relaxing was good / being with friends was good. They can still be good without smoking.
I'll probably die in a car crash anyway.	Improvements in quality of life - think of the benefits.
It's too much work; I can't handle it.	Think: Do I really want to go through this again? Time projection.
Smoking will help me get through / cope with (something) better.	Confront Logic: cigarettes don't have any magical coping power; many competent nonsmokers / some nonsmokers cope just fine.
I don't want to be fat.	May gain a few pounds - but can handle that later - just a temporary thing.
I'm too irritable - everyone hates me!	Just temporary - warn people.
	General Thoughts to Use: I'm free! I'm proud of myself! I can do it!

III. Wrap UP

SESSION 8

Brief Session Outline:

I. Review of Past Week and Strategies
- How have people done
- What strategies have they used
- What's worked

II. SLIPS
- Discussion of past slips (situations and emotions)
- Abstinence Violation Effect
- What to remember about slips
  - guilt feelings will pass
  - providing you with information, need to work harder
- How to interpret a slip
- Slip index card

III. High risk situations
- Definition
- anticipate and planning
- common high risk situations
- how to handle high risk situations
- Situational narratives

IV. Wrap up

Measures: NAS, QSU, BDI, BAI, LSS, NAS (GEN), Therapist Rating, & CO

I. Review of Past Sessions

A. Positive / negative affect

B. Relapse Prevention

C. Slips

II. Slips

1. What if despite all your planning and effort you should slip and smoke a cigarette.
   a) Ask group: how do you think you'd fell?
   b) If someone has already slipped, ask them specifically how it felt
2. People usually feel guilty, disappointed, like they've blown it, and it's all over.
   a) This is common.
   b) In fact, they have a name for this feeling - the Abstinence Violation Effect (AVE - explain what it is)
3. Two things to remember -
   a) these feelings will pass
   b) there's another way to interpret a slip

4. How you interpret slip is important.
   a) Interpret it just as a mistake.
   b) The important thing is to learn from the slip and not continue to smoke. Get back in control. One slip is not a relapse . Many people have an occasional slip but still remain an ex-smoker.
   c) You too can if you avoid self-defeating reactions to your slip. A slip is an indicator of where you need to do more planning.
   d) Use the ideas we've discussed to avoid further smoking.
5. suggest to group that they make their own special "slip" index card. Write on the card that one slip is not a relapse. They are not failures. Take approach of stop, look, and plan.

III. High Risk Situations

A. Define = any situation in which a slip is likely to occur.
B. Coping is easier if you ANTICIPATE these situations and plan strategies to deal with them. PLANNING is the key.
C. A lot of the situations whcih trigger a strong urge to smoke can be identified from your wrap sheets; from places you've slipped or relapsed in the past.
D. Common areas in which people slip:
   1. Anger/frustration - negative emotions (depression)
   2. Alcohol
   3. Smoking Cues
   4. Celebration
E. Relapses don't just occur out of thin air. Most people have a pattern. They can probably guess at their own pattern by now. Remember forwarned is forearmed!
F. General strategies for coping with high risk situations:
   1. Thought management
   2. Avoiding high risk situations
   3. Escape -- leave the situation
   4. Distration -- cognitively or behaviorally
   5. Delay
   6. Slow deep breathing to relax
   7. Getting support from others
   8. Treating yourself with rewarding or comforting activities
G. Go over situational narratives with group and come up with plans

SITUATIONAL NARRATIVES - HIGH RISK SITUATIONS

Negative Affect

1. You've just picked up your car from the mechanic and the bill is twice as much as you expected it to be. As you drive home you find that the very thing you took the car in for is still not fixed. The car stalls in rush-hour traffic. You feel angry and frustrated; you crave a cigarette.
2. Your boss has been pressuring you to finish the project you've been working on. You know you'll be pressured all day. A cigarette might ease the pressure so that you could work better.

Positive Affect

1. You're at a party with friends. People are smoking and drinking. You're having a glass of wine and intense conversation. You always used to have a cigarette with your drink. It looks good.
2. You've just finished dinner and you're feeling relaxed. You push back your chair and suddenly, you really crave a cigarette.

Neutral Affect

1. You are home alone. You feel bored. There isn't anything you have to do, and nothing you think of seems particularly appealing - except maybe a cigarette.
2. While waiting at the market checkout stand, you find yourself next to the cigarette stand and you notice that the market carries your old brand of cigarettes. Boy, do those cigarettes look good -- you can almost taste one!

IV. Wrap up

SESSION 9

Brief Session Outline:

I. Review of Past Week and Strategies
   - How have people done
   - What strategies have they used
   - What's worked

II. Problem Solving
   - General Disccussion - Come up with specific solution for individuals
   - Stress Management
   - Assetiveness
   - Use and Prepare Social Support

III. Using Cognitive Strategies (review)
   - Resumption Thoughts
   - Review strategies - commands, priming, etc.

IV. Wrap up

Measures: NAS, QSU, BDI, BAI, SOC, & CO

I. Review of Past Weeks Information

II. Problem-Solving

A. Have general problem-solving discussion of how things are going with strategies. What are group members having problems with? Be <u>specific</u> in coming up with solutions. Try to address everyone. As needed and appropriate, discuss the following strategies:

1. <u>Stress Management Techniques</u>
   a) deep breathing
   b) tension checks
   c) relaxation
2. <u>Assertiveness</u>
   a) appropriately asking for help; use of I statements
   b) requests of other not to smoke
   c) I am trying to quit. No thank you. I'm trying not to smoke. It's difficult for me to be around smokers right now, could you please not smoke.
3. <u>Use of Social Support</u>
   a) Identify helpful others (someone you can call to talk through urges; someone to celebrate with you; someone to cheer you on
   b) Avoid unhelpful others (those who nag, police, make light of your efforts, don't understand the effort)
4. <u>Cognitive Strategies</u>
   a) self-talk
   b) self-instructional techniques

III. Managing Your Thoughts (Review and Revisit)

1. Beware: thoughts and feelings can undermine your behavior. Important to manage your thoughts.
2. Ask group if they had any resumption thoughts during the week. What were they? Review thoughts mentioned in group (e.g., it isn't worth it; self-doubt crisis; unwanted changes; testing yourself)

3. Review strategies - review and ask group what they used (e.g., challenge, benefits, unpleasant smoking times; self-rewards; pleasant distractions).
    a) Giving yourself commands ("Don't do it!" "Stop!")
    b) Encouraging yourself (C'mon, you can do it)
    c) Reminding yourself how hard it was to quit in the first place.
    d) Telling yourself: I don't really want to smoke
    e) Imagining something relaxing, like a favorite spot.
    f) Imagining yourself as a successful ex-smoker.
    g) Going over your reasons for quitting
    h) Telling yourself "I just need to get through the next few days."
    i) Imagine your friends' or family's reactions if you were to smoke.
4. Use priming cards
5. One type of thought: SLIP ----- RELAPSE (use AVE card)

V. Wrap Up

A. Stress Attendance

B. Stress Activity Planning

SESSION 10

Brief Session Outline:

I. Review of Past Week and Strategies
   - How have people done
   - What strategies have they used
   - What's worked

II. Weight Control / Reduction
   - Don't use as excuse to smoke
   - Reasons you gain
   - Ways to avoid gain and to lose

III. General Problem Solving Discussion
   - Discuss specific solutions to problems

IV. Review Relapse Prevention
   - continue to work at becoming a non-smoker
   - identify high-risk situations
   - be aware of resumption thoughts

V. Develop a Maintanence Kit/Strategy
   - Continue to assess yourself
   - Assess you much better you feel
   - work at developing non-smoking activities

VI. Wrap up: Remind them about followup; return deposits

Measures: NAS, NAS (GEN), QSU, IDD, BDI, BAI, LSS, SCL-90R, PANAS/POMS, SOC, CO, & weight

I. General Discussion: How are people doing?

II. Weight Control

A. Some people may have concerns about gaining weight.
   1. In fact, it's not uncommon for women who quit smoking to gain 2-3 pounds, rarely more.
   2. First good to get smoking under control, before working intensely on weight control. (NOT everyone gains).
   3. DON'T USE AS EXCUSE TO GO BACK TO SMOKING.

B. Reasons people may gain weight:
   1. use of food substitutes
   2. use food to deal with tension, negative emotions
   3. change in taste, smell -- food becomes more appetizing
   4. some people report increased craving for sweets

C. Ways to avoid weight gain
   1. Many of the strategies and principles of smoking control apply to weight -- self-monitoring, self-management, cognitive strategies
   2. Self-Monitoring makes you aware and you are more likely to keep eating in check
   3. Some suggestions for now - handouts - you may want to use these in the future
   4. **EXERCISE** is the best way to prevent weight gain after quitting smoking -- changes metabolism and makes you more efficient at burning calories

D. Don't have people make too many lifestyle changes at once.
   1. Give them an orientation, problem-solving approach to the weight control.
   2. Remind them that we'll be following them monthly after the groups end and will deal with weight concerns also during that time.

III. General Problem-Solving Disscussion

A. How are people doing

B. What areas are they having difficulties

IV. Review Relapse Prevention.

A. Emphasize the importance of continuing to work on being ex-smokers. Don't let up now!

B. Discuss high risk situations.

-Did they experience any?

-Did they use strategies as planned?

-What about when they get stuck: Brainstorming strategies

-Ask group, what has worked best - come up with menu of alternatives

C. Managing your thoughts

1. Good all around strategy - use all the time
2. Challenge resumption thoughts
3. Remind yourself of positive thoughts

D. Utilize appropriate social support

V. Maintenance Kit

A. Ongoing assessment / planning / using strategies is important

B. Pay attention to your urges (track them). Try to notice patterns and plan for them.

C. Hand out list of strategies for quitting. Keep this handy to remind themselves of possible ways to cope.

VI. Wrap up

A. Congratulations to everyone.

B. Will be contacted at 1, 2, 3, 6, 12 month anniversaries

C. Will try to get group back together at 6 months

D. CO testing and weigh-ins

<u>Things to tell yourself</u>

- think that by quitting your health will improve
- encourage yourself
- take a positive attitude
- feel good because you've done this
- pat yourself on the back
- think about significant others who will be proud of you
- think about grief from family / friends if you relapse
- think that others will know if you smoke
- think that you don't feel well when smoking
- think about not being able to breath deeply when you were smoking
- think that the smell is offensive
- think that your mouth tastes like a garbage can when you smoke
- think that smoking tastes bad
- tell yourself that smoking is disgusting
- tell yourself that it's not worth it to have a cigarette
- think about the money you're saving
- think about using the money for something else

- tell yourself: "I'm a nonsmoker"
- Think: "I don't need them"
- keep telling yourself that you don't really want to smoke
- remind yourself that cigarettes are not a solution to problems
- think that smoking really won't improve anything
- think: "one day at a time" or "one minute at a time" if necessary
- remind yourself of why you want to quit
- think that if others can quit smoking, so can you
- tell yourself "NO" when tempted to smoke
- actively push thoughts about smoking out of your head
- keep your mind busy
- think: I've got to this point, it isn't worth blowing it
- think: I don't want to go through this again
- think: It will get easier
- think: The longer I go without smoking, the easier it will get
- If you slip, remember: it is not the end of the world. Don't smoke the next one. One cigarette does not mean complete relapse. Pick yourself up and start over again. Tell yourself that you can do it.

Nicotine Fading Switch 1: Handouts

High Group - Switch 1

Non-menthol

Camel King SoftPack Lights
Doral King SoftPack Lights
Marlboro King HardPack Med
Winston 100 SoftPack Lights
More 100 HardPack Lights

Menthols

Cambridge 100 SoftPack Lights
Doral King SoftPack Lights
Kool King HardPack/SoftPack
Newport 100 SoftPack Lights
Salem 100 HardPack Lights

Mid Group - Switch 1

Non-menthol

Cambridge 100 SoftPack Ultra-Lights Low Tar
Carlton 120 SoftPack Lights
Merit King HardPack Ultra-Lights
Vantage King HardPack/SoftPack Ultra-Lights
Winston King HardPack Ultra-Lights

Menthols

Carlton 120 SoftPack Lights
Kool King SoftPack Ultra-Lights
Merit 100 SoftPack Ultra-Lights
Misty Slims 100 HardPack Ultra-Lights
Salem 100 SoftPack Ultra-Lights

Low Group - Switch 1

Non-menthol

Bristol 100 SoftPack Low
Cambridge 100 SoftPack Low
Carlton 100 SoftPack Lights
Merit 100 HardPack/SoftPack Ultima
Now 100 SoftPack

Menthols

Carlton 100 SoftPack Lights
Kool King SoftPack Ultra-Lights
Now 100 SoftPack
Carlton 100 HardPack Lights
Now King SoftPack

Nicotine Fading Switch 2: Handouts

High Group - Switch 2

Non-menthol

Cambridge 100 SoftPack Ultra-Lights Low Tar
Carlton 120 SoftPack Lights
Merit King HardPack Ultra-Lights
Vantage King HardPack/SoftPack Ultra-Lights
Winston King HardPack Ultra-Lights

Menthols

Carlton 120 SoftPack Lights
Kool King SoftPack Ultra-Lights
Merit 100 SoftPack Ultra-Lights
Misty Slims 100 HardPack Ultra-Lights
Salem 100 SoftPack Ultra-Lights

Mid Group - Switch 2

Non-menthol

Bristol 100 SoftPack Low
Cambridge 100 SoftPack Low
Carlton 100 SoftPack Lights
Merit 100 HardPack/SoftPack Ultima
Now 100 SoftPack

Menthols

Carlton 100 SoftPack Lights
Kool King SoftPack Ultra-Lights
Now 100 SoftPack
Benson & Hedges De-Nic 100 HardPack Lights
Carlton 100 HardPack Lights

Low Group - Switch 2

Non-menthol

Benson & Hedges De-Nic 100 HardPack Lights
Benson & Hedges De-Nic King HardPack Lights
Bristol King SoftPack Low
Cambridge King SoftPack Low
Carlton 100 HardPack Ultra-Lights

Menthols

Carlton 100 SoftPack Lights
Kool King SoftPack Ultra-Lights
Benson & Hedges De-Nic King HardPack Lights
Carlton 100 HardPack Lights
Now King SoftPack

Nicotine Fading Switch 3: Handouts

High Group - Switch 3

Non-menthol

Benson & Hedges De-Nic 100 HardPack Lights
Benson & Hedges De-Nic King HardPack Lights
Bristol King SoftPack Low
Cambridge King SoftPack Low
Carlton 100 HardPack Ultra-Lights

Menthols

Carlton 100 SoftPack Lights
Kool King SoftPack Ultra-Lights
Benson & Hedges De-Nic King HardPack Lights
Carlton 100 HardPack Lights
Now King SoftPack

Mid Group - Switch 3

Non-menthol

Merit King HardPack/SoftPack Ultima
Now King SoftPack
Carlton King Ultra-Lights
Now 100 HardPack
Now King HardPack

Menthols

Kool King SoftPack Ultra-Lights
Benson & Hedges De-Nic 100 HardPack Lights
Benson & Hedges De-Nic King HardPack Lights
Carlton 100 HardPack Lights
Now King SoftPack

Low Group - Switch 3

Non-menthol

Merit King HardPack/SoftPack ULightsima
Now King SoftPack
Carlton King Ultra-Lights
Now 100 HardPack
Now King HardPack

Menthols

Now 100 SoftPack
Benson & Hedges De-Nic 100 HardPack Lights
Benson & Hedges De-Nic King HardPack Lights
Carlton 100 HardPack Lights
Now King SoftPack

APPENDIX B

ASSESSMENT MEASURES AND CONSENT FORMS

Subject ID: Date: Session:

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by each symptom during the PAST WEEK, INCLUDING TODAY, by placing an X in the corresponding space in the column next to each symptom

	NOT AT ALL	MILDLY it did not bother me much.	MODERATELY it was very unpleasant but I could stand it.	SEVERELY I could barely stand it.
1. Numbness or tingling.				
2. Feeling hot.				
3. Wobbliness in legs.				
4. Unable to relax.				
5. Fear of the worst happening.				
6. Dizzy or lightheaded.				
7. Heart pounding or racing.				
8. Unsteady.				
9. Terrified.				
10. Nervous.				
11. Feelings of choking.				
12. Hands trembling.				
13. Shaky.				
14. Fear of losing control.				
15. Difficulty breathing.				
16. Fear of dying.				
17. Scared.				
18. Indigestion or discomfort in abdoment.				
19. Faint.				
20. Face flushed.				
21. Sweating (not due to heat).				

Subject ID:_____ Date:_____ Session:_____

INSTRUCTIONS: This questionnaire consists of 21 groups of statements. After reading each group of statements carefully, circle the number (0,1,2 or 3) next to the one statement in each group which **best** describes the way you have been feeling the **past week, including today**. If several statements within a group seem to apply equally well, circle each one. **Be sure to read all the statements in each group before making your choice.**

1. 0 I do not feel sad.
   1 I feel sad.
   2 I am sad all the time and I can't snap out of it.
   3 I am so sad or unhappy that I can't stand it.

2. 0 I am not particularly discouraged about the future.
   1 I feel discouraged about the future.
   2 I feel I have nothing to look forward to.
   3 I feel that the future is hopeless and that things cannot improve.

3. 0 I do not feel like a failure.
   1 I feel I have failed more than the average person.
   2 As I look back on my life, all I can see is a lot of failure.
   3 I feel I am a complete failure as a person.

4. 0 I get as much satisfaction out of things as I used to.
   1 I don't enjoy things the way I used to.
   2 I don't get real satisfaction out of anything anymore.
   3 I am dissatisfied or bored with everything.

5. 0 I don't feel particularly guilty.
   1 I feel guilty a good part of the time.
   2 I feel quite guilty most of the time.
   3 I feel guilty all of the time.

6. 0 I don't feel I am being punished.
   1 I feel I may be punished.
   2 I expect to be punished.
   3 I feel I am being punished.

7. 0 I don't feel disappointed.
   1 I am disappointed in myself.
   2 I am disgusted with myself.
   3 I hate myself.

8. 0 I don't feel I am any worse than anybody else.
   1 I am critical of myself for my weaknesses or mistakes.
   2 I blame myself all the time for my faults.
   3 I blame myself for everything bad that happens.

9. 0 I don't have any thoughts of killing myself.
   1 I have thoughts of killing myself, but I would not carry them out.
   2 I would like to kill myself.
   3 I would kill myself if I had the chance.

10. 0 I don't cry any more than usual.
    1 I cry more now than I used to.
    2 I cry all the time now.
    3 I used to be able to cry, but now I can't cry even though I want to.

11. 0 I am no more irritated now than I ever am.
    1 I get annoyed or irritated more easily than I used to
    2 I feel irritated all the time now.
    3 I don't get irritated at all by the things that used to irritate me.

12. 0 I have not lost interest in other people.
    1 I am less interested in other people than I used to be.
    2 I have lost most of my interest in other people.
    3 I have lost all of my interest in other people.

13. 0 I make decisions about as well as I ever could.
    1 I put off making decisions more than I used to.
    2 I have greater difficulty in making decisions than before.
    3 I can't make decisions at all anymore.

14. 0 I don't feel I look any worse than I used to.
    1 I am worried that I am looking old or unattractive.
    2 I feel that there are permanent changes in my appearance that make me look unattractive.
    3 I believe that I look ugly.

15. 0 I can work about as well as before.
    1 It takes an extra effort to get started at doing something.
    2 I have to push myself very hard to do anything.
    3 I can't do any work at all.

16. 0 I can sleep as well as usual.
    1 I don't sleep as well as I used to.
    2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
    3 I wake up several hours earlier than I used to and cannot get back to sleep.

17. 0 I don't get more tired than usual.
    1 I get tired more easily than I used to.
    2 I get tired from doing almost anything.
    3 I am too tired to do anything.

18. 0 My appetite is no worse than usual.
    1 My appetite is not as good as it used to be.
    2 My appetite is much worse now.
    3 I have no appetite at all anymore.

19. 0 I haven't lost much weight, if any, lately.
    1 I have lost more than 5 pounds.
    2 I have lost more than 10 pounds.
    3 I have lost more than 15 pounds.

20. 0 I am no more worried about my health than usual.
    1 I am worried about physical problems such as aches and pains; or upset stomach; or constipation.
    2 I am very worried about physical problems and it's hard to think of much else.
    3 I am so worried about my physical problems that I cannot think about anything else.

21. 0 I have not noticed any recent change in my interest in sex.
    1 I am less interested in sex than I used to be.
    2 I am much less interested in sex now.
    3 I have lost interest in sex completely.

FTQ/FTND

Subject Number: _____ Date: _____

1. How many cigarettes a day do you smoke? _____ *number*

2. What brand do you smoke? _____

Check one item from each column below that best describes your current brand of cigarettes:

Cigarette Type	Size	Taste	Package
[ ] Filter	[ ] Regular (Kings)	[ ] Regular	[ ] Soft Pack
[ ] Non-Filter	[ ] 100's	[ ] Menthol	[ ] Hard Pack
	[ ] 120's		

3. Do you inhale? NEVER SOMETIMES ALWAYS

4. Do you smoke more frequently during the first few hours after awakening than during the rest of the day? YES NO

5. How soon after you wake up do you smoke your first cigarette?
_____ *minutes*

6. Of all the cigarettes you smoke during the day, which one would you hate most to give up? _____

7. Do you find it difficult to refrain from smoking in places where it is forbidden, for example, in church, at the library, cinema, etc.? YES NO

8. Do you smoke if you are so ill that you are in bed most of the day? YES NO

FTQ/FTND Scoring Template

Question	FTQ Scoring	FTND Scoring
1. How many cigarettes do you smoke?	0 = 1-15 1 = 16-25 2 = 26+	0 = • 10 1 = 11-20 2 = 21-30 3 = 31+
2. What brand do you smoke? (nicotine yield)	0 = low 1 = medium 2 = high	N/A Not scored on FTND
3. Do you inhale?	0 = no 1 = sometimes 2 = always	N/A Not scored on FTND
4. Do you smoke more in the moring than during the rest of the day?	0 = no 1 = yes	0 = no 1 = yes
5. How soon after you wake up do you smoke your first cigarette?	0 = > 30 min 1= • 30 min	0 = > 60 min 1 = 31-60 min 2 = 6-30 min 3 = • 5 min
6. Which cigarette would you hate most to give up?	0 = not first 1 = first of the day	0 = not first 1 = first of the day
7. Do you find it difficult to refrain from smoking in places where it is forbidden, for example, in church, at the library, in the cinema. etc.?	0 = no 1 = yes	0 = no 1 = yes
8. Do you smoke if you are so ill that you are in bed most of the day?	0 = no 1 = yes	0 = no 1 = yes
FTQ and FTND Totals		

PANAS-X / POMS

Subject ID: Date: Session:

This scale consists of a number of words and phrases that describe feelings and emotions people experience. Read each item and then circle the appropriate number in the space next to that word. Indicate to what extent you feel this way today.
Use the following scale to record your answers.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

1 2 3 4 5 cheerful	1 2 3 4 5 sad	1 2 3 4 5 active	1 2 3 4 5 angry at self
1 2 3 4 5 disgusted	1 2 3 4 5 calm	1 2 3 4 5 guilty	1 2 3 4 5 enthusiastic
1 2 3 4 5 attentive	1 2 3 4 5 afraid	1 2 3 4 5 joyful	1 2 3 4 5 downhearted
1 2 3 4 5 bashful	1 2 3 4 5 tired	1 2 3 4 5 nervous	1 2 3 4 5 sheepish
1 2 3 4 5 sluggish	1 2 3 4 5 amazed	1 2 3 4 5 lonely	1 2 3 4 5 distressed
1 2 3 4 5 daring	1 2 3 4 5 shaky	1 2 3 4 5 sleepy	1 2 3 4 5 blameworthy
1 2 3 4 5 surprised	1 2 3 4 5 happy	1 2 3 4 5 excited	1 2 3 4 5 determined
1 2 3 4 5 strong	1 2 3 4 5 timid	1 2 3 4 5 hostile	1 2 3 4 5 frightened
1 2 3 4 5 scornful	1 2 3 4 5 alone	1 2 3 4 5 proud	1 2 3 4 5 astonished
1 2 3 4 5 relaxed	1 2 3 4 5 alert	1 2 3 4 5 jittery	1 2 3 4 5 interested
1 2 3 4 5 irritable	1 2 3 4 5 upset	1 2 3 4 5 lively	1 2 3 4 5 loathing
1 2 3 4 5 delighted	1 2 3 4 5 angry	1 2 3 4 5 ashamed	1 2 3 4 5 confident
1 2 3 4 5 inspired	1 2 3 4 5 bold	1 2 3 4 5 at ease	1 2 3 4 5 energetic
1 2 3 4 5 fearless	1 2 3 4 5 blue	1 2 3 4 5 scared	1 2 3 4 5 concentrating
1 2 3 4 5 disgusted with self	1 2 3 4 5 shy	1 2 3 4 5 drowsy	1 2 3 4 5 dissatisfied with self
1 2 3 4 5 friendly	1 2 3 4 5 tense	1 2 3 4 5 worn out	1 2 3 4 5 unhappy
1 2 3 4 5 clearheaded	1 2 3 4 5 confused	1 2 3 4 5 on edge	1 2 3 4 5 listless
1 2 3 4 5 peeved	1 2 3 4 5 considerate	1 2 3 4 5 sorry for things done	1 2 3 4 5 grouchy
1 2 3 4 5 anxious	1 2 3 4 5 panicky	1 2 3 4 5 hopeless	1 2 3 4 5 unworthy
1 2 3 4 5 spiteful	1 2 3 4 5 sympathetic	1 2 3 4 5 uneasy	1 2 3 4 5 restless
1 2 3 4 5 discouraged	1 2 3 4 5 fatigued	1 2 3 4 5 helpful	1 2 3 4 5 annoyed
1 2 3 4 5 unable to concentrate	1 2 3 4 5 resentful	1 2 3 4 5 miserable	1 2 3 4 5 muddled
1 2 3 4 5 bitter	1 2 3 4 5 exhausted	1 2 3 4 5 ready to fight	1 2 3 4 5 good-natured
1 2 3 4 5 gloomy	1 2 3 4 5 desperate	1 2 3 4 5 rebellious	1 2 3 4 5 uncertain about things
1 2 3 4 5 weary	1 2 3 4 5 bewildered	1 2 3 4 5 bushed	1 2 3 4 5 deceived
1 2 3 4 5 furious	1 2 3 4 5 efficient	1 2 3 4 5 trusting	1 2 3 4 5 full of pep
1 2 3 4 5 bad-tempered	1 2 3 4 5 worthless	1 2 3 4 5 forgetful	1 2 3 4 5 carefree
1 2 3 4 5 terrified	1 2 3 4 5 vigorous	1 2 3 4 5 helpless	

NAS-M (at this moment)

Subject #: _____ Date:_____ Session: _____

Directions: Please rate (circle) the degree to which each of the following descriptive words applies to you **AT THIS MOMENT**.

At this moment, I...	None	Mild	Moderate	Severe
1. Craving to smoke and/or chew/dip	0	1	2	3
2. Feeling irritable	0	1	2	3
3. Feeling anxious	0	1	2	3
4. Having difficulty concentrating	0	1	2	3
5. Feeling restless	0	1	2	3
6. Experiencing a headache	0	1	2	3
7. Feeling drowsy	0	1	2	3
8. Experiencing stomach pains and/or nausea	0	1	2	3
9. Feeling tired/fatigued	0	1	2	3
10. Feeling impatient	0	1	2	3
11. Feeling hungry	0	1	2	3
12. Feeling down/depressed	0	1	2	3
13. Feeling angry	0	1	2	3
14. Feeling frustrated	0	1	2	3
15. Feeling constipated	0	1	2	3
16. Feeling itchy	0	1	2	3
17. Did you have trouble sleeping last night?		YES		NO
18. Did you smoke today?		YES		NO

How long ago did you smoke your last cigarette (Months, Weeks, Days and Hours):
Months_____ Weeks_____ Days ____ Hours_____

Note: only enter hours if you smoked a cigarette today.

If you <u>smoked today/in the past week</u> please estimate how many cigarettes you smoked today?_____

In the past week?_____

Questionnaire of Smoking Urges

Subject #: _____ Date: _____

Session: Pre 1 2 3 4 5 6 7 8 9 10

Instructions: Please circle the number that indicates how strongly you agree or disagree with each statement. Note: 1= Strongly Disagree and 7= Strongly Agree

1 2 3 4 5 6 7	1. Smoking would make me feel very good right now
1 2 3 4 5 6 7	2. I would be less irritable now if I could smoke
1 2 3 4 5 6 7	3. Nothing would be better than smoking a cigarette right now
1 2 3 4 5 6 7	4. I am not missing smoking right now
1 2 3 4 5 6 7	5. I will smoke as soon as I get the chance
1 2 3 4 5 6 7	6. I don't want to smoke now
1 2 3 4 5 6 7	7. Smoking would make me less depressed
1 2 3 4 5 6 7	8. Smoking would not help me calm down now
1 2 3 4 5 6 7	9. If I were offered a cigarette I would smoke it immediately
1 2 3 4 5 6 7	10. Starting now, I could go without smoking for a long time
1 2 3 4 5 6 7	11. Smoking a cigarette would not be pleasant
1 2 3 4 5 6 7	12. If I were smoking this minute, I would feel less bored
1 2 3 4 5 6 7	13. All I want right now is a cigarette
1 2 3 4 5 6 7	14. Smoking right now would make me feel less tired
1 2 3 4 5 6 7	15. Smoking would make me happier now
1 2 3 4 5 6 7	16. Even if it were possible, I probably wouldn't smoke now
1 2 3 4 5 6 7	17. I have no desire for a cigarette right now
1 2 3 4 5 6 7	18. My desire to smoke seem overpowering
1 2 3 4 5 6 7	19. Smoking now would make things seem just perfect
1 2 3 4 5 6 7	20. I crave a cigarette right now
1 2 3 4 5 6 7	21. I would not enjoy a cigarette right now
1 2 3 4 5 6 7	22. A cigarette would not taste good right now
1 2 3 4 5 6 7	23. I have an urge for a cigarette
1 2 3 4 5 6 7	24. I could control things better right now if I could smoke
1 2 3 4 5 6 7	25. I am going to smoke as soon as possible
1 2 3 4 5 6 7	26. I would not feel better physically if I were smoking
1 2 3 4 5 6 7	27. A cigarette would not be very satisfying now
1 2 3 4 5 6 7	28. If I had a lit cigarette in my hand I probably wouldn't smoke it
1 2 3 4 5 6 7	29. If I were smoking now I could think more clearly
1 2 3 4 5 6 7	30. I would do almost anything for a cigarette now
1 2 3 4 5 6 7	31. I need to smoke now
1 2 3 4 5 6 7	32. Right now, I am not making plans to smoke

** This scale is adapted from (Tiffany & Drobes, 1991). Written permission to use this scale is not required if it is used for research purposes, according to authors.

Subject ID:_____ Date:_____ Session:_____

Instructions: Below is a list of problems people sometimes have. Please read each one carefully, and circle the number that best describes HOW MUCH THAT PROBLEM HAS DISTRESSED OR BOTHERED YOU DURING THE PAST 7 DAYS INCLUDING TODAY. Circle only one number for each problem and do not skip any items. If you change your mind, erase your first mark carefully. If you have any questions please ask about them.

Use the following scale for each question:
0=Not at all; 1=A little bit; 2=Moderately; 3=Quite a bit; and 4=Extremely.

0 1 2 3 4 1. Headaches
0 1 2 3 4 2. Nervousness or shakiness inside
0 1 2 3 4 3. Repeated unpleasant thoughts that won't leave your mind
0 1 2 3 4 4. Faintness or dizziness
0 1 2 3 4 5. Loss of sexual interest or pleasure
0 1 2 3 4 6. Feeling critical of others
0 1 2 3 4 7. The idea that someone else can control your thoughts
0 1 2 3 4 8. Feeling others are to blame for most of your troubles
0 1 2 3 4 9. Trouble remembering things
0 1 2 3 4 10. Worried about sloppiness or carelessness
0 1 2 3 4 11. Feeling easily annoyed or irritated
0 1 2 3 4 12. Pains in heart or chest
0 1 2 3 4 13. Feeling afraid in open spaces or on the streets
0 1 2 3 4 14. Feeling low in energy or slowed down
0 1 2 3 4 15. Thoughts of ending your life
0 1 2 3 4 16. Hearing voices that other people do not hear
0 1 2 3 4 17. Trembling
0 1 2 3 4 18. Feeling that most people cannot be trusted
0 1 2 3 4 19. Poor appetite
0 1 2 3 4 20. Crying easily
0 1 2 3 4 21. Feeling shy or uneasy with the opposite sex
0 1 2 3 4 22. Feelings of being trapped or caught
0 1 2 3 4 23. Suddenly scared for no reason
0 1 2 3 4 24. Temper outbursts that you could not control
0 1 2 3 4 25. Feeling afraid to go out of your house alone
0 1 2 3 4 26. Blaming yourself for things
0 1 2 3 4 27. Pains in lower back
0 1 2 3 4 28. Feeling blocked in getting things done
0 1 2 3 4 29. Feeling lonely
0 1 2 3 4 30. Feeling blue
0 1 2 3 4 31. Worrying too much about things
0 1 2 3 4 32. Feeling no interest in things
0 1 2 3 4 33. Feeling fearful
0 1 2 3 4 34. Your feelings being easily hurt
0 1 2 3 4 35. Other people being aware of your private thoughts
0 1 2 3 4 36. Feeling others do not understand you or are unsympathetic
0 1 2 3 4 37. Feeling that people are unfriendly or dislike you
0 1 2 3 4 38. Having to do things very slowly to insure correctness
0 1 2 3 4 39. Heart pounding or racing
0 1 2 3 4 40. Nausea or upset stomach
0 1 2 3 4 41. Feeling inferior to others
0 1 2 3 4 42. Soreness in your muscles
0 1 2 3 4 43. Feeling that you are watched or talked about by others
0 1 2 3 4 44. Trouble falling asleep
0 1 2 3 4 45. Having to check and double-check what you do

0 1 2 3 4 46. Difficulty making decisions
0 1 2 3 4 47. Feeling afraid to travel on buses, subways or trains
0 1 2 3 4 48. Trouble getting your breath
0 1 2 3 4 49. Hot or cold spells
0 1 2 3 4 50. Having to avoid certain things, places or activities because they frighten you
0 1 2 3 4 51. Your mind going blank
0 1 2 3 4 52. Numbness or tingling in parts of your body
0 1 2 3 4 53. A lump in your throat
0 1 2 3 4 54. Feeling hopeless about the future
0 1 2 3 4 55. Trouble concentrating
0 1 2 3 4 56. Feeling weak in parts of your body
0 1 2 3 4 57. Feeling tense or keyed up
0 1 2 3 4 58. Heavy feelings in your arms or legs
0 1 2 3 4 59. Thoughts of death or dying
0 1 2 3 4 60. Overeating
0 1 2 3 4 61. Feeling uneasy when people are watching or talking about you
0 1 2 3 4 62. Having thoughts that are not your own
0 1 2 3 4 63. Having urges to beat, injure or harm someone
0 1 2 3 4 64. Awakening in the early morning
0 1 2 3 4 65. Having to repeat the same actions such as touching, counting or washing
0 1 2 3 4 66. Sleep that is restless or disturbed
0 1 2 3 4 67. Having urges to break or smash things
0 1 2 3 4 68. Having ideas or beliefs that others do not share
0 1 2 3 4 69. Feeling very self-conscious with others
0 1 2 3 4 70. Feeling uneasy in crowds, such as shopping or at a movie
0 1 2 3 4 71. Feeling everything is an effort
0 1 2 3 4 72. Spells of terror or panic
0 1 2 3 4 73. Feeling uncomfortable about eating or drinking in public
0 1 2 3 4 74. Getting into frequent arguments
0 1 2 3 4 75. Feeling nervous when you are left alone
0 1 2 3 4 76. Others not giving you proper credit for your achievements
0 1 2 3 4 77. Feeling lonely even when you are with people
0 1 2 3 4 78. Feeling so restless you couldn't sit still
0 1 2 3 4 79. Feelings of worthlessness
0 1 2 3 4 80. The feeling that something bad is going to happen to you
0 1 2 3 4 81. Shouting or throwing things
0 1 2 3 4 82. Feeling afraid you will faint in public
0 1 2 3 4 83. Feeling that people will take advantage of you if you let them
0 1 2 3 4 84. Having thoughts about sex that bother you a lot
0 1 2 3 4 85. The idea that you should be punished for your sins
0 1 2 3 4 86. Thoughts and images of a frightening nature
0 1 2 3 4 87. The idea that something serious is wrong with your body
0 1 2 3 4 88. Never feeling close to another person
0 1 2 3 4 89. Feelings of guilt
0 1 2 3 4 90. The idea that something is wrong with your mind

Smoking History Questionnaire

Subject Number: _____ Date: _____

1. How many people live in your home? (not counting yourself):_____
2. How many smokers are in your home? (not counting yourself):_____
3. How many of your co-workers smoke:_____
4. Work smoking policy (select all that appy):
   a) Can smoke in my work area
   b) Can smoke inside building in designated areas
   c) Can smoke outside building

SMOKING INFORMATION

1. At what age did you begin to smoke cigarettes? _____
2. At what age did you begin smoking *regularly* (smoke every day)? _____ *years*
3. How many cigarettes do you now smoke on the average day? _____ *number*
4. How long have you been smoking at this rate? _____ *years*

5a. Did you smoke a *different rate* before this? YES NO

5b. If YES, what was your previous rate? _____ *number*

6. What is your current preferred brand? _____
7. How long have you been smoking this brand? _____/_____ *yrs/mo.*
8. Do you also smoke: *How much each day*
   a. Pipe .....YES NO _____
   b. Cigar .....YES NO _____
   c. Use chewing tobacco/snuff .....YES NO _____
9. How strong is your desire to quit smoking right now (*circle a number*)?
   1 2 3 4 5 6 7
   None at all Moderate Very Strong
10. FOR WOMEN: Are you pregnant.....YES NO
11. Please list any current health problems: _____
    _____
12. Has a doctor told you to stop smoking *for a specific medical reason* ..... YES NO

    If YES, what was that reason:_____
13. Please list medications you are currently taking:

Name of Medication/Drug	Quantity/Frequency	Reason Taken	Start Date to Finish Date

14. Have you ever tried to quit smoking before ..... YES NO

If YES, *what methods did you try (for example: cold turkey, hypnosis, cut down, filters, nicotine patch/gum), and how long were you off cigarettes?*

When (mo/yr)	Method You Tried	How Long Off Cigarettes

15. What is the *total number of times* you have been able to quit smoking for at least 24 hours when you were trying to quit? _____

16. What was the *longest period of time* for which you have ever quit smoking? _____

17. Have you ever used Nicorette® nicotine gum or patch (circle which)..... YES NO
    If YES, was it helpful ..... YES NO
    When did you last use it? ..... ____/____ (mo/yr)

18. What do you think is the major reason why you continue to smoke, or what you feel you "get out of it":_____

19. Why do you want to quit smoking at this particular time?_____
    _____

20. How did you find out about this Smoking Cessation Program?_____

21. Please check ***one*** of the following: [ ] I am here mostly because my doctor told me I need to quit
    [ ] I am here mostly because I have decided I need to quit
    [ ] I am here mostly because a family member or friend strongly encouraged me to quit

Life Stress and Support

Instructions: Please read the statement and circle the number underneath the question that corresponds to your life during that time period.

1. People often go through extremely difficult or stressful time (for example, divorce, illness, or death of a close relative). How much stress have you gone through over the past 6 months? (circle one number)

(0)	(1)	(2)	(3)	(4)	(5)
No Stress	Very Little Stress	Mild Stress	Moderate Stress	A lot of Stress	Extreme Stress

2. How well do you fell that you have handled or coped with stress over the past 6 months? (circle one number)

(0)	(1)	(2)	(3)	(4)	(5)
Very Poorly	Poorly	Fair	Pretty Well	Well	Very Well

3. How often have you been able to control the stress in your life over the past 6 months? (circle one number)

(0)	(1)	(2)	(3)	(4)	(5)
Never	Seldom	Sometimes	Often	Very Often	Almost Always

4. Who do you feel that you can count on for help or support? (Check ALL that apply)

[ ] No one [ ] Daughter [ ] Son [ ] Friend or Neighbor
[ ] Wife [ ] Husband [ ] Other (specify)_____

5. How satisfied are you with the amount of help or support that you've received from others over the past 6 months?

(-3)	(-2)	(-1)	(1)	(2)	(3)
Very Dissatisfied	Somewhat Dissatisfied	A Little Dissatisfied	A Little Satisfied	Somewhat Satisfied	Very Satisfied

6. How often have you felt sad or depressed over the past 1 month? (circle one number)

(0)	(1)	(2)	(3)	(4)	(5)
Never	Seldom	Sometimes	Often	Very Often	Constantly

7. How often have you felt nervous or anxious over the past 1 month? (circle one number)

(0)	(1)	(2)	(3)	(4)	(5)
Never	Seldom	Sometimes	Often	Very Often	Constantly

Rating of Therapy and Consultants

Subject #: _____ Date: _____ Session:_____

Instructions: Please circle the number that indicates how strongly you agree or disagree with each statement. Note: 1= Strongly Disagree and 7= Strongly Agree

1 2 3 4 5 6 7 1. These sessions have helped me quit or cut-down.

1 2 3 4 5 6 7 2. I felt the consultants were very supportive during the sessions.

1 2 3 4 5 6 7 3. I believe I received the best treatment.

1 2 3 4 5 6 7 4. I believe I am more able to cut-down or quit because of these sessions.

1 2 3 4 5 6 7 5. The group was very supportive.

1 2 3 4 5 6 7 6. It is very likely that I will not smoke (regularly) again.

1 2 3 4 5 6 7 7. I could not have quit smoking without these sessions.

1 2 3 4 5 6 7 8. I could not have quit smoking without the group's support.

1 2 3 4 5 6 7 9. I believe the consultants were knowledgeable about smoking cessation.

1 2 3 4 5 6 7 10. The consultants were not very interested in our groups' smoking cessation.

1 2 3 4 5 6 7 11. The consultants were not at all enthusiastic during our group.

12. Please rate the 3 most important topics covered in these groups. (Rate most important 1)

____ Self-monitoring of smoking

____ Brand-switching

____ Substitute behaviors (e.g., straws, gum)

____ Substitute activities

____ Relapse Prevention

____ Stress Management

____ Opponent-Process (i.e., why craving lasts so long)

____ Slips

____ Activity planning

13. If I could have added one thing to this group it would be (please write/explain):

_____

14. I would have liked to spend more time on (please write/explain):

_____

15. The most important / beneficial aspect of the smoking cessation sessions was (please write/explain):

_____

16. In my opinion, we spent too much time in the group covering (please write/explain):

_____

Therapist Rating for Session 1: Both therapists fill out one sheet immediately after the session
Group Number: _____
Please Circle:
Therapist: Dana Lee Laura Mike
Other:_____

Condition Standard Nicotine Fading Behavioral Substitutes

Rate the following questions concerning the topics discussed in the most recent group
0=not discussed; 1=discussed very briefly; 2=discussed with some detail; 3=discussed completely

0 1 2 3 Discussed nicotine fading/brand switching

0 1 2 3 Discussed self-monitoring/tally sheets

0 1 2 3 Discussed ways to reduce nicotine that are not detailed in nicotine fading-brand switching (e.g., fewer puffs, shallower puffs, leave longer puffs, etc.)

0 1 2 3 Discussed individuals smoking background

0 1 2 3 Discussed group rules

0 1 2 3 Discussed using behavioral topography substitutes to make not smoking easier

Yes No Were behavioral substitute bags handed out to group members

Yes No Were group members given nicotine fading/brand switching sheets

Yes No Were group members given self-monitoring / tally sheets

Therapist Rating for Session 2: Both therapists fill out one sheet immediately after the session
Group Number: _____
Please Circle:
Therapist: Dana Lee Laura Mike
Other:_____

Condition Standard Nicotine Fading Behavioral Substitutes

Rate the following questions concerning the topics discussed in the most recent group
0=not discussed; 1=discussed very briefly; 2=discussed with some detail; 3=discussed completely

0 1 2 3 Discussed nicotine fading/brand switching

0 1 2 3 Discussed self-monitoring/tally sheets

0 1 2 3 Discussed ways to reduce nicotine that are not detailed in nicotine fading-brand switching (e.g., fewer puffs, shallower puffs, leave longer puffs, etc.)

0 1 2 3 Discussed the three ingredients of habit change

0 1 2 3 Discussed self-management strategies

0 1 2 3 Discussed using behavioral topography substitutes to make not smoking easier

0 1 2 3 Discussed ways to disrupt your smoking habit

Therapist Rating for Session 3: Both therapists fill out one sheet immediately after the session
Group Number: _____
Please Circle:
Therapist: Dana Lee Laura Mike
Other:_____

Condition Standard Nicotine Fading Behavioral Substitutes

Rate the following questions concerning the topics discussed in the most recent group
0=not discussed; 1=discussed very briefly; 2=discussed with some detail; 3=discussed completely

0 1 2 3 Discussed nicotine fading/brand switching (switch 2)

0 1 2 3 Discussed self-monitoring/tally sheets

0 1 2 3 Discussed Tolerance and opponent-process in explanation of cravings

0 1 2 3 Discussed self-talk and cognitive coping strategies

0 1 2 3 Discussed using behavioral topography substitutes to make not smoking easier

0 1 2 3 Discussed plans for quit day

Therapist Rating for Session 4: Both therapists fill out one sheet immediately after the session
Group Number: _____
Please Circle:
Therapist: Dana Lee Laura Mike
Other:_____

Condition Standard Nicotine Fading Behavioral Substitutes

Rate the following questions concerning the topics discussed in the most recent group
0=not discussed; 1=discussed very briefly; 2=discussed with some detail; 3=discussed completely

0 1 2 3 Discussed nicotine fading/brand switching (switch 3)

0 1 2 3 Discussed self-monitoring/tally sheets

0 1 2 3 Reviewed Tolerance and opponent-process in explanation of cravings

0 1 2 3 Reviewed self-talk and cognitive coping strategies

0 1 2 3 Discussed using behavioral topography substitutes to make not smoking easier

0 1 2 3 Discussed lifestyle balance - (e.g., plan and schedule pleasant events)

0 1 2 3 Discussed plans for quit day

Therapist Rating for Session 5: Both therapists fill out one sheet immediately after the session
Group Number: _____
Please Circle:
Therapist: Dana Lee Laura Mike
Other:_____

Condition Standard Nicotine Fading Behavioral Substitutes

Rate the following questions concerning the topics discussed in the most recent group
0=not discussed; 1=discussed very briefly; 2=discussed with some detail; 3=discussed completely

0 1 2 3 Discussed self-monitoring/tally sheets

0 1 2 3 Discussed withdrawal symptoms

0 1 2 3 Reviewed self-talk and cognitive coping strategies

0 1 2 3 Discussed using behavioral topography substitutes to make not smoking easier

0 1 2 3 Discussed activity planning

0 1 2 3 Discussed quit day events

Therapist Rating for Session 6: Both therapists fill out one sheet immediately after the session
Group Number: _____
Please Circle:
Therapist: Dana Lee Laura Mike
Other:_____

Condition Standard Nicotine Fading Behavioral Substitutes

Rate the following questions concerning the topics discussed in the most recent group
0=not discussed; 1=discussed very briefly; 2=discussed with some detail; 3=discussed completely

0 1 2 3 Discussed continued self-monitoring (not of smoking) but thoughts about smoking

0 1 2 3 Discussed Relapse Prevention

0 1 2 3 Identified high risk situations for each group member

0 1 2 3 Discussed/introduced the use of behavioral substitutes to decrease cravings

0 1 2 3 Discussed how to indentify high risk situations

0 1 2 3 Discussed implementing coping strategies (e.g., covert rehearsal)

Consent Form Attachment
General Treatment Package

Below is a list of common components that are in the general treatment package. All individuals will receive all of these treatment components. Additional components may be included your group.

Individual Interview: Individual session that will include: (a) providing detailed information about the study in order to make informed decision about your participation; (b) reading and signing consent forms; (c) collecting background information and collecting psychological related measurements.

Week 1 Session 1: First group session with 8-10 individuals who also desire to quit smoking. All members in this group will be given a special task that will improve the ease of quitting on the quit day (session 5). This session focuses on training individuals in self-monitoring. Fill out self-report information on mood, affect, and withdrawal symptoms. Quit date three weeks away.

Session 2: Review self-monitoring data and fine tune cut-down task. Fill out self-report information on mood, affect, and withdrawal symptoms. Continue to self-monitor smoking for the next week. Learn additional information about people who are "successful quitters."

Week 2 Session 3: Review self-monitoring data and fine tune cut-down task. Fill out self-report information on mood, affect, and withdrawal symptoms. Prepare for quit date. Discuss urges, craving, and relaxation.

Session 4: Fourth groups session with same members. Review self-monitoring data and fine tune cut-down task. Fill out self-report information on mood, affect, and withdrawal symptoms. Prepare subjects for quit date, which is next session. Prepare quit day strategy. Continue to self-monitor smoking for the next week.

Week 3 Session 5: **Quit day**, group meeting with structured smoking cessation program. Collect self-monitoring data and fill out self-report information on mood, affect, and withdrawal symptoms. Start smoking cessation program with a variety of techniques that help control urges to smoke, deal with change in life, and reduce withdrawal symptoms.

Session 6: Continue to collect information and control urges to smoke. Additional smoking cessation components. Group support.

Week 4: Session 7: Continue to collect information and control urges to smoke. Learning cognitive-behavioral techniques to control urges to smoke.

Session 8: Continue to collect information and control urges to smoke. Revisit relaxation and stress management techniques.

Week 5 Session 9: Continue to collect information and control urges to smoke. Work on relapse prevention.

Session 10: Final session. Collect information and control urges to smoke. Work on relapse prevention. Answer any questions. Continue with relapse prevention.

Consent Form: Smoking Cessation Program

Frank L. Collins, Ph.D. & Michael E. Larson, M.S.

Participants should note that neither Oklahoma State University nor its researchers endorse or encourage continuation of smoking; rather, the purpose of this study is to research certain effects upon those who are currently smoking and those attempting to quit smoking.

"I, _____, hereby authorize or direct Dr. Frank Collins or associates or assistants of his choosing, to perform the following treatment or procedure."

You are being asked to participate in a research study which will look at adjuncts to smoking cessation therapy. This is a smoking cessation project, and as such you will receive smoking cessation therapy. To study different aspects of smoking cessation therapy we are comparing three different treatments, one of which you will be randomly assigned to. Everyone in your group will receive the same treatment. Individuals not in your group, but in this study, may receive a different treatment. This allows us to determine which treatments are most effective. Please do not discuss your treatment with individuals in other treatment groups.

During this study, you will be asked to attend one individual interview session, 10 group sessions, with 4 sessions before the target quit day and 6 sessions after the quit day. See consent form attachment that describes in more detail the sessions and topics.

Attendance in smoking cessation is very important and is highly associated with successful outcome. Further, attendance at certain group meetings is particularly important to the research study and successful smoking cessation. To improve attendance participants are asked to give us a deposit of $50.00 that will be returned to you when you have met your attendance requirements. This deposit to increase attendance and is only dependent on attendance, it is not in any way affected by whether you are successful at quitting or not. The deposit will be handled in the following way, you will write a check for $50.00 to the Psychological Service Center. This check will not be cashed and will be returned to you when the attendance requirements have been met. **The attendance requirements are**: (1) Attend 3 of 4 session before the quit day, including session 1 and (2) Attend 5 of 6 sessions post quit day sessions, including session 5 (quit day) and session 10. If a participant wishes to withdraw his/her consent for the research/treatment program or quit the treatment/research altogether, the deposit will be returned to him/her at that time.

All information obtained during the study will remain confidential. Records will be coded by number and your name will be removed or blackened out on any of the forms other than this consent form. As part of the interview process you will be asked questions about some sensitive information, as required by law we must report any information concerning threat of harm to yourself or others, and where child abuse is suspected to the proper authorities. Other than those aspects all information is completely confidential because you are officially a client of the Psychological Service Center of Oklahoma State University. The only individuals who will have access to this data are Dr. Frank Collins and the research assistant(s) conducting the project with you. The nature of this study and the information provided by your participation will not be revealed.

Consent Form: Smoking Cessation Program (Continued)

This is done as part of an investigation entitled "Pre-Cessation Program Reduction Techniques: Do They Make Quitting Easier?." "The purpose of this project is to improve the understanding of the smoking cessation process and, hopefully, improve the success rates associated with smoking cessation."

"I understand that participation is voluntary, that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty after notifying the project director. Further, I may withdraw my participation in the research project but continue to be in group sessions if so desired."

"I may contact Dr. Frank Collins at (405) 744-6027 should I wish further information about the research. I may also contact Gay Clarkson, IRB Executive Secretary, University Research Services, 305 Whitehurst, Oklahoma State University, Stillwater, OK (405) 744-5700.

"I certify that I am 18 years of age or older and that I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me."

Date:_____ Time:_____ (am/pm) Signed:_____
(signature of subject)

"I certify that I have personally explained all elements of this form to the subject before requesting the subject to sign it."Signed:_____ (project director or his/her authorized representative)

GENERAL INFORMATION (This information will be used to collect followup information).

Name: _____
Last First Middle

Sex: _____ Height:_____ft_____in Weight:_____lbs Date of Birth:_____

Marital Status: S M D W Race: Black Caucasian Hispanic Other:_____

Years of Education: <9 10 11 12 13 14 15 16 17 18 19 20>

Home Address: _____
Street or Post Office Box City State Zip Code

Home Phone: _____ Work Phone: _____

Please provide the name of a close friend or relative who will always know where you are, even if you move:

Name: _____ Address: _____

Phone: _____ Relationship: _____

Are you employed? Yes No Type of Occupation: _____

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 10-30-96 **IRB#: AS-97-013**

Proposal Title: BEHAVIORAL TOPOGRAPHY SUBSTITUTES AND SMOKING: DO THEY MAKE QUITTING EASIER?

Principal Investigator(s): Frank Collins, Michael Larson

Reviewed and Processed as: Expedited

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING THE APPROVAL PERIOD.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Signature: _____ Date: December 10, 1996

Chair of Institutional Review Board

cc: Michael Larson

VITA

MICHAEL ERIK MANS LARSON

Doctor of Philosophy

Dissertation: BEHAVIORAL TOPOGRAPHY SUBSTITUTES AND SMOKING CESSATION: DO THEY MAKE QUITTING EASIER?

Major Field: Clinical Psychology

Biographical:

Personal Data: Born in Edina, Minnesota, On March 25, 1966.

Education: Graduated from Brainerd High School, Brainerd, Minnesota in May 1984; received an Associate of Arts degree from Brainerd Community College, Brainerd, Minnesota, in 1987; received a Bachelor of Science degree in Psychology from Winona State University, Winona, Minnesota in May 1991; received a Master of Arts degree in Clinical Psychology from Mankato State University, Mankato, Minnesota, in June 1991; received a Master of Science degree in General Psychology from Oklahoma State University, Stillwater, Oklahoma, in December 1994. Completed the requirements for the Doctor of Philosophy with a major in Clinical Psychology at Oklahoma State University in July 1998.

Experience: Worked in various capacities at Oklahoma State University from 1993 to 1997, including: Graduate Instructor: Psychology 1113 (General Psychology); Graduate Instructor: Abnormal Psychology; Psychological Associate: Marriage and Family Clinic; Psychological Associate: Psychological Service Center; Psychological Practicum: Developmental Disabilities; and Assistant Director: Psychological Services Center. Completed American Psychological Association accredited internship at the Department of Behavioral Medicine & Psychiatry, WVU School of Medicine, Morgantown, West Virginia, in June 1998.

Professional Membership: Association for the Advancement of Behavior Therapy, American Psychological Association.