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Using addictive substances nonaddictively: Implications for theory and treatment

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The University of Wisconsin - Milwaukee, 1992

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A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of

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Diane M. Reddy — Major Professor — 8-6-92 — Date

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The University of Wisconsin-Milwaukee, 1992
Under the Supervision of Professor Diane Reddy

This study investigated nicotine chippers (nondependent users of nicotine) because they present an anomaly for addiction theory. Nicotine chippers were compared to nicotine addicts and nonsmokers on psychosocial and physiological variables. The sixty-six subjects were matched on age, gender and number of years smoking. They completed an extensive set of self-report measures investigating theoretically and empirically derived factors potentially related to chipping. For a subset of these subjects, physiological responses to an acute stressor and, for smokers, to a dose of nicotine were measured. The findings address two issues posed by Shiffman (1989): Why do chippers not become addicted?;

and Why do they smoke at all? Regarding the latter, chippers seemed to smoke for many of the same reasons as addicts. For instance, a higher incidence of smokers was found among both chippers' and addicts' family and friends while they were growing up than nonsmokers suggesting that the stage has been set by genetic and/or social transmission factors. Smokers had lower constraints on access to nicotine than nonsmokers in the form of expectancies for negative social consequences. Also, chippers were more likely to believe that nicotine is a drug than nonsmokers. Smokers scored higher on a self-report measure of arousability than nonsmokers which has been linked to drug initiation (Pandina, Johnson, & Labouvie, 1990). Here, the similarities between chippers and addicts end and the differences between them address the issue of why chippers do not become dependent. Chippers exerted more self-control over their smoking than addicts even though addicts reported more techniques for doing so and a stronger desire to quit. To do this, chippers seemed to have armed themselves with more reasons for quitting and had greater self-efficacy to quit than addicts. They also did not rely as heavily on smoking to regulate their negative affect as addicts. Chippers were further protected by lower reactivity to external cues and a lower propensity to use substances in general than

addicts. Chippers' and addicts' different smoking patterns could not be explained by either different physiological reactions to an acute stressor or to a dose of nicotine. The results are discussed in terms of their implications for theory, treatment and future research.

Diane R. Rodda 8-6-92
Major Professor Date

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Literature Review

There is presently a great deal of controversy over current public policy on dealing with drug abuse (Shedler & Block, 1990; Tobler, 1986). This seems to be particularly true of the type exemplified by the "just say no" or educational approaches, which have been criticized (Adler, 1990; Bower, 1989; Martz, 1990; Shedler and Block, 1990) and have had limited success (Tobler, 1986). Shedler and Block (1990) criticize drug education approaches on two accounts. First, they are "alarmist" in that they pathologize all drug use, even what these authors refer to as "normative" or experimental drug use. The effect of this may be to frighten parents and educators unnecessarily. Second, these authors say that such approaches "trivialize" the factors underlying drug abuse. By focusing on lack of education as the problem, efforts are not being directed at underlying psychological issues related to drug abuse which have been found (Block, Block, & Keyes, 1988, Kellam, Brown, Rubin, & Ensminger, 1983, Shedler & Block, 1990).

Implicit in "just say no" approaches is the belief in instant and total addiction following exposure to an intoxicating substance. This belief has a long history. In the late 19th century, the popular literature was warning against the recreational use of opiates with

claims that it led inevitably to "depravity" (Harding, 1988). Harding (1988) suggests that our views have changed little since that time. Indeed, Harding and Zinberg (1983) review evidence of such attitudes ("It's so good, don't even try it once!") existing in the American public in the 1970's. In 1973 it was reported by the National Commission on Marihuana and Drug Abuse that ninety percent of Americans disagreed with the statement, "You can use heroin occasionally without ever becoming addicted." Theory has generally supported this notion of inevitable addiction. Shiffman (1989) states that most models of addiction support the view that all persons who are chronically exposed to an addictive drug will become addicted. Jellinek's (1960) "disease concept" of alcoholism is perhaps the clearest example of this with its central tenet that alcoholism is a progressive disorder.

This propagation of the notion of instant or inevitable addiction is another focus of criticism of social policy on drug abuse. Some have commented on the potential for this "cry of wolf" campaign to backfire (Berger, 1989; Martz, 1990). Most of these messages are aimed at children. However, it is apparent to children as well as adults that there is a range of impairment among

drug users - from almost none to total incapacitation and addiction. Seeing this misrepresentation of drug use may have the effect of altering young peoples' beliefs about the addictiveness of certain drugs and about the trustworthiness of so-called "authorities" on the subject (Martz, 1990). Martz (1990) believes that this may lead individuals to underestimate the potential dangers involved in drug use. A further problem with this approach is that arousing individuals' fears without providing a way to deal with them can lead to a sense of vulnerability and a defensive avoidance of the message thereby decreasing the chances of attitude change (Leventhal, 1970; Leventhal & Watts, 1966).

There do seem to be individuals who can use highly addictive substances over prolonged periods of time without becoming addicted. They have been colloquially referred to as "chippers", a street term originally describing occasional heroin use. Chipping denoted their ability to "chip" a small piece off of a "rock" of heroin without doing the whole thing. Heroin chippers have been studied mostly using case history and interview methods (Blackwell, 1983; Crawford, 1978; Graeven & Folmer, 1977; Powell, 1973; Zinberg & Jacobson, 1976). This literature will be reviewed when pertinent in the following sections. Perhaps spurring interest in this issue were Lee Robins

and her colleagues' (Robins, Helzer, & Davis, 1975, Robins, Helzer, Hesselbrock, & Wish, 1979) studies of drug use among Vietnam Veterans after they returned to the United States. This research produced the startling findings that drug use did not always lead to addiction and that addiction was more reversible than previously thought.

In Harding's (1984) review of the data on occasional opiate use, he noted that little is known about how occasional use is patterned over time, how stable it could be, what the consequences of it could be and what the extent of other drug use is among opiate chippers. He also pointed out the need to develop instruments to discriminate among using styles which would be suitable for large scale surveys (Harding, 1984). This last point would address the paucity of data on nondependent patterns of drug use (Harding, 1988). Harding (1988) has also commented on representativeness of the samples used in studies of opiate chippers. Partly due to the illegality of heroin, there may a question of a selective process operating in those who are willing to come forward and admit their use. Another shortcoming of prior research on chippers is a seeming lack of theoretical guidance in the search for differences between these

individuals and addicts. Granted, most theories do not account for chippers. But, recent advances in addiction theory such as an emphasis on appetitive drug effects (as opposed to avoidance of withdrawal) and the role of affect management may lend some support to this search (Baker, 1988).

That these chippers exist merits their study especially if public interest in them grows as a result of the hype of instant addiction present in current public policy campaigns. Harding (1984) expressed the point of view that studying nonabusive drug use is essential to understanding why some go on to become addicts. Blackwell (1983) suggested that examining the controls that nonaddicts use may shed light on why others lose control. Pandina and Huber (1990) highlight the scope of the issue of occasional users by pointing out that people who are truly addicted are a "very small minority within the far larger population who use these same agents only on an occasional basis" (p. 56). Zinberg and Lewis (1964) have expressed a similar point of view.

The value of studying nonaddicted drug users may become apparent in addressing recent advancements in theory. Peele (1984) has stated that theories of drug dependence have not been able to explain "why people seek intoxication or other drug experiences or why they cease

to need these experiences" (p. 1346). Baker (1988) highlighted the role of appetitive drug effects in current models of addiction. This view suggests that individuals may use drugs for their positive reinforcing effects and that drug using behavior is not just driven by a reduction of withdrawal symptoms which has been the prevalent school of thought. When using addicts as subjects in the search for appetitive drug effects, the confound of withdrawal symptoms presents a particular difficulty. Chippers, however, do not have this liability and therefore may be the ideal way in which to study the role of appetitive effects or positive reinforcement in drug use.

A better understanding of how people maintain a low level of use of highly addictive substances over long periods of time may help elucidate the role of individual differences with respect to drug use. At the same time light may be shed on the process of the development (or nondevelopment) of addictive behavior. Finally, the pattern of drug use exhibited by Chippers has been neglected not only theoretically but empirically as well. Though there has been increasing interest in nonaddicted drug users (Bower, 1989), distinguishing among patterns of use has not been widely applied to illicit or licit drugs such as caffeine and nicotine, with the exception of

alcohol (Harding & Zinberg, 1983).

Saul Shiffman and his colleagues have studied tobacco chippers. Shiffman (1989) compared tobacco chippers and addicts on a range of cardiovascular and self-report data including current stress, coping style, social support, smoking history, reasons for smoking and family history of smoking. Blood pressure, heart rate, alveolar carbon monoxide, mood and withdrawal symptoms were measured before and after smoking a cigarette. There were no demographic differences between the groups (e.g., gender, age, education, etc.). The two groups had been smoking for approximately the same number of years and had similar smoking histories except for the number of cigarettes smoked. The data demonstrated that chippers do inhale when they smoke. Chippers had no withdrawal symptoms while dependent smokers did (which decreased after smoking) and chippers appeared to suffer little from dependence. While both chippers and addicts showed increased cardiovascular arousal after smoking, chippers had a significantly greater increase in heart rate than addicts after smoking. Chippers were less likely to smoke under conditions of negative affect than addicts but both groups were equally likely to smoke when feeling good. Overall, addicts' smoking was more strongly associated with affective states (either positive or negative) than

was chippers' smoking (whose smoking was more often associated with neutral affect). Chippers were not found to be "social smokers." The differences between groups on stress, coping and social support were nonsignificant, though in the hypothesized direction (chippers were less stressed and better adapted to stress). Dependent smokers showed a higher incidence of smokers in their families than chippers. Interestingly, dependent smokers were more likely to have had an aversive reaction to their first cigarette than were chippers. In summary, Shiffman (1989) states, "If chippers' smoking is not motivated by attempts to relieve or prevent withdrawal, then why do they persist in smoking?"

To further clarify the nature of chippers' atypical smoking behavior, Shiffman, Fischer, Zettler-Segal, and Benowitz (1990) took blood samples (for nicotine and cotinine - a long lasting matabolite of nicotine) and breath samples (for alveolar carbon monoxide) before and after smoking from tobacco chippers and dependent smokers. Chippers and addicts had similar increases in blood levels of nicotine after smoking suggesting comparable absorption rates. Thus, the data suggest that chippers inhale cigarettes and absorb as much nicotine per cigarette as dependent smokers do. When compared to dependent smokers

whose smoking had been temporarily reduced to five cigarettes per day, chippers did not attempt to compensate for their low rate of smoking by extracting more nicotine per cigarette while addicts did (showing extraordinary titration in cigarette-deprived addicts). In sum, chippers are regularly exposed to nicotine and have absorption rates similar to addicts, and are not practicing extraordinary titration (trying to maintain minimal blood nicotine levels). Thus, chippers' anomalous behavior cannot be explained by a lack of exposure to the substance or by the maintenance of minimal levels of that substance in the bloodstream.

The fact that chippers are exposed to normal doses of nicotine with each cigarette suggests that their smoking could be maintained by pharmacological (reinforcing) effects of nicotine (Shiffman et al., 1990). These authors state that studying chippers (who do not have the confounds of dependence and withdrawal) may help clarify this. Shiffman notes that his studies used small numbers of subjects and that the prevalence of nondependent drug use is not clear. It is also noted that future studies should address the developmental course of regular smoking and chipping and that individual differences (psychological and social factors) between chippers and addicts should be further explored. This latter point

includes studying whether chippers' smoking is maintained by pharmacologic or nonpharmacologic behavioral factors. Finally, Shiffman (1989) points out that there are two issues: what maintains smoking in chippers and what protects them from dependence.

Accepting the implicit assumption that different addictions are more similar than dissimilar (Baker, 1988), studying tobacco chippers would seem to have merit. As mentioned above, it is difficult to recruit subjects on the basis of their illegal drug use, and when successful, there may be a selection bias present as far as who is willing to come forward. This problem could be circumvented by using as subjects licit drug users such as cigarette smokers. Cigarette smoking in and of itself is a major health problem. Cigarette smoking has been found to increase the risk of many diseases including heart disease and lung cancer (U.S. Public Health Service 1964, 1980, 1981). Estimates of the annual death rate due to tobacco use are as high as 390,000 and this has been ranked the highest death rate of any abused substance (Doweiko, 1990). The Surgeon General (Koop, 1988) has stated that addiction to nicotine is similar to, and for some stronger than addiction to heroin or cocaine. In support of this, while some believe that the majority of

users of addictive substances are not dependent on them (Pandina & Huber, 1990; Zinberg & Lewis, 1964), over 90% of cigarette smokers meet standard criteria for dependence (Gust, Hughes, & Pechacek, 1988). As little as five to ten percent of smokers smoke as few as five cigarettes per day (McKennel & Thomas, 1967). Jack E. Henningfield, a psychopharmacologist at the National Institute of Drug Abuse (as quoted in Rosenberg, 1987) has stated "Recent studies have confirmed that milligram for milligram, nicotine is more potent than cocaine in modifying behavior."

For reasons mentioned above, Chippers, including tobacco chippers are an important group to study. The proposed study is designed to explore differences between nicotine chippers and nicotine addicts as one step towards further understanding of this theoretically and empirically neglected phenomenon. In the next section, relevant literature will be reviewed. From this, avenues for further exploration of individual differences between chippers and addicts will be suggested.

Behavioral Theories of Choice

Almost universal in theories of addiction is the notion of reinforcing properties of drugs as a factor which leads to addiction (though, as mentioned above, this has not been held as the factor that maintains addiction).

However, accepting the drug as a reinforcer does not address the question of why that drug is chosen over other reinforcing activities (Vuchinich & Tucker, 1988). Behavioral theories of choice suggest two classes of determinants that address this: direct constraints on access to drugs and the availability of other reinforcers and constraints on access to them. Thus, if constraints on drugs are high and if other reinforcers are available and the constraints on them are low, then a choice might be made in favor of them instead of drugs.

Direct Constraints on Access to Drugs Vuchinich and Tucker (1988) suggest two types of direct constraints on access to drugs: "a) the amount of behavior required to gain access to consumption and b) the introduction of consequences contingent on consumption." The first of these can be summed up as cost, not only monetary but time, effort etc. Blackwell's (1983) study of nondepndent opiate users is pertinent to this issue. Her subjects were 51 nondependent opiate users who were well educated, articulate individuals from advantaged family backgrounds. They were interviewed with regards to their drug use history, reasons for use, circumstances of decreasing or stopping use, use amoung friends and beliefs about opiates and other opiate users. She found that many of the

subjects had negative feelings about needles. This would certainly increase the psychological "cost" of heroin.

Regarding consequences of consumption, negative aftereffects (e.g., "hangover", guilt or anxiety) and the loss of approval of others are two examples. Powell's (1973) study of twelve occasional heroin users is relevant to the latter. The subjects (mostly middle-class young adults) were interviewed and given several psychological tests. Most of the subjects intensely disliked the drug scene and felt that their friends and environment helped them avoid it. It is likely that the disapproval of their friends and significant others was an important factor in this. Some of the subjects explicitly stated that this was the case. Arrest for possession of an illegal substance would certainly constitute a consequence of consumption as well but is not applicable to licit drugs.

Availability of, and Constraints on Access to Other Reinforcers The issue of the availability of alternate gratifications has been cited by other researchers as well (Cox & Klinger, 1988; Peele, 1985). Blackwell's (1983) data again bears on this issue. Among her subjects, it was found that heroin was not their favorite high. Also, when asked why they had not become dependent, they referred to competing activities, interests and plans. Similarly, Powell (1973) found that

his subjects' abstinence from heroin was a function of being involved in something that interested them. The evidence points to these subjects having other sources of reinforcement available to them and thus avoiding the "choice" of heroin as a reinforcer.

Drug use is frequently characterized as a coping response (Cooper, Russell, & George, 1988; Niaura, Rohsenow, Binkoff, Monti, Pedraza, & Abrams, 1988) whereby the avoidance or amelioration of negative affect or distress is reinforcing. Nondrug coping responses used to avoid or escape distress also constitute alternate sources of reinforcement. The relationship between distress and drug use is heavily reliant on the availability of effective alternative coping responses (Marlatt, Kosturn, & Lang, 1975; Strickler, Tomaszewski, Maxwell, & Suib, 1979; Tucker, Vuchinich, & Sobell, 1981). It has been found that heavier drug users have greater levels of negative affect than less heavy drug users (Pandina, White, & Yorke, 1981) suggesting that heavy users have less access to ways of avoiding negative affect.

Hypotheses It is predicted that chippers will report having higher constraints on access to nicotine in the form of the "cost" (e.g., price, environmental

restrictions on smoking) and consequences of use (e.g., physiological and reactions of others) than addicts. It is also predicted that chippers will report having greater numbers of, and success with alternate ways of obtaining the effects that nicotine provides than addicts.

Cues

Cues, both environmental and interoceptive, have figured prominently in theories of addiction including behavioral models (Siegel, 1983; Stewart, deWit, & Eikelboom, 1984; Wikler, 1965) and social learning models (Cooper, Russell, & George, 1988). Individuals' reactivity to cues have been studied extensively with regard to addiction and relapse (Niaura et al., 1988). The dichotomy of external and internal cues is a useful one, the former referring to the context of drug use and the latter referring mainly to affective states (Niaura et al., 1988).

External Cues Conditioning models of addiction assert that a variety of stimuli that make up the context of drug administration can become conditioned stimuli (CSs). Wikler (1965) in his conditioned withdrawal model, suggests that such stable, exteroceptive stimuli become CSs through pairing with primary reinforcing pharmacological properties of the drug (both positive effects of the drug and the suppression of acute change caused by abstinence).

These CSs come to elicit withdrawal distress (the conditioned response or CR). Drug use then, is instrumental behavior whose purpose it is to escape or avoid the conditioned withdrawal. Stewart, deWit and Eikelboom's (1984) conditioned appetitive motivational model also posits that contextual cues become conditioned stimuli. However, rather than being an avoidance model like Wikler's, the CR is a positive motivational state with leads to a desire for more drugs. Siegel's (1983) conditioned compensatory response model proposes that contextual cues accompanying drug administration become CSs that elicit reactions that occur in the opposite direction of the pharmacological effect of the drug. The theory states that the purpose of this is to compensate for the upcoming pharmacological insult and ultimately maintain a homeostatic balance. However, in the absence of the drug this actually creates an imbalance which is an aversive state and which can be avoided or escaped through drug use. While these models differ in the proposed pathway through which contextual cues lead to drug use, they all highlight the importance of such environmental stimuli.

Many authors have noted that opiate chippers purposely avoid the drug scene (Blackwell, 1983; Crawford,

1978; Harding, 1988; Powell, 1973). Thus, they may be reducing the number of drug-related, contextual cues that they are exposed to. Along this line, Zinberg and Jacobson (1976), in their case history study of five controlled opiate users, found that one of their subjects specifically stated that he refused to have his own "works" (i.e., the apparatus for administration of heroin). Harding (1988) also notes this phenomena in opiate chippers. When dealing with licit drugs, such cues are much more prevalent in our everyday lives. An alternative hypothesis to chippers being exposed to fewer cues must be considered: that they are less reactive to them.

Internal Cues Affective states, acting as cues for drug use, have been given prominent roles in models of addiction from different theoretical points of view. Wikler (1965) states that negative affect states (such as anxiety or sadness) become CSs because of their resemblence to withdrawal. This triggers the CR (conditioned withdrawal) which motivates the individual to use drugs to avoid the withdrawal distress. Regarding Siegel's conditioned compensatory response model, Poulos, Hinson, and Siegel (1981) have suggested that negative affect may be a conditioned response motivating drug use. If the unconditioned response (primary pharmacological reinforcing property) of a drug is positive affect, then

the corresponding counterdirectional CR would be negative affect. Again, a state of homeostatic imbalance leads to the avoidance response of drug use. Stewart, deWit and Eikelboom's (1984) conditioned appetitive motivational model proposes that negative affect acts to increase the incentive value of the drug. Cooper, Russell, and George's (1988) social learning model of drug abuse considers drug use to be a coping response. If an individual has a lack of nondrug coping responses (and therefore is presumably experiencing some form of negative affect) and has positive expectancies for drug use, he or she will be more likely to use drugs.

As with external cues, two hypotheses regarding what enables chippers to use addictive substances in a controlled manner are apparent: chippers are exposed to fewer affective cues than are addicts and chippers are less reactive to affective cues than addicts. Regarding the first hypothesis, heavy drug users have been shown to have greater levels of negative affect than less heavy drug users (Pandina, White, & Yorke, 1981). Graeven and Folmer (1977) interviewed 44 experimental heroin users with regard to family life, peer involvement, involvement in the criminal justice system and personality. They found that the high experimental heroin users had more

negative feelings about themselves and about their future than low experimental heroin users. Perhaps regarding either of the hypotheses stated above, Powell (1973) did not find a strong association between mood or psychological condition and heroin use among his occasional heroin user subjects. Similarly, Shiffman (1989) found nicotine addicts' smoking to be more strongly associated with affective states than chippers' smoking.

Thus far, only cues regarding drug use have been considered. Cues can elicit drug abstaining responses as well. Nondependent opiate users, a subset of whom Blackwell (1983) called controllers, used a variety of cues in such a way. For these individuals signs of decreased physical health, lowered cognitive functioning such as attention and concentration, and of tolerance in themselves all led to a reduction or temporary abstention in use.

Hypotheses It is predicted that chippers will report less external cues for smoking and being less reactive to these cues than addicts. It is further predicted that chippers will report less affect-related smoking suggesting that they are less reactive to internal cues than addicts. Finally, chippers will be expected to be more reactive to cues to decrease or stop use than addicts.

Family History of Drug Use

Family history of alcohol and drug use has been found to have an influence on usage patterns in offspring (Tarter, 1988), though the mechanism of transmission of this infuence is a subject of debate. Among Shiffman's (1989) subjects, dependent smokers were more likely than chippers to have family members who smoked. Further, when chippers had relatives who ever smoked, they were more likely to have quit smoking than were relatives of dependent smokers.

There is considerable evidence for the role of genetic influence on alcoholism and other drug abuse (Searles, 1988; Tarter, 1988). Baker (1988), in an interesting commentary on this line of research, stated, "Curiously, genetic studies may eventually offer the best encouragement for a thoroughgoing, innovative exploration of subtle environmental influences on drinking behavior" (p. 116). Zinberg and his colleagues (Zingerg & Jacobson 1976; Zinberg, Harding, & Winkeller, 1977) have expressed the point of view that there are social regulatory mechanisms involved in alcohol use that are not present for illicit drug use. Involved here are the link between alcohol and social events (champagne at weddings, wine at church or temple) as well as role models that provide

education on the circumstances of acceptable use. Since tobacco is a licit drug, perhaps these factors are operating in smoking behavior as well. Families are certainly an important source of such regulatory mechanisms.

As far as learning factors are involved, Becker's (1953) study on becoming a marijuana user developed the notion that individuals must learn to enjoy drug effects. He proposed that there are three steps. First, one must learn the proper technique, second, there must be a recognition of the effects of the drug and connection of these with the use of it, and third, one must "learn to enjoy the effects he has just learned to experience." All of these steps can be learned through direct teaching or through observation. Regarding the third step and the possibility that a novice may experience negative effects, more seasoned users may minimize these or help them focus on the positive aspects. Also, newcomers may be told that these negative effects are "temporary" or that he or she will "get to like it after a while" (Becker, 1953). McAuliff (1975) interviewed opiate users regarding early experiences with use of the drug. Similarly, he reports that first time users "learned" from more experienced users about various reactions to the drug. Again, families as well as close friends can be an important

source for such "learning."

Hypotheses Chippers will be expected to have lower numbers of smokers among their family members and close friends than addicts with nonsmokers expected to have the lowest numbers of all three groups. Also, it is predicted that chippers will have a higher incidence of light or occasional smokers among family and friends who do smoke than addicts. It is hypothesized that chippers will report having had less social learning opportunities regarding smoking in the form of observation and direct teaching than addicts again with nonsmokers expected to have the least of all groups. As a relationship between parent-child cross drug use (as opposed to same drug use between parent and child) has been demonstrated (Pandina & Johnson, 1989; Rittenhouse & Miller, 1984), the above hypotheses will be explored for alcohol and caffeine use as well.

Behavioral Self-Control

Loss of control is a central tenet of disease theories of addiction (Peele, 1984) but is absent from other theories of addiction. Disease theories of addiction have been discredited by research that has failed to show that loss of control is associated with alcoholic drinking (Peele, 1984). However, it has been

found that alcoholics and problem drinkers are more external in their locus of control than nonproblem drinkers are (Rohsenow, 1983). It may be that problem drinkers invest alcohol with the power to control their behavior (Peele, 1984). Amid this confusion about the role control plays in addiction, self-control is a primary component in certain treatment approaches to addiction, some of which espouse controlled drinking versus total abstinence as a treatment goal (Heather, & Robertson, 1983; Hester & Miller, 1989; Sobel & Sobel, 1978). It may be telling that while theory has ignored this element (as it has ignored chippers), treatment approaches have not.

Despite the silence of psychological (nondisease) theories of addiction on control, it is a frequent theme in research on chippers. Zinberg and Lewis (1964) interviewed drug users and categorized them on a continuum of use and addiction. Their category 3 included individuals who use narcotics on a regualr basis but developed no signs of dependence on them. This group, who sound very much like what other authors have described as chippers, used for the positive effects of the drug but feared addiction. This fear led them to impose strict controls on their use.

Harding and Zinberg (1983) conducted semi-structured

interviews with opiate users, 61 of whom were controlled users and 30 of whom were compulsive users. Overall, controlled users had a significantly greater number of rules for use than compulsive users. For example, controlled users were more likely to plan for their use, exercise caution when obtaining the drug, budget money for opiates and to refuse to inject opiates than were compulsive users. Powell (1973) found that the heroin chippers he studied believed that one of the major things that differentiated them from addicts was their monitoring of their use and exerting control over it. This self-monitoring took the form of watching for signs of developing tolerance or simply using it "too much." The exertion of control took the form of temporary abstention. Blackwell (1983) also cited extensive self-monitoring and use of rules as methods to control use among her nondependent opiate user subjects. This exertion of control took the form of stopping or cutting down on use as dictated by rules. These rules were in response to cues such as spending too much money, developing signs of tolerance, noticing changes in physical or psychological functioning and noticing signs of changes in friends who were using opiates. Interestingly, no two persons (of 19 who used this kind of self regulation) used the same rules

and they gave no indication that they had learned how to regulate their use from friends.

Harding (1988), in his review of the controlled heroin use literature suggests two conditions for controlled use. The first is social rituals and sanctions examples of which include not using alone, not using with strangers, staying out of the "drug scene" and using only in the company of other chippers. The second condition for controlled use is individually formulated strategies which involve a reliance on the self rather than on peers to regulate use. Examples of these strategies are monitoring for the exceding of financial limits on use, for signs of deteriorating physical and psychological health, and for signs of becoming addicted.

Hypotheses It is predicted that chippers will indicate that they try to limit their smoking more strongly than addicts and that they more frequently engage in a variety of methods of controlling their use than addicts. It is also hypothesized that chippers will endorse various health, social and personal hygiene reasons for controlling smoking more strongly than addicts. Further, chippers are expected to report greater feelings of self-efficacy with respect to controlling their smoking than addicts. Finally, this element of self-control may permeate to other areas of chippers'

lives and thus it is predicted that chippers will show greater propensity to use self-control over other mood altering substances such as alcohol and caffeine and in areas of self-regulation such as weight control, sleep, exercise and study habits more so than addicts.

Expectancies

Social learning theory proposes that drug abuse is the result of various factors leading to the use of the drug as a method of coping (Cooper, Russell, & George, 1988). The first of these factors is the lack of nondrug coping responses, the second is the presence of positive expectancies for the efficacy of the drug as a coping response. Thus, when people find themselves in a situation where they do not have a nondrug related coping response at their disposal and if they happen to have high positive expectancies for the drug to help them cope with negative emotion, they will be likely to use the drug. The reliance on drugs as a coping response is what leads to abusive drinking (Cooper, Russell, & George, 1988).

Research has provided support for the role of expectancies in determining drug use behavior. For example, in Brown's (1985) study of college students, she found that expectations of enhanced social and physical pleasures with the use of alcohol were most strongly

associated with frequent social drinkers. In contrast, expectations of tension reduction were most strongly associated with problematic drinking. In summing up the literature on expectancies and adult alcohol use, Goldman, Brown, and Christiansen (1987) state that there is a positive relationship between strength of positive alcohol expectancies and degree of drinking. These same authors conclude that expectancies are robust predictors of drug use. Furthermore, studies have shown that behavioral outcomes in the laboratory can be predicted by questionnaire assessments of expectancies (Rohsenow & Bachorowski, 1984; Sher, 1985).

Regarding the original social learning theory formulation, Cooper, Russell, and George (1988) point out that it is not known to what degree "the relationship between expectancies and alcohol abuse is mediated through reliance on alcohol as a coping mechanism" (p. 219). This may be especially pertinent to what maintains chippers' behavior. Chippers may not be using drugs to cope but rather to obtain positive effects in the absence of any stress or distress. Thus, the chipper's expectancy for the drug may not be in regard to its efficacy as a coping device, but rather they may have high expectancies for the drug's ability to bring about other reinforcing states or conditions.

While expectancies have rarely, if ever, been directly studied in chippers, "expectancylike" (Goldman, Brown, & Christiansen, 1987) items have been included in studies. Crawford (1978) interviewed heroin addicts and chippers as well as nonusers. She found many differences between addicts and chippers in their expectancies about heroin. When asked what kinds of fears they might have had about heroin before they first tried it, addicts' most commonly expressed fears were of an overdose and of needles while chippers' were of becoming addicted. More addicts than chippers thought they had enough "will power" to control their heroin use. Zinberg and Lewis (1964) report that their nondependent opiate user subjects valued the positive pharmacological effects of the drug but feared addiction. It may be that chippers are more realistic in assessing, as evidenced by their expectancies for the effects of the drug, the possible consequences of drug use (Crawford, 1978). This brings up the important point that expectancies for negative effects of the drug must be considered as well as those for positive effects. Examples of such negative effects in addition to addiction are negative health consequences and social reprisal. Both of these, as mentioned in previous sections, have been expressed by chippers in relation to their drug use

(Blackwell, 1983; Powell, 1973). It is apparent that there is a paucity of data on the role expectancies play in determining nondependent or occasional use of drugs with the exception of alcohol.

Hypotheses It is hypothesized that addicts will have greater expectancies for nicotine to help them cope with negative events or emotions than chippers. The question of whether chippers will have greater expectancies for nicotine to produce positive states or feelings in the absence of any stress or distress than addicts is an empirical one. The empirical literature does not seem to provide a basis for a prediction and therefore no differences are expected. Also, it is hypothesized that chippers will have greater expectancies for negative outcomes of nicotine use than addicts.

First Cigarette Experience

Initial experimentation is an important factor in becoming a smoker (Leventhal & Cleary, 1980). Leventhal and Cleary (1980) have suggested three categories of motives for trying a first cigarette: 1) self-definition which involves desires for independence from authority and rebelliousness; 2) social compliance which includes individuals with high approval needs and acquiescence to peer pressure; and 3) affect regulation or smoking to control emotions. According to these authors, another

important process is occurring during the initiation stage, that of interpreting smoking-induced sensations. Hirschman, Leventhal, & Glynn (1984) interviewed 386 urban public school children regarding smoking. They found that a high percentage of first triers reported noxious symptoms such as coughing, dizziness, sickness, burning throat, headache and nausea. The experience of any or all of these symptoms did not necessarily have a direct impact on subsequent tries. Rather, the interpretation of the symptom played an important role in further smoking (Hirschman, Leventhal, & Glynn, 1984). These authors found that coughing was frequently interpreted as a sign of damage to the body and was associated with not progressing to a second try. Also, higher numbers of reported symptoms was associated with the belief that the first cigarette was damaging the body. Other reactions to physiological symptoms may include hoping that the body will soon overcome the symptom, looking upon the symptom as a challenge to be overcome or simply dismissing the symptom. Leventhal and his collegues suggest that the experience of cigarette smoking is a product of not only the interpretation of the effects, but also of the social context and the physiological reaction to the cigarette. Such a cognitive-developmental approach to the process of

becoming a smoker would seem to have much value in light of the finding that 85-90% of individuals who try four cigarettes go on to become regular smokers (Salber, Freeman, & Abelin, 1968).

Shiffman (1989) found that nicotine addicts actually reported having more highly aversive reactions to their first cigarette than chippers. (However, Shiffman did not measure his subjects' interpretations of these symptoms.) He hypothesized that chippers may be less reactive to nicotine which would reduce the pharmacological reinforcing effects of smoking. Shiffman noted that chippers could be conceptualized as having failed to progress developmentally from initial stages and therefore it may be fruitful to study their behavior from a developmental approach.

McAuliffe (1975) reviewed evidence from studies of first experiences with opiates. He found that future addicts had higher proportion of euphoric first effects to opiates than nonaddicts. For those who had negative reactions on their first try, they had connections to the drug world where they "learned" from experienced users that negative reactions are common at first but that they will decrease. A learning process similar to what Becker (1953) described in his steps to becoming a marijuana user would seem to be active here. Future addicts also

had more experience with other drugs and knew that "bad trips" are part and parcel of the drug experience (McAuliffe, 1975). McAuliffe's results suggest that while positive first experiences with a drug are an important factor in the development of a regular usage pattern, interpretations of negative effects can be influenced by information and thereby not preclude advancement to regular use. Such an outlook on first experiences, which is consistent with Hirschman, Leventhal, and Glynn (1984), would explain Shiffman's (1989) results as well.

Hypotheses It is predicted that chippers will report having had more symptoms on their first cigarette experience than addicts and that they will be more likely to have interpreted them as indicating bodily damage than addicts. It is further hypothesized that chippers' overall evaluation of the first cigarette experience will be more negative than that of addicts. Taking into account the social context of the first smoking experience, it is hypothesized that chippers will report having had more negative social consequences of their initial experiences than addicts.

Arousability

Pandina has expressed the view that those who have persistent and considerable negative affect and heightened

arousability are at risk to proceed from low or casual levels of drug use to drug abuse (Pandina, Johnson, & Labouvie, 1990). Pandina and his collegues define arousability as a "state of excitatory potential" which may be triggered by reactivity to cues or by spontaneous or impulsive behavior patterns. It is a way of reacting to and being affected by the environment. These researchers believe that arousability can be described by terms such as "impulsive", "sensation seeking", "action proned" and "disinhibited" at the high end of a bipolar measure of this construct (Pandina, Johnson, & Labouvie, 1990). This "state of excitatory potential" is the arousal function of all affect (positive and negative) and corresponds to approach behavior. Because arousability is the energizing and activating force behind all emotions, according to Pandina, it is central to the understanding of affectivity in humans.

Pandina and his collegues collected longitudinal data from a sample of adolescents regarding aspects of personality functioning and drug use (Pandina, Labouvie, & White, 1984). To measure arousability, they used four subscales from a shortened version of Jackson's (1974) Personality Research Form (cognitive structure, harm avoidance, impulsivity and play) and two subscales from the Zuckerman (1979) Sensation Seeking Scale

(disinhibition and experience seeking). The results indicated a strong role for negative affectivity and arousability in drug abuse vulnerability. Interestingly, positive affectivity did not seem to be implicated as strongly in this relationship. In particular, arousability seemed to be most strongly related to use intensity and increased risk for initiation (Pandina, Johnson, & Labouvie, 1990). Overall, higher scores on autonomy, exhibition, impulsivity, and play; and lower scores on achievement, cognitive structure and harm avoidance were "overrepresented among heavy users" (Labouvie & McGee, 1986).

Other addiction researchers have posited a relationship between arousability and drug abuse as well. Tarter (1988), in reviewing the research, stated that evidence is beginning to accumulate that a tendency to become easily and intensely distressed and to be impulsive are associated with an increased risk for alcoholism. He subsumed these qualities under the category of "emotionality" and cited a considerable amount of evidence that this is an inherited predisposition.

It is interesting to speculate on the physiological basis of this construct of arousability. Pandina's description of arousability as a "state of excitatory

potential" would certainly seem to lend itself to a definition at the physiological level. Arousability, Tarter's collection of attributes labelled "emotionality" and Eysenck's (1983) "neuroticism" appear to have some conceptual similarity by virtue of the common descriptors such as the tendency to become easily distressed and to be impulsive. In fact, Eysenck (1983) has described neurotics as being characterized by high arousal. He believes that this is the behavioral manifestation of extreme autonomic lability (Eysenck, 1983). Shiffman (1989) has measured physiological reactivity to nicotine and found chippers' cardiovascular reactions to be similar to dependent smokers' reactions. The purpose of these measures in Shiffman's study was to establish that chippers absorbed nicotine through smoking. Physiological reactivity to a stressor as an indicator of arousability is quite another issue however, and seems pertinent in light of current emphasis on affect management in addiction research. Given Eysenck's (1983) autonomic lability hypothesis, measures of autonomic nervous system functioning (heart rate and blood pressure) will be of interest in the present study.

Hypotheses It is hypothesized that chippers will score lower on the self-report measure of arousability than addicts with nonsmokers expected to score the lowest

of all groups. The issue of negative and positive affectivity was addressed in the section on expectations and congruent with Pandina's findings, it is predicted that addicts will expect nicotine to reduce negative affect more so than chippers. No differences are expected between chippers and addicts on expectancies for nicotine to produce positive feelings or states in the absence of distress. Regarding the physiological measures, it is predicted that chippers will be less physiologically aroused by a stressor than addicts as measured by analysis of covariance using the appropriate baseline measure as the covariate with nonsmokers expected to be the least aroused of all three groups.

Method

Subjects

Subjects were recruited from undergraduate psychology courses at the University of Wisconsin - Milwaukee and were offered extra credit toward their course grade or money for their participation. Those who wished to participate were given questionnaires and asked to complete them at their leisure. The questionnaires consisted of brief demographic data, current smoking practices and smoking behavior history, and items designed to tap into the seven previously

reviewed factors (behavioral theories of choice, cues, family history of drug use, behavioral self-control, expectancies, first cigarette experience and arousability) that are hypothesized to differentiate chippers from addicts. A discription of the items on these questionnaires will be provided below. Regarding the self-report method of collecting data on drug use, self-reports have been shown to reliably correspond to substance use behaviors (Radosevich, Lanza-Kaduce, Akers, & Krohn, 1980; Rouse, Kozel, & Richards, 1985).

Sixty-six subjects were chosen from this pool. In order to ensure that smokers' patterns were stable and not in a transitional phase, they had to meet the following criteria: (1) not be currently attempting to quit or reduce their smoking; and (2) report that they have been smoking at their current rate for a minimum of two years (smoking has been shown to stabilize a median of two years after initiation; Wohlford & Giammona, 1969; Salber, Freeman, & Abelin, 1968; even for young people and at low levels - one cigarette per week; Baugh, Hunter, Webber, & Berenson, 1981).

Twenty-two chippers met the following criteria: (1) smoked, on average, at least one cigarette per week and (2) did not average more than five cigarettes per day (titration has been found to be less than 50% effective

when smoking drops to five cigarettes per day; Benowitz, Jacob, Kozlowski & Yu, 1986). Twenty-two dependent smokers were chosen based on their meeting the following criteria: (1) they smoked a minimum of 15 cigarettes per day (Wesnes & Warburton, 1983, in reviewing the nicotine and human performance literature, found consensus that 60% or more of what they considered to be "habitual" smokers smoked at least 15 cigarettes per day.) and (2) met a subset of DSM III-R criteria for tobacco dependence (the same criteria Shiffman used): either a) three or more attempts to quit or reduce smoking or b) experience at least two withdrawal symptoms following, within 24 hours, cessation or reduction in nicotine use (American Psyciatric Assocition, 1987).

Procedures

Subjects were matched on age (+/- 5 years), number of years smoking at current level (+/- 7 years) and gender resulting in 22 matched triples with 33 males and 33 females. This procedure was carried out to decrease the likelihood that any observed differences between the groups were due to these factors. Theoretically, by removing these sources of variability, the sampling error is reduced. The reduction of the sampling error when using pairwise matching was a major benefit in the present

study as the small sample size used (primarily due to the highly specific nature of the subject group) has the effect of increasing the sampling error. The factors mentioned above were chosen to match subjects on because they were thought to have some effect on one or more of the dependent variables. For instance, age and gender differences have been found in physiological reactivity (Watkins & Eaker, 1986) and there is a possibility of age-cohort differences in willingness to engage in health-promoting behaviors which are heavily represented on the behavioral self-control questionnaire. Regarding number of years smoking at current level, a higher number of years translates into a greater number and wider range of experiences with smoking. Intuitively, this would seem to lead to differences in expectancies for certain outcomes or in feelings of self-efficacy in regard to self-control over smoking.

This final group of subjects were contacted by phone for the purposes of conducting a consistency check on their self-reported smoking and to arrange for the laboratory portion of the study in which physiological reactivity to a stressor was measured (see appendix J). Regarding the consistency check, subjects were asked again how much they smoke and if they inhale. Also, whenever possible, a collateral contact was attempted such as the

subjects' parents, siblings, friends or room-mates to whom the same questions were posed. To screen for cardiovascular risk factors that may potentiate physiological responses, subjects were asked about their history of cardiovascular disease and any current prescribed medication that they were on. A positive history of cardiovascular disease that was currently being treated precluded the subject's participation in the reactivity portion of the study. To further screen for cardiovascular potentiators the experimenter asked the subject about family history of cardiovascular disease, prescription and nonprescription medications and the use of caffeine. Subjects were told that we were performing a further study involving physiological measures while working on concentration and visual-motor tasks among smokers. Those who passed the cardiovascular screen were asked to participate and told that they would be paid fifteen dollars for their time (which would be approximately one hour). Subjects were told to abstain from smoking, caffeine use and alcohol use for at least two hours prior to their scheduled testing session (see Wesnes & Warburton, 1983).

When subjects arrived at the laboratory, they were given an informed consent form to read and sign (see

appendix M) as well as questionnaires on current stress and coping. Also, they were asked when the last time was that they smoked a cigarette, and drank caffeinated or alcoholic beverages and how much of each of these the subject had partaken in that day. The purpose of the stress and coping questionnaires was to assess the relationship between stressors encountered in daily life and physiological reactivity in the laboratory (see Manuck & Krantz, 1986 for a discussion of this issue) and to assess the degree of stress and coping repetoires that subjects perceived themselves as having.

The subject was then seated in front of a television monitor. A blood pressure cuff was fitted over the brachial artery on the subject's nondominant arm. To measure heart rate, a photoplethysmograph was attached to the pad of the middle finger on the nondominant hand. While placement of both the cuff and photoplethysmograph on the same arm may result in the interference of the signal from the latter while the cuff is inflating, the photoplethysmograph is very sensitive to movement thus placement on the dominant hand (which was operating the joystick) was not acceptable.

The subject was asked to remain as still as possible for the next several minutes while the baseline measures were being taken. The baseline period lasted six minutes

and the average of the last two measures were taken as the baseline for blood pressure and of the last two trials of continuous measurement for heart rate. Taking into account that introductory comments, filling out questionnaires and sensor placement took at least 15 minutes (15 to 30 minutes of sitting is recommended before taking baseline measures), these procedures follow those suggested by Schneiderman and Pickering (1986).

The experimenter explained that the subject would listen to a tape recorded conversation between an employee, supervisor and co-worker during which the names of certain fruits will be spoken by a fourth voice. To insure the subject's attention to the auditory stimulus, the subject was instructed to call out the names of the fruit as they heard them. The subject was also told that he or she would be required to closely attend to the conversation as there would be questions about the it later. The subject was told that while listening to the conversation, he or she would play the video game, Pacman and that one's best effort should be put into it. As justification for these procedures, the experimenter told the subject that we were interested in nicotine's effect on physiological reactivity.

Psychological stressors used for studying reactivity

should have a demonstrated ability to evoke the responses being studied and further, should do so reliably as well as yield a range of individual differences (Krantz, Manuck, & Wing, 1986). Tasks that invlove some degree of "mental challenge", vigilance and "active instrumental control," all of which seem to be represented in the above described tasks, have been shown to evoke sizeable sympathetic responses (Krantz, Manuck, & Wing, 1986). Further, dual-task performance in particular, has been found to increase sympthetic nervous system responses (Glass et al, 1980). Krantz, Manuck, and Wing (1986) have stated that increasing the level of challenge and of the subject's engagement in the task through instructions (e.g., that they would be questionned on the taped conversation later and to put their best effort into the video game) has been shown to raise physiological responses as well.

The stimuli presentation lasted nine minutes (task duration of five to fifteen minutes is sufficient in most research studies - Krantz, Manuck, & Wing, 1986). Measures of blood pressure were taken every 90 seconds during the presentation of the stimuli and heart rate was continuously monitored. A rest period followed this during which measures continued to be taken at the same rates. During this rest period smokers were asked to

smoke their own cigarette ad libitum. A naturalistic protocol was desired to examine differences in smoking behavior and in effects of smoking following an acute stressor. Nonsmokers were simply asked to sit quietly and were monitored until they returned to baseline (+/- 5 mmHg of the baseline for blood pressure and +/- 5 beats per minute of the baseline for heart rate). The subjects were then given a questionnaire, the content of which was for the purposes of performing manipulation checks. Finally, after completion of this last questionnaire, subjects were debriefed as to the nature of the experiment and paid fifteen dollars.

Measures and Apparatus

In an attempt to obtain reliability data on the main dependent measures that were developed especially for this study, subjects were asked to fill out the questionnaires a second time a suitable period of time after having initially filled it out. Eight subjects agreed to do so. Time between test occasions was between two weeks and two months. Due to the small number of subjects recruited to provide test-retest data, this is by no means definitive reliability data. Furthermore, on close examination of these eight pairs of questionnaires it was evident that the response quality differed on the two test occasions.

For instance, the majority of the questionnaires filled out on the second occasion contained less written material on the free-response questions or on the "other" response option on the multiple choice-type questions than on the first occasion. Also, more questions seemed to have been left blank on the second occasion than on the first. It seems reasonable to assume that the subjects' motivation level was somewhat less on the second occasion than on the first and this was probably due to the fact that this was a lengthy questionnaire and took a considerable amount of time to fill out. Thus, the test-retest data are suspect.

When appropriate then, this data will be suplemented by internal consistency data. The rationale for this is that a reliable measure is one which has a small error component (i.e., measures a single underlying dimension) and therefore does not randomly fluctuate from one occasion to the next. Internal consistency data indicates the degree to which the instrument measures a single construct (i.e., the degree to which its items are intercorrelated positively) and thus how well one's score can be predicted on this and similar items based on the response to one item. Many of these questionnaires encompass several different scales (e.g., on the Behavioral Self-Control questionnaire there are questions on the degree of, reasons for, techniques used to, and

felt efficacy at controlling one's use of nicotine, alcohol and caffeine). Therefore, it was necessary to break down some of the questionnaires into the component parts when possible and run the reliability statistics on these. This avoids the mistake of reporting on the relatedness of items that represent different underlying dimensions. This reliability data will be presented below.

History of, and Current Smoking Behavior. This questionnaire included items regarding current smoking practices including frequency, duration and current attempts at quitting or reducing smoking; history of attempts at quitting, reducing smoking, increasing smoking and withdrawal; and brand preference (see Appendix B). Reliability data for this questionnaire are as follows: number of cigarettes smoked per week, r = .99; number of quit attempts in the past, r = .79; number of attempts at reducing smoking in the past, r = -.34; number of increases in smoking in the past, r = .97; and number of symptoms experienced following cessation or reduction of smoking, r = .79.

Behavioral Theories of Choice. Direct constraints on access to drugs is the first determinant involved in choice theory. The amount of behavior required to obtain

drugs is one type of such constraints. Price or restrictions on where smoking is allowed are examples of such constraints and subjects were given the opportunity to list such responses on an open-ended question asking them why they restrain themselves from smoking frequently (see Appendix F). Consequences of consumption are another type of direct constraint. Regarding these consequences, subjects were asked if they experience any allergic or negative physiological reactions during or after smoking, and if they felt guilty or anxious during or after smoking. Also, the degree to which significant others disapprove of or discourage smoking was gauged (see Appendix C). The test-retest data was as follows: personal reactions (allergic or negative physiological reactions), $\underline{r}$ = .72; significant others disapproving of smoking, $\underline{r}$ = .93; significant others discouraging smoking, $\underline{r}$ = .98.

The availability of, and constraints on access to other reinforcers comprise the second determinant of choice theory. Other ways the subject has of obtaining the same feelings, states or effects as cigarettes provide were measured as well as the degree to which the subject believed that these other ways are as effective as cigarettes. The reliability of these measures is indicated as follows: number of "other ways," $\underline{r}$ = .71;

rated effectiveness of these "other ways," r = .54.

Cues. External cues encompass environmental stimuli that make up the context of drug administration. Subjects were asked the degree to which various situations, such as eating a meal, being in the car or studying, make them want to smoke (see Appendix D). The degree to which subjects are reactive to internal or affective cues were measured by subjects' expectancies that smoking will alter various mood states for them. Thus, inasmuch as subjects expect cigarette smoking to help them relax or make them feel less angry, it was inferred that feeling unrelaxed or angry are internal cues that the subject reacts to (see Appendix H). Finally, to address subjects' use of cues to decrease or abstain from smoking, they were asked how often they cut down or stop smoking temporarily in response to such cues as physical (sore throat, cough) or mental symptoms (inability to concentrate, feeling edgy - see Appendix F). The reliability data are presented as follows: external cues, r = .50, however the alpha coefficient for this scale was .91; Chronbach's alphas for the internal cues scales (three affect-related smoking scales on the expectancy questionnaire) were .82, .92, and .86.

Family History of Drug Use. Subjects were asked

which family members and close friends smoked cigarettes while they were growing up and what amount these individuals smoked. In research on chippers, the investigation of the process by which the family has affected substance use seems to have been neglected. Therefore, this questionnaire also included questions on the significant others' role in teaching how to smoke, telling the subject about the effects of cigarettes or their reasons for smoking. Also tapped, were the subjects' own impressions and observations of the effects of, and reasons for tobacco use by their significant others regardless of whether or not they were told about these effects and reasons for smoking. Similar questions appeared for alcohol and caffeine as well as the degree to which subjects thought that their significant others ate certain foods to regulate their affect (see Appendix E).

The reliability data on this questionnaire are as follows: the number of significant others using nicotine, $\underline{r}$ = .63; number of significant others using alcohol, $\underline{r}$ = .84; number of significant others using caffeine, $\underline{r}$ = .42; direct teaching opportunities regarding nicotine, $\underline{r}$ = .26, (alpha = .35); alcohol, $\underline{r}$ = .43, (alpha = .34); and caffeine, $\underline{r}$ = .25 (alpha = .39); observational opportunities regarding nicotine, $\underline{r}$ = -.60,

(alpha = .79); alcohol, r = .54, (alpha = .56) and caffeine, r = -.14, (alpha = .62). Regarding subjects' observational opportunities, more impressive reliability data was found on questions where subjects were asked to indicate the number of their significant others who they felt enjoyed using nicotine, r = .97; used nicotine to feel better when upset, r = .94 and used nicotine to feel even better when euthymic, r = .92; number of significant others who they felt enjoyed using alcohol, r = .82; used alcohol to feel better when upset, r = .20; and used alcohol to feel even better when euthymic, r = .89; number of significant others who they felt enjoyed using caffeine, r = .61; used caffeine to feel better when upset, r = .49; and used caffeine to feel even better when euthymic, r = .62. Reliability data for questions on significant others who used foods to regulate affect was r = .23.

Behavioral Self-Control. Subjects were asked how strongly they limit their smoking and how efficacious they feel with regards to their attempts at self-control. In accordance with the informal rules that were found to be used in the chipper literature (Harding, 1988), questions appeared such as the degree to which subjects monitor money spent, number of cigarettes smoked, time between

cigarettes, types of situations in which they will smoke and various physical and psychological symptoms. Subjects were also asked questions about their reasons for limiting smoking, when they do, such as health concerns, appearance, social standing and athletic ability; and the degree to which these reasons account for their behavior. These same areas; amount of self-control used and the degree of self-efficacy associated with this, and rules and reasons for limiting use were covered for alcohol and caffeine use as well. Finally, other areas of self-regulation were covered on this questionnaire such as dieting history and success at dieting in the past, exercise routines, sleep patterns and study habits (see Appendix F).

Reliability data are as follows: limiting nicotine, $\underline{r}$ = .11, alcohol, $\underline{r}$ = .66, and caffeine, $\underline{r}$ = .55; felt efficacy at limiting nicotine, $\underline{r}$ = -.17, alcohol, $\underline{r}$ = .32, and caffeine, $\underline{r}$ = .88; techniques used to limit nicotine, $\underline{r}$ = .66, alpha = .60; alcohol, $\underline{r}$ = .35, alpha = .87; and caffeine, $\underline{r}$ = .41, alpha = .83; and reasons for limiting nicotine, $\underline{r}$ = .73, alpha = .90; alcohol, $\underline{r}$ = .74, alpha = .90; and caffeine, $\underline{r}$ = .12, alpha = .94.

Expectancies. Certain items that were appropriate to cigarette smoking were taken from the Alcohol Expectancy Questionnaire (Brown, Goldman, Inn & Anderson, 1980) and

adapted for use in the proposed study. These items represent expectancies of various outcomes of nicotine use such as facilitating social interactions (including sexual prowess, assertiveness and power), decreasing negative affect (worry, stress, hostility, inferiority feelings), increasing positive affect (self-confidence, relaxation, excitedness) and arousal (alertness, energy, coordination). Also, on this questionnaire, subjects were asked about their expectancies for certain social outcomes of cigarette smoking such as image enhancement or social reprisal. These items were adapted from Dermer and Jacobsen (1986). Finally, questions appeared regarding expectancies for the development of certain diseases or negative health outcomes as a result of smoking (see Appendix H). Reliability data for the seven subscales of this questionnaire (see Results section) are as follows: Positive Social Consequences, $\underline{r}$ = .46, alpha = .88; Negative Social Consequences, $\underline{r}$ = .78, alpha = .85; Negative Health Consequences, $\underline{r}$ = .02, alpha = .93; Socially Facilitating, $\underline{r}$ = .63, alpha = .90; Affect Regulation - Positive, $\underline{r}$ = .24, alpha = .82; Cope with Negative Events or Affect, $\underline{r}$ = .58, alpha = .92; Affect Regulation - Arousal, $\underline{r}$ = .47, alpha = .86.

First Cigarette Experience. Items on this

questionnaire were adapted from the structured interview used by Hirschman, Leventhal and Glynn (1984). Areas covered included the context of the first cigarette (who with, source of cigarette, mood), reasons for trying the first cigarette (curiosity, peer pressure, "look or feel tough," "feel less stressed"), consequences of the first cigarette (getting caught and punished, felt closer to the people present, looked "cool" or "silly") and topography (depth of inhaling, finish whole cigarette). Subjects were asked about their experience of an array of symptoms (e.g., burning throat, coughing, dizziness, headache) and the degree to which they expected to get used to these or believed that these meant some damage was being done to their bodies. Finally, subjects were asked for their overall appraisal of their first cigarette experience (see Appendix G). Reliability data for this section was as follows: reasons for trying first cigarette, $\underline{r}$ = .05, alpha = .79; symptoms experienced, $\underline{r}$ = .37, alpha = .88; expectancies for getting used to these symptoms, $\underline{r}$ = -.06, alpha = .95; and beliefs that the symptoms meant damage was being done to their bodies, $\underline{r}$ = -.18, alpha = .96.

Arousability. The exact same instrument that Pandina used to measure arousability was used in the present study (Pandina, Labouvie & White, 1984). Subjects

responded affirmatively or negatively to items from four subscales from a shortened version of Jackson's (1974) Personality Research Form: Cognitive Structure (e.g., "I very seldom make careful plans."), Harm Avoidance (e.g., "I think I would enjoy mountain climbing."), Impulsivity (e.g., "Many of my actions seem to be hasty.") and Play (e.g., "I spend a good deal of my time just having fun."). Similarly, subjects responded to two subscales from the Zuckerman (1979) Sensation Seeking Scale: Disinhibition (e.g., "I like to gamble for money.") and Experience Seeking (e.g., "I would like to hitchhike across the country." - see Appendix I).

Stress and Coping. Subjects' perceptions of the stress they are currently experiencing in their lives were measured by the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983 - see Appendix K). Subjects' coping style was assessed with the Daily Coping Inventory (Stone & Neale, 1984 - see Appendix L).

Manipulation Checks. This included questions on the tape recorded conversation as well as how challenging they found the Pacman game to be and how much effort they put into it. Also, a count of the number of names of fruits the subject correctly calls out was recorded as a measure of the degree to which they attended to the

taped conversation (see Appendix N).

Physiological Reactivity. Heart rate (HR), systolic blood pressure (SBP) and diastolic blood pressure (DBP) were monitored using a Autogenic Systems Biolab connected to a microcomputer (Zenith Data Systems, Model Z 158) with Biolab 160 software and a Paramed blood pressure monitor (Model 9200) with a standard automatic inflatable blood pressure cuff. A photoplethysmographic sensor attached to the pad of the middle finger on the nondominant hand was used to measure heart rate. Blood pressure readings were taken every 90 seconds and heart rate was measured continuously. In the present study the peak of the SBP and DBP responses, with the respective baseline measures used as covariates, was taken as a measure of reactivity to the stressor. Also, the peak HR response for the entire stimulus period, again with the appropriate baseline measure used as a covariate, was taken as the measure of reactivity as far as this variable was concerned. For the rest period, the means of the blood pressure and heart rate readings for the period were used as the measure of reactivity.

Stimulus Presentation. For the visual-motor task, a video game (Pacman) was used with the Atari Supersystem and a 13 inch color television monitor (Sanyo Electric Inc., Model 31C435). The game was played on

the "Strawberry" level of difficulty - a moderately high level. The auditory task was a recorded conversation presented using a Panasonic tape recorder (Model RQ-2309AV) and a pair of headphones.

Results

Subject Characteristics and Distribution of Variables

To examine whether demographic and smoking experience variables were evenly distributed among the groups, oneway analyses of variance (ANOVAs) were performed for continuous variables and chi-square analyses were performed for discrete variables. The groups did not differ on age, $F(2, 63) = .0167$, $p = .9834$; (as would be expected given that this was one of the matching variables) or on year in school, $F(2, 59) = 1.2113$, $p = .3051$. While the sample was predominantly white; there were three American Indian, two Asian and one Hispanic subjects. There were no significant differences on the distribution of ethnicity among the groups, χ^2 (6, $N = 66$) $= 9.4$, $p = .1523$. (See Table 1 for mean values of these variables.) Therefore, demographic variables were evenly distributed between groups.

To determine if chippers and addicts differed on various aspects of cigarette smoking, oneway ANOVAs were executed. As expected, addicts smoked significantly more

cigarettes per week than chippers, $F(1, 42) = 168.7201$, $p < .001$. The two groups did not differ significantly on the number of years that they have been smoking at their present rate, $F(1, 42) = 1.6280$, $p = .2090$ (again, as expected given that this was one of the variables that subjects were matched on). Addicts had made significantly more quit attempts, $F(1, 39) = 5.1557$, $p < .05$; had attempted more often to reduce the amount that they smoke, $F(1, 39) = 5.7065$, $p < .05$; and reported experiencing more symptoms when they did quit or cut down, $F(1, 40) = 43.1025$, $p < .001$; than did chippers. (See Table 1 for mean values of these variables.) Thus, chippers and addicts differ on variables that they would be expected to, given their different rates of smoking (number of cigarettes smoked per week and experience with quit and reduction attempts). They do not differ on one very important variable which was hypothesized to be related to several of the dependent variables and hence was a matching variable: namely, number of years smoking.

Behavioral Theories of Choice

In order to address the question of whether chippers reported having higher direct constraints on access to cigarettes than addicts, Chi-square analyses were run on responses to questions on whether or not cost and restricted locations limited their smoking (which

represent a certain degree of effort needed to gain access to consumption) and oneway ANOVAs were performed on responses to questions about personal and significant other reactions to their smoking (which represent consequences contingent on consumption). Nonsmokers were not included in these analyses as the measures were directed specifically at smoking behavior. Smoking group and the degree to which cost limits smoking appear to be independent of one another (2 chippers and 4 addicts indicated this was so), $\underline{x}^2(1, \underline{N} = 44) = 0.7719$, $\underline{p} = .3796$. Smoking group and the degree to which location restriction limits smoking also appear to be independent of one another (1 chipper and no addicts indicated that this was so), $\underline{x}^2(1, \underline{N} = 44) = 1.0233$, $\underline{p} = .3118$. Questions on personal reactions to cigarettes were responded to on 5-point Likert-type scales with 1="Not at all" and 5="Very likely." Chippers ($\underline{M} = 1.77$) and addicts ($\underline{M} = 1.82$) did not differ significantly on their likelihood of experiencing a negative somatic reaction while smoking, $\underline{F}(1, 42) = .0194$, $\underline{p} = .8898$; or on that of experiencing such a reaction after smoking (chipper $\underline{M} = 1.91$, addict $\underline{M} = 1.82$; $\underline{F}(1, 42) = 0.0977$, $\underline{p} = .7562$). Chippers ($\underline{M} = 2.00$) were significantly more likely to experience guilt about their smoking than addicts ($\underline{M}$ =

1.45; $F(1, 42) = 4.6667$, $p < .05$). There were no significant differences between groups on the degree of anxiety experienced about smoking though an interesting trend (in the opposite of the predicted direction) showed up in which addicts ($M = 1.95$) felt slightly more anxious than chippers ($M = 1.55$) about smoking, $F(1, 42) = 2.7216$, $p = .10$. When subjects indicated the degree to which immediate family members and their "best friend" disapproved of and tried to discourage their smoking (on 5-point Likert-type response format, 1="Not at all", 5="Very much so"), chippers ($M = 4.82$) and addicts ($M = 4.32$) did not differ significantly on the number of such significant others disapproving at least slightly, $F(1, 42) = .9784$, $p = .3282$; or on the number of significant others trying to discourage them from smoking (chipper $M = 4.05$, addict $M = 3.64$), $F(1, 42) = .4547$, $p = .5038$. Thus, very slight support was found for the first component of behavioral theories of choice (direct constraints on access to nicotine) in the form of chippers experiencing more guilt about their smoking than addicts. An interesting finding was that addicts experienced slightly more anxiety about their smoking than chippers suggesting perhaps that they have reservations about their habit.

The second component of behavioral theories of choice

is the availability of, and constraints on access to other reinforcers. In order to examine whether chippers reported having greater availability of access to other reinforcers than addicts, oneway ANOVAs were performed on the number of "other ways" that the groups felt that they could obtain the "same feelings, states or effects" as they get from cigarettes. Again, nonsmokers were not included in these analyses for the reason noted above. The two groups did not differ significantly from one another in the total number of other ways that they wrote down (chipper M = 2.41, addict M = 2.45), $F(1, 42)$ = .0101, p = .9205. Chi-square analyses were then run on the different types of "other ways" that were listed to determine if the two groups differed on whether or not they used the alternate methods. The alternate methods that were listed in a free-response format fell into the following categories: alcohol, exercising, sweets, caffeine, sex, socializing, marijuana/other illict drugs, other foods, sleeping and other. A lack of independence between alternate method used and smoking group was found for only one such method, marijuana/other illicit drugs, with 5 addicts reporting use of such drugs and no chippers reporting use, $\chi^2(1, N = 44) = 5.6410$, $p = .01$.

Subjects were asked to rate their alternate methods

as to their effectiveness on 5-point Likert-type scales (1="Works somewhat as well", 5="Works better") which were then averaged for the number of alternate methods they had listed. Oneway ANOVAs were run on these averaged effectiveness ratings of the alternate methods to examine if the groups differed on their experience of constraints on access to alternate reinforcers. The two groups did not differ significantly on this variable (chipper *M* = 3.68, addict *M* = 3.46; *F*(1, 42) = .4276, *p* = .5174). Thus, the second component of behavioral theories of choice was not supported by the present analyses as far as its ability to differentiate between chippers and addicts. Of note is addicts tendency to use illicit drugs to obtain the same effects as cigarettes more often than chippers suggesting a tendency to use substances (both licit and illicit) as a way of managing their affect.

In order to explore why chippers smoke at all, nonsmokers were added to the same analyses reported above regarding alternate methods of affect regulation. This addresses the question of whether chippers, as compared to nonsmokers have less access to alternate ways of regulating their affect and hence rely on cigarettes to do so. There were no differences between groups on the number of "other ways" for regulating affect (chipper *M* = 2.41, addict *M* = 2.45, nonsmoker *M* = 2.91; *F*(2, 63) =

.6000, p = .5519); or on their ratings of the effectiveness of their "other ways," (chipper M = 3.68, addict M = 3.46, nonsmoker M = 4.05; F(2, 51) = 1.4328, p = .2481). Regarding the specific types of "other ways," similar results as those found between chippers and addicts were found when all three groups were compared except for the use of exercise (9 chippers, 10 addicts and 16 nonsmokers reported using exercise as an "other way"), χ^2(2, N = 66) = 5.2313, p = .07. Therefore, chippers do not seem to be smoking due to a significant lack of alternate methods of affect regulation compared to nonsmokers.

Cues

Subjects' responses (on 5-point Likert-type scales, 1="Not at all", 5="Very much so") to sixteen questions on the degree to which various situations make them want to smoke were summed and subjected to oneway ANOVA to determine if addicts were more responsive to external cues than chippers. Again, the nature of these and other measures taken in this section precluded the use of nonsmokers in these analyses. Addicts (M = 14.00) reported responding to significantly more external cues than chippers (M = 7.18), F(1,42) 73.7360, p <.001. Addicts (55.86) also reported responding significantly

more strongly to external cues than chippers (33.95), $F(1, 42) = 55.8101$, $p < .001$.

Subjects' reports of affect related smoking (suggesting that internal or affective cues trigger smoking) were taken from the expectancy questionnaire (see later section). Subjects were asked to respond to questions on 5-point Likert-type scales (1="Not at all", 5="Strongly agree") on their expectancies for cigarettes to alter their affective state. These questions were organized into three scales: Positive Affect Regulation (e.g., "Smoking cigarettes makes me feel happy."), Coping with Negative Events or Affect (e.g., "Smoking cigarettes relieves boredom.") and Arousal (e.g., "Smoking cigarettes can make me feel more wide awake."). Subjects' responses were summed on each scale and subjected to oneway ANOVAs to examine whether or not addicts were more reactive to internal cues than chippers. The two groups did not differ in their endorsement of positive affect regulation smoking items (chippers M = 12.36, addicts M = 14.09, $F(1, 42) = 1.6048$, $p = .2122$. Addicts did obtain a significantly higher score on the Cope with Negative Events or Affect scale (M = 30.23) than did chippers (M = 23.27; $F(1, 42) = 5.97$, $p = .01$). The two groups did not differ on the Arousal scale (chipper M = 7.5, addict M = 9.36; $F(1, 42) = 2.1041$, $p = .1543$).

In order to determine if chippers were more likely to respond to cues to cut down or stop smoking than addicts, oneway ANOVAs were executed on subjects responses on two questions, one on physical cues or symptoms and one on mental symptoms (answered on 5-point Likert-type format, 1="Never", 5="Very often"). The two groups did not differ in their responses to physical cues to cut down or stop (chipper M = 2.45, addict M = 2.09; F(1, 42) = .6843, p = .4128); or in their responses to mental cues to cut down or stop (chipper M = 0.50, addict M = 0.73; F(1, 42) = .4124, p = .5242).

Some support was found for the hypothesis that chippers are less responsive to certain types of cues to smoke cigarettes than addicts. In particular they are less responsive to external or situational cues and to internal cues in the form of negative affective states (surmised from their lower expectancies for smoking to help them cope with such states). The two groups did not differ in their reactivity to other affective cues or to cues to cut down or stop smoking.

Family History of Drug Use

Nicotine To test the hypothesis that chippers have lower numbers of smokers among their family members and close friends, while growing up, than addicts and that

nonsmokers have the lowest numbers of smokers among their significant others of all groups, oneway ANOVAs were run on the number of such people subjects identified as having smoked at least "a few cigarettes" while they were growing up. Scheffe's Test for multiple comparison of means was used throughout this results section (at the .05 level of probability unless otherwise specified). Chippers and addicts reported significantly more smokers among significant others than did nonsmokers while growing up, but did not differ from one another, $F(2, 63) = 8.6114$, $p < .001$. To examine the proposition that while growing up chippers had more light or occasional smokers among their significant others than addicts and nonsmokers and that they had less social learning opportunities regarding smoking than addicts (with nonsmokers reporting the least amount of such opportunities of all groups), oneway ANOVAs were performed on selected questions. There were no differences between groups on the number of significant others who were occasional smokers (smoked at least "a few cigarettes per month, week or day"), $F(2, 63) = 1.7454$, $p = .1829$. A composite score was derived for the social learning variable of observation by counting whether a family member or friend smoked in front of subjects, or if they observed certain effects of cigarettes on their "others" or thought about why these others smoked

(alpha = .79). There were no differences between groups on this variable, $F(2, 63) = .5547$, $p = .5770$. A composite score was derived for another learning variable, direct teaching, by counting whether significant others taught subjects how to smoke, told subjects about the effects cigarettes had on them, or told subjects why they smoked (alpha = .35). Again, there were no significant differences between groups on this variable, $F(2, 63) = 2.2769$, $p = .1110$. (See Table 2 for mean values of these variables.)

To obtain a better understanding of the role of social learning in smoking behavior, subjects were asked to what degree their significant others enjoyed smoking, smoked to make themselves feel better when worried or upset, or smoked to make themselves feel even better (on 5-point Likert-type scales, 1="Not at all", 5="Very much"). Again, the hypothesis that addicts experienced more of such social learning than chippers and that smokers as a whole (both chippers and addicts) experienced more than nonsmokers was tested by summing the number of significant others listed as having done so (with a scale score of at least 2 with 1 equaling Not at all) and subjecting them to ANOVA. Chippers and addicts reported significantly more family members and friends having

enjoyed smoking cigarettes than nonsmokers but did not differ from each other, $F(2, 63) = 5.7882$, $p < .01$. There were no significant differences between groups on "others" smoking to make themselves feel better, $F(2, 63) = 1.4789$, $p = .2357$; or to feel even better, $F(2, 63) = .8414$, $p = .4359$. (See Table 2 for mean values of these variables.) Again, chippers and addicts came out looking more alike than different. Smokers as a whole (both chippers and addicts) did report having more smokers among family and friends than nonsmokers while growing up. However, as far as the mechanism of how that translates into developing a cigarette smoking habit, very slight evidence for a social learning (observational) model was found in that smokers reported thinking that more of their significant others enjoyed smoking than did nonsmokers.

Alcohol To examine differences between groups regarding the presence of alcohol users among family and friends while growing up and regarding related observational and direct teaching opportunities, oneway ANOVAs were performed. Chippers reported significantly more alcohol users among family and friends than did nonsmokers, $F(2, 63) = 7.0554$, $p < .01$; but did not differ from addicts (neither did addicts differ significantly from nonsmokers). There were no differences between groups as far as the number of occasional alcohol users

among significant others while growing up, $F(2, 63) = 1.3815$, $p = .2587$. Moreover, there were no differences between groups on opportunities to observe "others" drink alcohol (alpha = .56), $F(2, 63) = 1.0037$, $p = .3723$ or having been taught directly about the effects of alcohol (alpha = .34), $F(2, 63) = .9464$, $p = .3936$. Chippers reported significantly more significant others having seemingly enjoyed drinking alcohol than nonsmokers, $F(2, 63) = 4.3159$, $p = .01$ (there were no other significant differences between groups on this variable). There were no differences between groups on reported numbers of others drinking alcohol to feel better, $F(2, 63) = 1.5017$, $p = .2306$. Chippers and addicts reported significantly more "others" drinking alcohol to feel even better than nonsmokers, $F(2, 63) = 3.3472$, $p < .05$. (See Table 2 for mean values of these variables.) Overall, smokers (and particularly chippers) reported more alcohol use among significant others and more social learning opportunities than nonsmokers. Once again, chippers and addicts were rather similar to each other in this area.

Caffeine To examine differences between groups regarding the presence of caffeine users among family and friends while growing up and regarding related observational and direct teaching opportunities, oneway

ANOVAs were performed. There were no differences between groups on the number of caffeine users among family and friends, $F(2, 63) = 1.7591$, $p = .1806$; or on occasional caffeine users among "others", $F(2, 63) = .8394$, $p = .4367$. Moreover, there were no differences between groups in their observational opportunities (alpha = .62), $F(2, 63) = .3867$, $p = .6809$; or in their direct teaching opportunities (alpha = .39), $F(2, 63) = 1.1870$, $p = .3119$. There was a marginally significant effect for chippers having reported thinking that their family and friends enjoyed using caffeine more than nonsmokers, $F(2, 63) = 2.8981$, $p = .06$ (there were no other differences between groups for this variable). The groups did not differ in their beliefs that their family and friends used caffeine to feel better when worried or upset, $F(2, 63) = .2193$, $p = .8037$; or to feel even better, $F(2, 63) = .1912$, $p = .8265$. (See Table 2 for mean values of these variables.) Thus, family history of caffeine use and social learning opportunities therein do not seem to differentiate between addicts, chippers and nonsmokers. A greater number of significant others were reported to have used caffeine than either nicotine or alcohol. The sample mean for the number of significant others that used the particular substances were: cigarettes $M = 3.48$, alcohol $M = 5.30$ and caffeine $M = 6.62$.

Subjects' responses about their own and their significant others' use of foods to regulate affect were examined with ANOVA (5-point Likert-type scale, 1="Not at all", 5="Very much so"). Nonsmokers reported using food to make themselves feel better significantly more than addicts, $F(2, 63) = 4.5277$, $p = .01$ (there were no other significant differences between groups on this variable). There were no differences between groups on the number of significant others thought to use foods to make themselves feel better, $F(2, 63) = 1.1251$, $p = .3311$. (See Table 2 for mean values of these variables.)

Overall, a family history and informal social learning model (addressing how family history translates into substance use) was of little value in differentiating between chippers and addicts. It was, however, useful for differentiating between smokers as a whole (chippers and addicts) and nonsmokers. Generally, greater cigarette and alcohol use was reported among family and friends of smokers as well as greater social learning opportunities than was reported among nonsmokers.

Behavioral Self-Control

Nicotine In order to determine if chippers consciously try to limit their smoking more strongly than do addicts, and if they feel more efficacious in doing so,

oneway ANOVAs were executed on various questions addressing these issues. The response format was a 5-point Likert-type scale with 1="Not at all" and 5=the strongest affirmative response (the actual label may have changed depending upon what was appropriate to the question) unless otherwise stated. For the obvious reasons, nonsmokers were excluded from these analyses but were included in later sections on self-control over other substance use and self-regulatory behaviors. The two groups did not differ on the degree to which they reported trying to limit the number of cigarettes they smoked, $F(1, 42) = 2.2115$, $p = .1445$; but chippers reported trying more strongly to restrain themselves from smoking frequently than addicts, $F(1, 42) = 5.4528$, $p < .05$. Furthermore, chippers reported greater success with limiting the number of cigarettes they smoke, $F(1, 37) = 29.0722$, $p < .001$; and with restraining themselves from smoking frequently, $F(1, 37) = 26.0843$, $p < .001$; than did addicts. Although none of the chippers were ex-addicts they still had a history of quit attempts. Chippers reported greater expected ease with which they could quit (5-point Likert-type scale, 1="Very easy", 5="Very difficult") than did addicts, $F(1, 40) = 106.8775$, $p < .001$; as well as greater actual success with quitting in the past (5-point Likert-type scale, 1="Very successful", 5="Not at all

successful") than did addicts, $F(1, 33) = 16.4637$, $p < .001$. For those smokers who had attempted to quit, there were no differences between chippers and addicts on how long they had quit for, $F(1, 29) = 1.6770$, $p = .2055$. When asked how strongly they wanted to quit, a trend was evident in which addicts reported wanting to quit somewhat more strongly than chippers, $F(1, 42) = 3.0309$, $p = .0890$. (See Table 3 for mean values of these variables.) Thus, support was found for the proposition that chippers control their use more strongly than addicts and that they feel more successful in doing so, have greater expectancies for being able to quit and have indeed had greater success in quitting in the past than have addicts. However, if length of time quit for is a measure of success, the two groups did not differ on this. Also, more evidence was found (referring to addicts' tendency to feel slightly more anxiety over their smoking than chippers) that addicts are concerned about their habit in that they express a stronger desire to quit than chippers. This last finding also suggests that chippers are not as concerned about their smoking as addicts. It may be that because of their limited use or their ability to control it they see it as less threatening.

To explore smokers' rules or techniques that they use

to control their smoking as well as their reasons for attempting to do so, subjects rated various techniques and reasons (on 5-point Likert-type scales, 1=the strongest negative response, 5=the strongest affirmative response). To examine differences between chippers and addicts on these issues, ANOVAs were run on the number of techniques and reasons that they endorsed as well as on an averaged rating of how often and strongly (respectively, using the Likert-type scale described above) these were involved in their attempts at self-control over their nicotine use. Addicts reported using more rules or techniques to control their smoking than chippers, $F(1, 42) = 4.7008$, $p < .05$; though chippers reported a higher average rating of how often they use their techniques, $F(1, 42) = 16.9763$, $p < .001$. Chippers reported more reasons (e.g., to avoid disapproval of others, to avoid diseases associated with smoking) for limiting their smoking than addicts, $F(1, 42) = 7.1764$, $p = .01$; and endorsed these reasons more strongly than addicts, $F(1, 42) = 12.9707$, $p < .001$. (See Table 3 for mean values of these variables.) So, chippers have less techniques that they use to limit their smoking but do use the ones they have more often than addicts. Also, they have more reasons and rate their reasons more strongly as far as controlling their use than addicts. That addicts admit to having more techniques at their

disposal again suggests that they have some degree of concern over their smoking.

Alcohol In order to explore differences between chippers, addicts and nonsmokers in their tendency to control their alcohol consumption and their success and expectations for doing so, oneway ANOVAs were performed on various questions that were answered on 5-point Likert-type scales with 1="Not at all" and 5=the strongest affirmative response (unless otherwise stated). This set of analyses tests the hypothesis that the self-control that chippers show in relation to their cigarette smoking carries over to another mood-altering substance. Nonsmokers reported trying to limit the number of alcoholic drinks they consume significantly more strongly than both chippers and addicts (who did not differ from one another), $F(2, 62) = 8.4069$, $p < .001$. Nonsmokers also reported trying to restrain themselves from drinking frequently more strongly than both chippers and addicts (who again did not differ from one another), $F(2, 62) = 5.4805$, $p < .001$. There were no differences between groups in their reported success at limiting the number of drinks that they have, $F(2, 62) = 2.2628$, $p = .1126$; but a trend emerged as far as reported success at self-restraint from drinking frequently with nonsmokers reporting the

highest of the groups, $F(2, 61) = 2,5087$, $p = .0897$.

There were no differences between groups as far as their expectancies for their ability to quit drinking alcohol, $F(2, 61) = .7708$, $p = .4671$; or, for those who had attempted, in their actual success at quitting in the past, $F(2, 21) = 1.3044$, $p = .2924$ (for both of these questions 1=the strongest negative response and 5=the strongest affirmative response). There was a trend towards significance for the number of past quit attempts (for alcohol) with addicts having the highest number followed by chippers and then nonsmokers, $F(2, 32) = 2.3680$, $p = .10$. For those who had quit drinking in the past, there were no differences between groups for the length of time they quit for, $F(2, 13) = .1587$, $p = .8549$. Also for those who had quit drinking previously, addicts reported drinking significantly more before their last quit attempt than both chippers and nonsmokers, $F(2, 12) = 6.2212$, $p = .01$. Trends emerged for present number of alcoholic beverages consumed per week with chippers reporting the highest, $F(2, 39) = 2.4933$, $p = .09$; and for the maximum amount of alcoholic beverages consumed in one day with addicts reporting the highest such consumption, $F(2, 55) = 2.9351$, $p = .06$. A trend also emerged for desire to quit drinking with nonsmokers expressing the strongest desire, $F(2, 60) = 2.4689$, $p = .09$. (See Table

4 for mean values of these variables.) Nonsmokers seem to be exercising the most self-control over their alcohol use while chippers and addicts did not differ in this. It appears that nicotine addicts may have more problematic drinking patterns as evidenced by their slightly higher number of past quit attempts and a significantly higher past consumption rate before their last quit attempt (though the last finding should be viewed with caution given the low number of subjects involved in the analysis).

Oneway ANOVAs were executed on the number of techniques used, and reasons for cutting down or quitting drinking to determine if chippers exercise more self-control in this area than addicts. Also, subjects rated how often they use their techniques and how strongly they endorsed their reasons on 5-point Likert-type scales with 1=the strongest negative response and 5=the strongest affirmative response. The average of these ratings was computed and ANOVAs were run to examine differences between groups. Nonsmokers reported using significantly more techniques than addicts for quitting or cutting down on their drinking (there were no other significant differnces between groups on this variable), $F(2, 63) = 3.4903$, $p < .05$. On average, nonsmokers used their

techniques significantly more often than both addicts and chippers, $F(2, 60) = 6.4076$, $p < .01$. There were no differences between groups regarding the number of reasons they endorsed for wanting to limit their drinking, F (2, 63) = 1.9734, $p = .1475$; though nonsmokers reported a stronger endorsement of their reasons than addicts, $F(2, 62) = 3.4206$, $p < .05$. (See Table 4 for mean values of these variables.) In sum, chippers' greater propensity to use self-control as far as their smoking is concerned did not permeate to this other appetitive behavior. Rather, nonsmokers showed up as using the most self-control with respect to alcohol use.

Caffeine To examine the proposition that chippers' expected high use of self-control over cigarette smoking would also be evident in regard to caffeine use (that is, higher use of self-control than addicts), oneway ANOVAs were performed on various questions about limiting use, success at same as well as past experience with, and expectancies for cutting down or quitting. Nonsmokers reported limiting the number of caffeinated beverages that they consume more strongly than addicts, $F(2, 63) = 4.7017$, $p = .01$. A marginally significant effect was found for restraint from drinking caffeinated beverages frequently with nonsmokers reporting the highest such restraint, $F(2, 63) = 2.7045$, $p = .07$. Chippers did not

differ from either addicts or nonsmokers on these two variables. Trends emerged for success at limiting the number of caffeinated beverages one drinks with chippers and nonsmokers (who had the same means) reporting greater success than addicts, $F(2, 50) = 2.7925$, $p = .0708$; and for success at restraining oneself from using caffeine frequently with chippers reporting the highest success, $F(2, 49) = 2.3588$, $p = .10$. There were no significant differences between groups on their expectancies for the ease with which they could quit using caffeine, $F(2, 59) = .3773$, p .6874; or for those who had tried to quit in the past, their reported success at doing so, $F(2, 19) = 2.2895$, $p = .1286$. There were also no differences between groups for their number of past quit attempts, $F(2, 29) = .8832$, $p = .4243$; or for those who had tried quitting, the length of time they had quit for, $F(2, 14) = .1276$, $p = .8812$. There were no differences between groups in the amount of caffeine they used before their last quit attempt, $F(2, 14) = 1.8507$, $p = .1936$. A trend emerged for present caffeine use with addicts reporting the highest, $F(2, 52) = 2.8965$, $p = .06$. There were no differences between groups as far as the maximum amount of caffeine they have ever used in one day, $F(2, 55) = .5364$, $p = .5879$; or in their present desire to quit using

caffeine, $F(2, 62) = 0.6514$, $p = .5248$. (See Table 5 for mean values of these variables.) Thus, there was little if any support for the contention that chippers would show higher amounts of self-control over their caffeine use than addicts, though when they did exercise such control, they reported slightly greater success at it than addicts. Nonsmokers again seem to be exercising the most self-control of all three groups.

To examine more specifically whether chippers use a greater number of techniques to control their caffeine use than addicts and whether they report using such techniques more often than addicts with nonsmokers expected to rate highest on these of all groups (on 5-point Likert-type scales, 1="Never", 5="Very Often" - an average of these ratings was taken), oneway ANOVAs were performed. Nonsmokers reported using a greater number of techniques than chippers, $F(2, 63) = 4.9500$, $p = .01$. However, for the techniques chippers did report using, they reported using them significantly more often than addicts, $F(2, 47) = 3.4835$, $p < .05$. To examine whether chippers had more reasons for wanting to quit using or reduce their use of caffeine than addicts, again with nonsmokers expected to have the most reasons of all, oneway ANOVAs were performed on this variable as well as on the average degree to which they endorsed these reasons (5-point Likert-type scale,

1="Not at all", 5="Very strongly"). There were no differences between groups on the number of reasons they endorsed, $F(2, 63) = 1.8255$, $p = .1696$; or on the strength with which they endorsed them, $F(2, 49) = .4649$, $p = .6310$. (See Table 5 for mean values of these variables.) Therefore, some support was found for the hypothesis that chippers would try to control their caffeine use moreso than addicts with nonsmokers also rating high in this area.

Finally, to explore whether self-control is more evident for other lifestyle variables (weight regulation, exercise, sleep patterns and study patterns) in chippers than addicts, ANOVAs were performed on various related measures. Table 6 shows mean values for these variables. There were no differences between groups on their expectancies for success at dieting (5-point Likert-type scale, 1="Very easy", 5="Very difficult"), $F(2, 63) = .6137$, $p = .5446$; on the number of times they have tried to diet, $F(2, 29) = 1.5281$, $p = .2339$; or, for those who had dieted, on the length of time they stuck with it, $F(2, 30) = 1.0065$, $p = .3775$; or their reported success at it, $F(2, 39) = 2.0600$, $p = .1411$. For weight control then, prior differences found in self-control over substance use did not carry over to this area.

Regarding exercise, there were no significant differences between groups in how often they exercise, $F(2, 52) = .7949$, $p = .4570$; the length of time they typically exercise for, $F(2, 54) = 1.1697$, $p = .3182$; or for the likelihood they would arrange their schedule around exercising (on 5-point Likert-type scale, 1="Not at all", 5="Very likely"), $F(2, 62) = 1.1416$, p .3259. Again, a pattern of self-control expected in cigarette use did not carry over into this area of living.

Regarding sleep patterns, there were no differences between groups in the number of hours they consider to be a "good nights sleep," $F(2, 63) = 1.2117$, $p = .3045$; or in the number of hours they are presently getting, $F(2, 63) = .6559$, $p = .5225$. As far as the regularity of their sleep patterns, there were no differences between groups on whether or not they go to bed at the same time most every night, $\chi^2(2, N = 65) = .6195$; or on whether or not they wake up at about the same time most every morning, $\chi^2(2, N = 66) = .4122$. Thus, no expected pattern of greater regulation or self-control emerged for this area.

Regarding study habits, there were no significant differences between groups on how strongly they "stick to" regular study times, $F(2, 60) = .9148$, $p = .4061$; or on how often they have difficulty completing their assignments on time, $F(2, 60) = .5281$, $p = .5961$ (both of

these were answered on 5-point Likert-type scales with 1=the strongest negative response, and 5=the strongest positive response). No carry-over of greater self-control over cigarette use among chippers was evident for this area of self-regulation.

Overall, chippers do exert more self-control over their smoking than addicts. Little support was found for the hypothesis that this self-control would permeate to other areas of substance use and self-regulation except for with regard to caffeine use. Nonsmokers emerged as exerting the greatest amount of self-control over substance use (alcohol and caffeine; though interestingly in the last section it was reported that nonsmokers were most likely to use food to regulate their affect). There was again some evidence that addicts are more concerned with their habit than chippers.

Expectancies

Items on the expectancy questionnaire fell into seven subscales that were formed intuitively and based on face validity of the items. To examine the hypothesis that addicts would have greater expectancies for cigarettes to help them cope with negative events or emotions than would chippers, oneway ANOVAs were performed on a number of items that made up a scale labeled Cope with Negative

Events or Affect (e.g., "Smoking cigarettes helps me feel less inferior."). All items on the expectancy questionnaire were answered on a 5-point Likert-type scale with 1="Very much so", 5="Not at all." Nonsmokers were included in these analyses as a comparison group. They were asked to rate their expectancies for the various effects of cigarettes even though they do not smoke (e.g., "Smoking cigarettes makes one feel less worried."). Addicts scored significantly higher on this coping scale than did nonsmokers, $F(2, 63) = 4.4069$, $p = .01$; and marginally higher than chippers (when the Scheffe Test was used at the .10 level). Table 7 shows mean values for this and all subscales on the expectancy questionnaire. The other specific hypothesis that was made for this section was that chippers would have greater expectancies for negative outcomes of cigarette smoking than would addicts. To examine this hypothesis, two scales from the expectancy questionnaire were subjected to ANOVA: Negative Social Consequences (e.g., "Smoking cigarettes makes me look inconsiderate.") and Negative Health Consequences (e.g., "Smoking cigarettes is harmful to my health."). Nonsmokers scored significantly higher on Negative Social Consequences than both chippers and addicts (who did not differ from each other), $F(2, 63) = 18.5715$, $p < .001$. There were no differences between groups on Negative

Health Consequences, $F(2, 63) = 1.1238$, $p = .3315$. Thus, addicts do seem to use nicotine to help them regulate their negative affect moreso than chippers (and nonsmokers). Though regarding expectancies for negative consequences of smoking, chippers and addicts came out looking more similar than dissimilar and both were less concerned with this variable than nonsmokers.

Other scales that were developed on the expectancy questionnaire were Positive Social Consequences (e.g., "Smoking cigarettes makes me look more sociable."), Socially Facilitating (e.g., "Smoking cigarettes enables me to have a better time at parties."), Affect Regulation - Positive (e.g., "Smoking cigarettes makes me feel happy."), Affect Regulation - Arousal (e.g., "Smoking cigarettes can make me feel more wide awake."), and one item asking subjects' opinion on the statement "Nicotine is a drug." There were no differences between groups on Positive Social Consequences, $F(2, 63) = 1.0842$, $p = .3444$; or on Socially Facilitating, $F(2, 63) = 1.3776$, $p = .2597$. Addicts scored significantly higher on Affect Regulation - Positive than nonsmokers, $F(2, 63) = 3.1911$, $p < .05$ (there were no other significant differences between groups on this scale). There were no significant differences between groups on Affect Regulation - Arousal,

$F(2, 63) = 2.0126$, $p = .1421$. Nonsmokers believed nicotine is a drug more strongly than chippers (who did not differ significantly from addicts), $F(2, 62) = 3.8101$, $p < .05$. In these areas then, chippers and addicts appeared to be more similar than dissimilar in their expectancies for cigarette smoking. Some evidence for appetitive effects of nicotine were found in that addicts had stronger expectancies for nicotine to provide positive affective states for them than did nosmokers.

First Cigarette Experience

In order to examine differences between groups in the context in which they had their first cigarette, Chi-square analyses were performed on questions having to do with who they were with when they tried their first cigarette and the source of their first cigarette, as well as oneway ANOVAs were performed on questions regarding their age at the time and their mood. Nonsmokers were only included in these analyses of course if they had ever tried smoking a cigarette (twelve reported having done so). Table 8 shows mean values for first cigarette experience variables. Subjects overwhelmingly reported being with someone when they tried their first cigarette, though three addicts (and no chippers or nonsmokers) reported smoking their first cigarette alone, $\chi^2(2, N = 55) = 4.7596$, $p = .09$; suggesting a marginal probability that

the two variables are not independent. The great majority of subjects in all three groups tried their first cigarette with friends (18 of 20 addicts responding, 17 of 22 chippers and 10 of 12 nonsmokers) while the 5 remaining chippers, one addict and no nonsmokers tried their first cigarette with a family member other than a parent. Two nonsmokers (and none from the other groups) tried their first cigarette with their parents and one addict had a first cigarette experience with someone other than these categories. The chi-square statistic suggests a significant degree of dependence between these two variables (type of smoker and who tried first cigarette with), $\underline{x}^2(6, \underline{N} = 54) = 13.5809$, $\underline{p} < .05$; though this should be interpreted with caution as there were 9 cells with an expected frequency less than 5. Regarding the source of the first cigarette, most subjects reported getting their first cigarette from friends, though more addicts (6 versus 2 chippers and 1 nonsmoker) took it from their parents or bought it themselves (4 addicts versus 1 chipper and no nonsmokers). Three nonsmokers reported that their parents gave them their first cigarette while no others subjects from the other two groups reported obtaining their first cigarette from this source. The chi-square statistic indicates a marginal probability that

the two variables (type of smoker and source of first cigarette) are not independent, $\underline{x}^2(14, \underline{N} = 56) = 21.3857$, $\underline{p} = .09$; though again, these results should be interpreted with caution due to the large number of cells with a very low frequency.

When asked to describe their mood on the day of their first cigarette on 5-point Likert-type scales with 1="Not at all" and 5="Very much so," there were no differences between groups on happy, $\underline{F}(2, 49) = 1.5192$, $\underline{p} = .2290$; unhappy, $\underline{F}(2, 40) = 1.3359$, $\underline{p} = .2744$; or on "no particular mood," $\underline{F}(2, 42) = 0.3142$, $\underline{p} = .7320$. A marginally significant effect was found for age when tried first cigarette, $\underline{F}(2, 53) = 2.4298$, $\underline{p} = .0978$; with nonsmokers being the oldest. Addicts seem to be slightly overrepresented in terms of having tried their first cigarette alone, while chippers were overrepresented in terms of having tried their first cigarette with a family member other than a parent. Interestingly, the only subjects to report having tried their first cigarette with their parents were nonsmokers, a finding repeated in that they were also the only ones to have a parent give them their first cigarette. Addicts seem to have been more likely to have taken their first cigarette from their parents.

To examine differences between groups on their

reasons for trying their first cigarette, chi-square analyses were performed on their "number one" reason and ANOVAs were performed on subjects' ratings of a variety of reasons on 5-point Likert-type scales (1="Not at all," 5="Very strong"). The great majority of subjects in all three groups (70% of addicts, 71.4% of chippers and 83.3% of nonsmokers) listed their number one reason for trying their first cigarette as curiosity, $\chi^2(8, N = 53) = 7.1989$, $p = .5153$. ANOVAs were performed on the following potential reasons: curiosity, peer pressure, wanting to "fit in," wanting to look or feel sexy, tough, or more grown up; wanting to feel "even better" and wanting to feel less stressed. Of these, two marginal findings were revealed for wanting to look or feel tough, $F(2, 53) = 2.9135$, $p = .06$; and wanting to look or feel more grown up, $F(2, 52) = 2.6784$, $p = .0781$; with addicts rating these the highest of all groups. Thus, it appears that addicts were more likely to have tried their first cigarette for self-definition purposes (Leventhal and Cleary, 1980).

In order to determine if chippers experienced more aversive consequences of smoking their first cigarette than addicts, chi-square analyses were performed on various questions about getting "caught" and ANOVAs were

performed on two questions about the severity of their punishment (if they were caught) and how afraid they were of getting caught (5-point Likert-type scales with 1=the strongest affirmative response and 5= the strongest negative response). Subjects overwhelmingly reported not having gotten caught with only one addict reporting otherwise, $\underline{x}^2(2, \underline{N} = 56) = 1.5735$, $\underline{p} = .4553$. Only one subject, who was an addict reported getting punished for the first cigarette experience, $\underline{x}^2(2, \underline{N} = 36) = 1.4400$, $\underline{p} = .4868$. This small number of subjects being punished for their first cigarette obviously precludes running an ANOVA on the severity of their punishment. There were no differences between groups in terms of how afraid they were of being caught smoking their first cigarette, $\underline{F}(2, 51) = 1.9389$, $\underline{p} = .1543$. ANOVAs were also run on subjects' ratings of how they felt they looked to others and how they felt about the people they were with (5-point Likert-type scales, 1="Not at all", 5="Very much so"). There were no significant differences between groups as far as if they felt they looked "silly or stupid," $\underline{F}(2, 53) = 0.4609$, $\underline{p} = .6332$; "cool," $\underline{F}(2, 53) = 0.4586$, $\underline{p} = .6347$; "adult-like," $\underline{F}(2, 53) = .0.5164$, $\underline{p} = .5996$; "did not look any different," $\underline{F}(2, 52) = 1.0014$, $\underline{p} = .3744$; or on feeling closer to the people present at the time, $\underline{F}(2, 53) = 1.0238$, $\underline{p} = .3662$. Thus, support was not found for

the hypothesis that chippers would have experienced more negative social consequences of their first cigarette.

To examine differences between groups on the smoking behavior itself, chi-square analysis was performed on a question about whether subjects finished the whole cigarette and ANOVA was performed on a question about the degree to which the subjects reported inhaling the first cigarette. Most subjects reported finishing the whole of their first cigarette (37 of 56 responding) and this variable seems to be independent of the type of smoker, $\underline{x}^2(2, \underline{N} = 56) = .9487$, $\underline{p} = .6223$. There were no differences between groups on the degree to which they inhaled their first cigarette, $\underline{F}(2, 53) = 1.2999$, $\underline{p} = .2811$. Thus, as far as the topography of smoking the first cigarette, the groups do not differ.

To examine the hypothesis that chippers would report having had more symptoms on their first cigarette experience than addicts, that they would be less likely than addicts to expect to get used to the symptoms and that they would be more likely than addicts to interpret the symptoms as indicating bodily damage, subjects responded to questions regarding nine different types of symptoms associated with cigarette smoking (e.g., cough, dizziness, headache) and their expectancies regarding, and

interpretation of these symptoms. The response format was a 5-point Likert-type scale with 1="Very much so" and 5="Not at all" and oneway ANOVAs were performed on the summed totals of these ratings for the number of symptoms experienced, the degree to which subjects expected to get used to the symptoms, and the degree to which subjects interpreted the symptoms as bodily damage being done. There were no differences between groups in terms of the number of symptoms they experienced, $F(2, 53) = 0.1547$, $p = .8570$. There were also no differences between groups on the degree to which they expected to get used to the symptoms, $F(2, 53) = 1.2663$, $p = .2903$. Finally, there were no differences between groups as far as the degree to which they interpreted the symptoms as indicating bodily damage, $F(2, 53) = 1.4887$, $p = .2350$. Thus, the experience of symptoms on the first cigarette or reaction to them did not differentiate the three groups.

Finally, subjects were asked to describe their first cigarette experience on a 5-point Likert-type scale (1=Very positive, 5=Very negative). Nonsmokers reported the experience as having been significantly more negative than both addicts and chippers (who did not differ from one another), $F(2, 53) = 5.6509$, $p < .01$.

The three groups seem to differ slightly in terms of who, if anyone, they tried their first cigarette with.

Addicts were somewhat more likely than chippers or nonsmokers to have tried their first cigarette for self-definition purposes. There were no differences between groups on negative social consequences of their first cigarette or on the topography of their first cigarette. There were no differences between groups in terms of symptoms accompanying the first cigarette or their reaction to these symptoms. Finally, nonsmokers reported their first cigarette experience as being significantly more negative than smokers.

Arousability

In order to examine the hypothesis that chippers would score lower on the self-report measure of arousability than addicts with nonsmokers expected to score the lowest of all three groups, ANOVAs were executed on the cummulative scores (score one for each item answered in the indicated direction) on the six subscales of Pandina's (Pandina, Labouvie, & White, 1984) arousability scale. Chronbach's alphas were run on the subscales with the following results: experience seeking (r = .77), disinhibition (r = .69), cognitive structure (r = .64), harm avoidance (r = .75), impulsivity (r = .73), and play (r = .69). For cognitive structure and harm avoidance, a higher score indicates lower

arousability. Table 9 shows means values for all subscales on the arousability questionnaire.

Chippers and addicts scored significantly higher on experience seeking than nonsmokers, $F(2, 63) = 13.9825$, $p < .001$; but did not differ significantly from each other. Chippers and addicts again scored significantly higher on disinhibition than nonsmokers while not differing significantly from each other, $F(2, 63) = 3.3894$, $p < .05$ (Scheffe's test was computed at the .10 level of significance). Nonsmokers scored marginally significantly higher than addicts on cognitive structure (this is in the predicted direction), $F(2, 63) = 2.4848$, $p = .09$; while they did not differ significantly from chippers nor did chippers differ from addicts (Scheffe's test set at the .10 level of probability). Nonsmokers scored significantly higher than both chippers and addicts (who did not differ from one another) on harm avoidance (the predicted direction), $F(2, 63) = 3.0557$, $p = .05$ (Scheffe's test set at the .10 level of significance). There were no differences between groups on impulsivity, $F(2, 63) = 1.6674$, $p = .1969$. A marginally significant finding was found for play in which nonsmokers scored lower than chippers, while there were no other significant differences between groups on this scale, $F(2, 63) = 2.6236$, $p = .08$ (Scheffe's test set at .10 level of

probability). Thus, three out of the six subscales differentiated nonsmokers from smokers (both chippers and addicts) and nonsmokers were differentiated from one or the other group on two of the subscales. This suggests, with rather strong support, that users have higher levels of this construct of arousability than abstainers. Once again, chippers and addicts came out looking more similar than dissimilar.

Physiological Reactivity

Of the sixty six matched subjects used in the study, twenty nine ultimately participated in the laboratory portion of the study[1]. These included nine addicts, eight chippers and twelve nonsmokers. The data were examined for differences between these groups on various demographic and background variables. In order to determine if the groups differed in sex and the type of cigarette typically smoked (light or regular - for smoking groups only), Chi-square analyses were performed. Sex, (χ^2 (2, N = 29) = .64096, p = .72580); and type of cigarette smoked, (χ^2(1, N = 17) = .15238, p = .69627) appear to be independent of level of smoking (chipper or addict). To further explore differences between groups in cigarettes typically smoked, a t-test was performed on the nicotine content of the subjects' usual brand of

cigarettes. Chippers (M = 0.81) and addicts (M = 0.77) did not differ in the nicotine content of their usual brand of cigarettes ($t(14) = 0.33$, $p > .20$). Differences in age, year in school and number of years smoking were examined by Analysis of Variance (ANOVA). No significant differences were found for age, $F(2, 26) = .8854$, $p = .4246$; year in school, $F(2, 26) = .5894$, $p = .5625$; or number of years smoking, $F(2, 26) = 1.2783$, $p = .3072$. (See Table 10 for means on these variables). These variables then would appear to be similarly distributed across groups.

In order to demonstrate that the stressful event (dual task performance) used in the reactivity study was valid, subjects' responses on various indices of investment in the task and prior experience with the task were examined with ANOVA. Table 10 shows mean values of these variables. There were no differences between groups in prior experience with the game Pacman, $F(2, 26) = .0631$, $p = .9390$. There were no differences between groups on how challenging they rated the task to be, $F(2, 26) = .5898$, $p = .5617$, or on the degree of effort they felt they put into the task, $F(2, 26) = .2540$, $p = .7776$. On 5 point Likert-type scales with 5 equaling the highest affirmative response, subjects generally found the task to be between "somewhat" and "moderately" challenging and put

in a "high" to "very high" degree of effort in the task. Also, all (100%) subjects used in the study responded correctly to two questions on the content of the tape recorded conversation indicating that they were attending to the audio portion of the stressful event. Further evidence of this is seen in the finding that all but one subject called out at least 8 fruit words and the remaining subject called out 6, again indicating that the task was truly a dual performance one for these subjects. Also, subjects did not differ between groups on the number of fruit words they called out, $F(2, 26) = 1.3208$, $p = .2842$. Thus, degree of investment in the task and prior experience with Pacman seem to be evenly distributed between groups. Also, the task seems to have been dual performance in nature for these subjects.

In order to examine the degree to which subjects were physiologically aroused by the stressor, repeated measures ANOVAs were performed for systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart rate (HR) comparing baseline measures with peak responses during the presentation of the stressor. The peak SBP during the stressor was significantly higher ($M = 140.897$) than the mean baseline SBP ($M = 112.828$; $F(1, 28) = 64.43$, $p < .001$). Also, the peak DBP during the stressor was

significantly higher (M = 102.276) than the mean baseline DBP (M = 82.483; F (1, 28) = 27.83, p < .001). Finally, the peak HR during the stressor was significantly higher (M = 104.590) than the mean baseline HR (M = 75.517; F (1, 28) = 160.28, p < .001). Thus, on all physiological measures used in the present study, subjects found the task to be very arousing. This finding was confirmatory in nature in that this dual task procedure has been established as being able to elicit reactivity in previous studies in our laboratory.

To assess whether pre-existing stressors encountered in daily life and coping styles might be influencing physiological reactivity, subjects' responses on the Perceived Stress Scale and the Daily Coping Inventory were subjected to ANOVA. Chippers (M = 22.75), addicts (M = 26.00) and nonsmokers (M = 21.75) did not differ significantly in their perceptions of stressful events in their lives or in their perceived competencies in dealing with them as seen on their scores on the Perceived Stress Scale, F (2, 26) = ..6010, p = .5557. Likewise, there were no significant differences between chippers (M = 4.00), addicts (M = 3.33) and nonsmokers (M = 4.83) in the number of coping techniques used to cope with the "most bothersome event or issue of the day" as indicated by their scores on the Daily Coping Inventory, F (2, 26)

= .2.1985, p = .1312. Also, the type of coping that was indicated as having been used and smoking group appear to be independent (X^2 (2, N = 29) = 13.49, p = .6364). However, the most prevalent coping method used for all three groups was Direct Action ("Thought about solutions to the problem, gathered information about it, or actually did something to try to solve it"). Thus, it appears that the groups are more similar than dissimilar in their perceptions of stress in their lives and their methods for coping with such stressors. It would not be expected then that these factors would affect subjects' physiological responses to the laboratory stressor differentially.

In order to rule out differences between groups during the baseline period on systolic blood pressure (SBP), diastolic blood pressure (DBP), and heart rate (HR) ANOVAs were performed. There were no significant differences between groups on SBP, F(2, 26) = 1.33, p = .2803; DBP, F(2, 26) = 1.47, p = .2478; or HR, F(2, 26) = 0.89, p = .4220. (See Table 11 for mean values of these variables.) Therefore, any differences between groups on the physiological measures will not be readily explained by preexisting differences in resting blood pressure or heart rate.

In order to determine whether addicts were more

physiologically reactive than chippers and nonsmokers to an acute, laboratory stressor, analyses of covariance (ANCOVA) were performed SBP, DBP and HR. Subjects were compared on the peak measure (highest reading recorded) during the presentation of the stressor using the corresponding baseline measure as the covariate. Table 11 shows mean values for these variables. No significant differences were found between groups on SBP, $F(2, 26) = 0.70$, $p = .504$; DBP, $F(2, 26) = 0.92$, $p = .412$; or HR, $F(2, 26) = 0.22$, $p = .808$. From these findings it appears that chippers, addicts and nonsmokers responded similarly to the stressor presented in the laboratory.

Partial correlations were performed on the physiological measures and the number of cigarettes one smokes per week controlling for the appropriate baseline physioligcal measures. No significant correlations were found for SBP, $r(26) = .21$, $p = .14$; DBP, $r(26) = .08$, $p = .35$; or HR, $r(26) = -.10$, $p = .31$. It appears then that the number of cigarettes one smokes does not predict physiological reactivity to a stressor.

During the final period, which for smokers involved smoking a cigarette and for nonsmokers was essentially a recovery period, SBP, DBP and HR continued to be measured and the mean response was recorded. ANCOVAs were

performed to examine differences between groups on mean SBP, DBP and HR using the appropriate baseline measure as the covariate. Nonsmokers had significantly lower SBP than both chippers and addicts, $F(2, 26) = 9.98$, $p = .001$. Nonsmokers had marginally lower DBP than both chippers and addicts, $F(2, 26) = 2.66$, $p = .089$. There were no significant differences between groups on HR, $F(2, 26) = 1.62$, $p = .219$. (See Table 11 for mean scores on these variables.) Smokers (both chippers and addicts) were more aroused as measured by SBP and DBP than nonsmokers during this period as would be expected given the stimulant properties of nicotine.

Partial correlations were performed on the peak of the physiological measures during the last period and the number of cigarettes one smokes per week controlling for the appropriate baseline physiological measures and for the elapsed smoking time in the laboratory. This last variable was partialed out as it correlated with number of cigarettes smoked per week ($r = -.56$) and as time between puffs would have an effect on physiological reaction to the cigarette (see section below). Only smokers were included in these analyses because they were the only subjects who received a dose of nicotine during this period thus elevating their peak physiological responses

above those of nonsmokers. No significant relationships were found for SBP, r (17) = .12, p = .33; or for DBP, r (17) = .20, p = .24. A marginally significant relationship was found for HR, r (17) = -.38, p = .08, indicating that the less one smokes, the greater was the heart rate increase following smoking a cigarette. This is consistent with Shiffman's (1989) finding that chippers had greater heart rate response to a dose of nicotine than did addicts.

In order to determine if chippers and addicts differed in the manner in which they smoked, ANOVAs were performed on the number of puffs they took, the distance from the filter that the cigarette was smoked down to and the amount of time it took to smoke the cigarette. Chippers (M = 12.75) and addicts (M = 13.33) took roughly the same number of puffs, F(1, 16) = .088, p = .7698; and smoked the cigarette down to approximately the same distance from the filter (chippers M = 10.25 millimeters, addicts M = 10.63 millimeters), F (1, 16) = .007, p = .9334. However, the groups did significantly differ on the time it took them to smoke their cigarette, F (1, 16) = 5. 017, p < .05; with chippers taking longer (M = 371.00 seconds) than addicts (M = 260.33 seconds) to finish. Thus, while chippers and addicts were both physiologically aroused by their cigarette as was seen previously,

chippers appear to be regulating their exposure to the nicotine by giving themselves more time between puffs. A finding such as this is one of the benefits of a naturalistic, ad libitum smoking period as was used in the present study. It is particularly strengthened by the aforementioned finding that the groups did not differ in the type of cigarette that they smoked.

The main purpose of using a naturalistic, ad libitum smoking period was to study potential differences in the way in which chippers and addicts used their cigarettes to regulate their affect following a stressful event. To do so, subjects were asked to indicate how tense, stressed and anxious they were feeling on 5 point Likert-type scales (1=not at all, 5=very much) at three points during the experimental session: upon entering the lab, at the end of the presentation of the stressor and after smoking a cigarette (or, for nonsmokers, after sitting quietly). To examine differences between groups and across time, repeated measures ANOVAs with the between subjects variable of group (chipper, addict or nonsmoker) were performed on subjects' responses to these affect questions. There were no differences between groups in feeling tense, $F(2, 26) = 2.11$, $p = .141$; or within subjects across time, $F(2, 26) = .2809$, $p = .757$. There

were no differences between groups in feeling stressed, $F(2, 26) = 2.14$, $p = .138$; or within subjects across time, $F(2, 26) = 0.97$, $p = .392$. Also, there were no differences between groups in feeling anxious, $F(2, 26) = 0.76$, $p = .477$; or within subjects across time, $F(2, 26) = 1.99$, $p = .157$. (See Table 12 for mean values of these variables.) Also, none of the interactions in the above analyses were significant. So, although chippers and addicts experienced greater physiological arousal (as seen in blood pressure responses) than nonsmokers during the last period, they are not reporting that they are more tense, stressed or anxious (however, neither are they reporting that they are less tense, stressed or anxious). Also, it does not appear that addicts are using their cigarette to help them calm down after the stressor, though they did report wanting a cigarette more strongly than chippers on a 5 point Likert-type scale (1=not at all, 5= very much) (addict $M = 3.44$, chipper $M = 1.13$; $F(1, 16) = 22.64$, $p < .001$.

One final aspect of physiological reactivity was examined and that was the question of whether subjects' responses on the arousability questionnaire mentioned previously could be used to predict reactivity to determine if there is a physiological substrate to this construct. Partial correlations were run on the composite

score (the sum of all six subscales, reversing the scores on cognitive structure and harm avoidance due to these two scales being scored in the opposite direction as mentioned earlier) and on SBP, DBP, and HR while controlling for the corresponding baseline measures. Regarding physiological reactivity to the laboratory stressor, there were no significant correlations between the construct of arousability as measured by self report and SBP, r (26) = -.16, p = .207; DBP, r(26) = .09, p = .327; or HR, r(26) = -.08, p = .346. As far as physiological reactivity to the cigarette for which peak scores were used, elapsed time to finish the cigarette was also partialled out and only smokers were used. There were no significant correlations between the construct of arousability and SBP, r (17) = .21, p = .22; DBP, r (17) = .28, p = .15; and HR, r (17) = .31, p = .13. Thus, self-reported arousability did not predict physiological reactivity to the stressor or to the cigarette. It should be kept in mind however, that the number of subjects used in these analyses was quite low.

Discussion

This study provides further documentation that long-term exposure to an addictive substance does not inevitably lead to addiction. This flies in the face of

traditional addiction theory. A variety of striking differences were found between chippers, addicts and nonsmokers. These data are particularly useful in addressing the two issues posed by Shiffman (1989): what keeps chippers from becoming addicted and why do they smoke at all. This study is in the unique position of addressing both issues as it also included nonsmokers. Differences between chippers and addicts speak to the former and differences between smokers (chippers and/or addicts) and nonsmokers address the latter.

Like Shiffman (1989), the chippers in the present study showed similar cardiovascular reactions to addicts after exposure to nicotine suggesting that they absorbed nicotine through smoking. Shiffman et al. (1990) also found similar absorption rates of nicotine between chippers and addicts and that chippers do not show extraordinary titration or unusually high extraction of nicotine from cigarettes. Thus, tobacco chippers are exposed to nicotine and are not attempting to maintain minimal levels of nicotine in their bloodstream. Therefore, their unusual smoking behavior cannot be explained by a lack of exposure to the substance or to the maintenance of minimal levels of the substance in their bodies. We can look beyond these potential explanations then to other reasons, including psychosocial,

physiological and appetitive effects of the drug itself.

As far as why chippers smoke at all, some important findings in the present study bear on this. Smokers reported more significant others who smoked when they were growing up and had more social learning opportunities regarding smoking presented to them than did nonsmokers. Thus, genetics and/or learning factors involved in drug use (Becker, 1953; McAuliff, 1975) may play a role. Shiffman's (1989) addicts had greater numbers of family members who smoked than chippers, while the present study did not. Shiffman (1989) also found that chipping seems to run in the family. We again did not replicate this finding but we also did not talk directly to our subjects' relatives.

Chippers may exert less control over substances in general than nonsmokers as seen in the case of alcohol in the present study. This is consistent with our finding that chippers had greater numbers of significant others who used alcohol while they were growing up than did nonsmokers. Thus, family history is again implicated as being related to substance use. This is also consistent with past research that has found that the relationship between parent-child drug use need not be for the same drug (Pandina & Johson, 1989; Rittenhouse & Miller, 1984).

Smokers seemed to have lower expectancies for negative social consequences of smoking than nonsmokers and chippers believed to a lesser degree than nonsmokers that nicotine is a drug. Thus two barriers to smoking may be reduced for chippers, the latter speaking to a decreased realization of the possibility of addiction amongst chippers. These two "barriers" also provide support for a behavioral theories of choice model of chippers' smoking behavior in that they represent a decrease in constraints on access to nicotine.

Also, smokers scored higher in arousability than nonsmokers. This has been found to be associated with higher levels of initiation and use intensity (Pandina, Johnson, & Labouvie, 1990). The initiation factor is what would seem to be important in understanding chippers' smoking behavior as they do not use nicotine with great intensity. This variable of arousability has not been looked at before in relation to chippers and its role in initiation merits further study. Regarding initiation, smokers reported less negative first experiences with cigarettes than did nonsmokers.

Regarding appetitive factors, some evidence of their role in smoking was found in the provacative finding that addicts had higher expectancies for cigarettes to produce positive affective states than nonsmokers. However,

smokers were not found to have higher expectancies for cigarettes to provide arousal or positive social consequences than nonsmokers. Shiffman (1989) also found that chippers were not "social" smokers. Chippers' smoking was also apparently not due to a lack of alternative methods of regulating affect compared to nonsmokers.

Regarding the factors that protect chippers from becoming dependent on nicotine, chippers seem to experience greater constraints on access to smoking in terms of feeling guilty when smoking than addicts. Chippers also exert more self-control over their smoking than addicts. This has been frequently found with opiate chippers (Blackwell, 1983; Harding, 1988; Harding & Zinberg, 1983; Powell, 1973) but the present study represents the first time this has been found with nicotine chippers. A question that has been posed in the research literature (Blackwell, 1983) is, why do addicts fail to control their use? As mentioned above, from data in the present study, it does not appear to be due to a skill deficit or to a lack of desire to quit. Rather, it may be due to the finding that chippers had more reasons for wanting to limit their smoking, endorsed these reasons more strongly and had greater self-efficacy regarding

limiting their use.

Chippers had lower expectancies for cigarettes to help them cope with negative affect or events than addicts. Similarly, Shiffman (1989) found addicts were more likely to smoke under conditions of negative affect. Support then was found in the present study for a social learning formulation of drug abuse in that addicts had higher expectancies for the efficacy of the drug (nicotine) as a coping response than chippers (Cooper, Russell, & George, 1988). Also, it appears that a particular combination of expectancies regarding cigarettes (low for coping with negative affect/events, and low for negative social consequences) may predict chippers anomolous use of nicotine, just as expectancies have been found to predict alcohol use (Goldman, Brown & Christiansen, 1987). This use of expectancies to predict nicotine chipping is also a first in the research literature.

This difference between the groups in expectancies or reasons for smoking may have its roots in very early stages of smoking. Addicts were more likely to have tried their first cigarette alone suggesting that social factors were not important and addicts were more likely to have tried their first cigarette for self-definition purposes (Hirschman, Leventhal & Glynn, 1984). Shiffman (1989)

found addicts had a more aversive reaction to their first cigarette than chippers. While this study did not replicate this, the present findings together with Shiffman's suggest differences between the groups in the very beginning stages of smoking.

Chippers seemed to have less of a propensity than addicts to use substances overall as seen in lower use of illicit drugs and caffeine, and lower likelihood of past problem drinking. However, they reported using more alcohol than nonsmokers. There may be a contiuum then of substance use or propensity to use substances. Chippers also were less reactive to external cues to smoke than addicts.

Chippers seemed to be regulating their intake of nicotine in terms of time between puffs. They may simply be doing this because they have not built up tolerance to the nicotine (this may also explain the negative correlation between number of cigarettes smoked per week and HR response to the cigarette). Another important finding in the present research is that chippers, addicts and nonsmokers responded similarly on a variety of cardiovascular functions to an acute, laboratory-based stressor.

In sum, the present findings suggest that the stage

has been set for chippers to smoke by genetic and social transmission factors as evidenced by the data from the family history questionnaire. Supporting this, data from studies of chronic smokers suggest that there are individual differences in acute response of humans to nicotine (Pandina & Huber, 1990). This study suggests that chipping, like regular smoking, appears to be facilitated by decreased barriers or constraints on access to nicotine (e.g., expectancies for negative social consequences and the belief that nicotine is a drug) and higher arousability than nonsmokers. Then, the present findings suggest that by some fortuitous set of circumstances chippers have been able to limit their use through an armamentarium of reasons, greater self-efficacy to do so and seemingly do not rely as heavily on smoking to help regulate negative affect. Further protective factors indicated by the present results include a lower reactivity to external cues to smoke and a lower propensity to use substances in general than addicts.

Certain implications for smoking cessation would seem to follow from these results. First, individuals who wish to quit smoking may bennefit by fortifying themselves with reasons for quitting as the chippers in the present study had. Perhaps treatment should start with a careful review of the reasons one wants to quit for. This may involve

numerous suggestions made by the counselor (including disapproval of others, health issues, and personal appearance and performance) with the smoker choosing those that apply. A frequent review of these reasons and one's commitment to them may be necessary. As suggested in the present study methods for building self-efficacy would seem to be essential. This could involve a review of past successes and a focus on small achievements (e.g., praise for all the cigarettes one has not smoked after a brief relapse). Finally, the use of alternative methods of coping with negative affect should be facilitated as suggested by the findings herein that addicts had higher expectancies for cigarettes to help them cope with negative affect or events.

Subjects in the present study were on average younger, had been smoking for a fewer number of years, and the chippers smoked less than subjects in Shiffman's studies (1989, Shiffman et al., 1990). Also, some of Shiffman's chippers were ex-addicts while the present study considered this an exclusionary factor for chippers. Subjects in the present study were carefully matched on age, gender and number of years smoking. Despite the differences in the studies, many consistent results were found as mentioned above.

While an ad libitum smoking period was chosen deliberately to answer questions about affect management and regulation of dose, a controlled dose of nicotine would address questions of differences between addicts and chippers in receptivity and reactivity to the drug. If one group is not as reactive to nicotine as another, it is unlikely that they would experience the same degree of effects of the drug, especially appetitive ones. It may be that individuals are "wired" or "programmed" to be more receptive to certain substances. Thus, the stage may be set for individuals' use of particular substances by a certain amount of receptivity to certain substances (which may be the genetic component mentioned above) and by social learning opportunities when young.

In conclusion, a number of striking findings from this study should be replicated and further explored. For example, the present research represents the first time expectancies and cues have been examined in relation to nicotine chippers. Aside from replication of these important findings, future research should focus on the origins of differences between groups on these factors. Further efforts should be made to tap into appetitive factors both with physiological and self-report measures. Regarding the provacative results found in the present study on factors that contribute to the exertion of self-

control (reasons and self-efficacy for limiting use), further investigation of these and other factors would seem profitable. Also, a number of striking findings were consistent with Shiffman's and thus are also promising avenues for future research. These include the demonstrated relationship between addicts' smoking and negative affect, initiation and early stages of smoking.

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Table 1

Means of Demographic and Smoking Variables

	Nicotine Addicts (SD)	Chippers (SD)	Nonsmokers (SD)
Age	22.18(4.00)	22.06(3.90)	21.95(4.52)
Year in college	2.45(1.19)	2.23(1.15)	2.90(1.83)
Cigarettes/week[c]	155.91(52.66)	8.09(8.73)	-
Years present rate	5.32(3.81)	4.11(2.26)	-
Light brand (%)	72.70	60.00	-
Quit attempts[a]	1.81(1.63)	0.75(1.33)	-
Reduction attempts[a]	1.48(1.17)	0.65(1.04)	-
Withdrawal symptoms[c]	3.09(1.44)	0.55(1.00)	-

Note. Statistical effects refer to tests of differences between addicts and chippers. A "-" indicates no data available.

[a] $p<0.05$; [b] $p<0.01$; [c] $p<0.001$

Table 2

Family History of Drug Use (Means)

	Nicotine Addicts (SD)	Chippers (SD)	Nonsmokers (SD)
Nicotine			
[d]	1	2	1,2
Smokers	4.32(1.76)	4.05(2.30)	2.09(1.72)
Occasional smokers	0.23(0.43)	0.50(0.91)	0.64(0.79)
Observation variable	1.73(0.83)	1.91(0.87)	2.00(0.93)
Teaching variable	0.95(1.00)	1.09(1.15)	0.50(0.67)
[c]	1	2	1,2
Others enjoyed	3.82(1.97)	3.45(1.95)	1.95(1.86)
Others feel better	2.95(2.59)	2.27(2.05)	1.82(1.92)
Others even better	2.18(1.97)	2.14(1.96)	1.50(1.92)
Alcohol			
[c]		1	1
Drinkers	5.45(2.24)	6.55(2.52)	3.91(2.24)
Occasional drinkers	1.55(1.92)	2.50(2.26)	2.32(1.86)
Observation variable	1.73(0.88)	2.00(0.82)	1.64(0.95)
Teaching variable	0.91(0.92)	1.32(1.04)	1.05(1.06)
[b]	1	1	
Others enjoyed	5.45(2.24)	6.23(2.52)	4.18(2.22)
Others feel better	2.95(2.61)	3.36(3.32)	1.95(2.30)
[b]	1	2	1,2
Others even better	4.32(2.87)	4.45(3.45)	2.41(2.38)

(continued)

Table 2 (cont'd)

Family History of Drug Use (Means)

	Nicotine Addicts	Chippers	Nonsmokers
Caffeine			
Users	6.64(2.44)	7.27(2.31)	5.95(2.24)
Occasional users	3.27(2.93)	3.27(2.98)	2.32(2.53)
Observation variable	1.41(0.67)	1.55(0.74)	1.59(0.73)
Teaching variable	0.64(0.79)	1.05(1.25)	0.64(0.95)
Others enjoyed using[a]	5.32(2.38)	6.45(2.56)[1]	4.77(2.14)[1]
Others feel better	1.86(2.17)	1.45(2.63)	1.86(2.27)
Others even better	1.55(1.99)	2.00(3.32)	1.95(2.57)
Coping Style			
Self: use of food[c]	1.68(0.57)[1]	2.36(1.40)	2.73(1.35)[1]
Others: use of food	5.14(2.96)	6.00(3.59)	4.59(2.82)

Note. Statistical effects refer to tests of differences between groups. Values refer to numbers of individuals or opportunities/experiences except for the Coping Style section where all values represent mean ratings on 5-point Likert scales.

[a] $p<0.10$; [b] $p<0.05$; [c] $p<0.01$; [d] $p<0.001$; [1,2] Similar superscripts denote significant differences.

Table 3

Behavioral Self-Control - Nicotine (Means)

	Nicotine Addicts (SD)	Chippers (SD)
Limit number	1.73(0.83)	2.23(1.34)
Limit frequency[b]	1.91(0.75)	2.68(1.36)
Success limiting number[d]	2.43(1.03)	4.11(1.02)
Success limiting frequency[d]	2.43(0.87)	4.11(1.08)
Expected ease of quitting[d,*]	4.43(0.51)	1.95(0.97)
Success with past quitting[d,*]	3.75(1.37)	2.07(0.96)
Number of days quit for	104.17(206.49)	214.03(266.26)
Desire to quit[a]	2.68(1.17)	2.05(1.25)
Number of techniques[b]	5.00(1.98)	3.68(2.06)
Frequency of technique use[d]	2.43(0.39)	3.37(0.99)
Number of reasons[c]	6.36(1.87)	7.68(1.36)
Endorsement of reasons[d]	3.02(0.69)	3.78(0.70)

Note. Statistical effects refer to tests of differences between groups. Unless otherwise stated, values represent mean ratings on a 5-point Likert scale. Unless otherwise indicated, higher values represent a stronger affirmative response.

[a] $p \leq 0.10$; [b] $p \leq 0.05$; [c] $p \leq 0.01$; [d] $p \leq 0.001$; [*] reverse coded

Table 4

Behavioral Self-Control - Alcohol (Means)

	Nicotine Addicts (SD)	Chippers (SD)	Nonsmokers (SD)
Limit number [d]	1 2.36(1.29)	2 2.23(1.11)	1,2 3.57(1.12)
Limit frequency [c]	1 2.41(1.37)	2 2.45(1.22)	1,2 3.52(1.12)
Success limit number	3.43(1.33)	4.00(1.15)	4.18(1.14)
Success limit frequency [a]	3.85(1.53)	4.00(1.15)	4.59(0.59)
Expected ease quitting [*]	2.45(1.30)	2.14(1.36)	1.95(1.36)
Success past quitting [*]	2.00(1.63)	1.00(0.00)	2.44(1.94)
Past quit attempts (#) [a]	1.55(1.86)	0.70(1.06)	0.43(0.85)
Drinks/week pre-quit [c]	1,2 48.50(37.01)	1 7.75(5.06)	2 1.20(1.30)
Drinks/week presently [a]	4.71(6.77)	7.66(7.56)	2.47(3.68)
Maximum drinks one day [a]	14.95(6.76)	14.38(7.90)	9.78(6.50)
Number of days quit	427.48(411)	333.33(55)	316.98(391)
Desire to quit [a]	1.82(1.44)	1.36(0.49)	2.21(1.51)
Number of techniques [b]	1 4.00(2.43)	4.50(1.90)	1 5.59(1.74)
Frequency technique use [c]	1 2.88(0.95)	2 3.13(0.93)	1,2 3.85(0.87)
Number of reasons	7.09(2.41)	7.36(2.15)	8.32(1.86)
Endorsement of reasons [b]	1 3.21(0.68)	3.56(0.66)	1 3.69(0.54)

(continued)

Table 4 (cont'd)

Note. Statistical effects refer to tests of differences between groups. Unless otherwise stated, values represent mean ratings on a 5-point Likert scale. Unless otherwise indicated, higher values represent a stronger affirmative response.

[a] $p \leq 0.10$; [b] $p \leq 0.05$; [c] $p \leq 0.01$; [d] $p \leq 0.001$; [*] reverse coded

[1,2] Similar superscripts denote significant differences.

Table 5

Behavioral Self-Control - Caffeine (Means)

	Nicotine Addicts (SD)	Chippers (SD)	Nonsmokers (SD)
Limit number[c,1]	1.50(0.91)	1.68(1.17)	2.45(1.18)[1]
Limit frequency[a]	1.55(0.96)	1.68(1.21)	2.27(1.12)
Success limit number[a]	3.00(1.55)	4.00(1.49)	4.00(1.19)
Success limit frequency[a]	3.00(1.59)	4.00(1.50)	3.89(1.28)
Expected ease quitting[*]	2.35(1.35)	2.25(1.62)	2.64(1.53)
Success past quitting[*]	2.63(2.07)	1.83(1.83)	3.75(1.04)
Past quit attempts (#)	0.67(0.89)	1.50(2.14)	0.92(1.16)
Number/week pre-quit	39.75(30.6)	23.60(19.0)	18.13(8.43)
Number/week presently[a]	21.78(12.2)	17.06(19.6)	10.53(9.36)
Maximum number one day	8.76(3.83)	7.70(5.49)	6.90(6.56)
Number days quit for	94.40(153)	115.62(149)	154.86(271)
Desire to quit	1.45(0.96)	1.41(0.59)	1.71(1.19)
Number of techniques[c]	2.32(2.32)	1.82(1.59)[1]	3.73(2.27)[1]
Frequency technique use[b,1]	2.44(0.76)	3.33(1.08)[1]	3.12(1.09)
Number of reasons	3.23(2.89)	3.95(2.42)	4.68(2.21)
Endorsement of reasons	3.07(0.72)	3.32(1.02)	3.33(0.73)

(continued)

Table 5 (cont'd)

Note. Statistical effects refer to tests of differences between groups. Unless otherwise stated, values represent mean ratings on a 5-point Likert scale. Unless otherwise indicated, higher values represent a stronger affirmative response.

[a] $p \leq 0.10$; [b] $p \leq 0.05$; [c] $p \leq 0.01$; [d] $p \leq 0.001$; [*] reverse coded

[1,2] Similar superscripts denote significant differences.

Table 6

Behavioral Self-Control - Lifestyle (Means)

	Nicotine Addicts (SD)	Chippers (SD)	Nonsmokers (SD)
Diet			
Ease lose weight*	2.68(1.29)	3.05(1.36)	3.09(1.38)
Number past attempts	2.70(2.31)	13.20(30.19)	1.42(1.31)
Number days dieted	88.00(76.0)	68.45(70.2)	173.69(308)
Success past attempts*	2.20(0.94)	3.00(1.32)	2.64(0.92)
Exercise			
Frequency (per week)	4.15(2.79)	3.69(2.54)	3.04(2.42)
Minutes per session	54.29(33.5)	72.14(38.7)	62.87(42.2)
Arrange schedule	2.68(1.43)	3.36(1.50)	3.14(1.65)
Sleep			
Good nights sleep (hr)	7.82(1.26)	7.82(1.33)	8.32(1.09)
Hours/night presently	6.86(1.36)	7.09(1.27)	7.27(0.88)
Study Habits			
Regular study times	3.05(1.07)	3.10(1.18)	3.48(1.12)
Late assignments	1.85(0.75)	2.18(1.30)	2.05(1.02)

(continued)

Table 6 (cont'd)

Note. Statistical effects refer to tests of differences between groups. Unless otherwise stated, values represent mean ratings on a 5-point Likert scale. Unless otherwise indicated, higher values represent a stronger affirmative response.

* reverse coded

Table 7

Expectancies (Means)

	Nicotine Addicts	Chippers	Nonsmokers
Cope Neg. Affect [c]	30.23(9.99) [1,2]	23.27(8.85) [1]	22.05(10.6) [2]
Neg. Soc. Consequences [d]	17.95(5.77) [1]	19.59(5.15) [2]	27.23(5.22) [1,2]
Neg. Hea. Consequences	17.86(3.51)	18.18(3.62)	19.23(2.11)
Pos. Soc. Consequences	19.27(5.62)	18.59(5.59)	16.55(7.73)
Socially Facilitating	25.82(7.17)	24.14(8.88)	21.41(10.3)
Affect Regulation-Pos. [b]	14.09(3.99) [1]	12.36(5.00)	10.59(4.74) [1]
Affect Reg.-Arousal	9.36(4.50)	7.50(4.01)	7.14(3.24)
Nicotine is a drug [b]	4.77(0.69)	4.33(1.11) [1]	4.95(0.21) [1]

Note. Statistical effects refer to tests of differences between groups. Unless otherwise stated, values represent mean ratings on a 5-point Likert scale. Unless otherwise indicated, higher values represent a stronger affirmative response.

[a] $p \leq 0.10$; [b] $p \leq 0.05$; [c] $p \leq 0.01$; [d] $p \leq 0.001$

[1] Denotes significant difference.

[2] Denotes marginally significant difference.

Table 8

First Cigarette Experience (Means)

	Nicotine Addicts (SD)	Chippers (SD)	Nonsmokers (SD)
Mood			
Happy	3.28(1.49)	4.00(1.23)	3.58(1.16)
Unhappy	1.79(1.19)	1.47(0.77)	1.20(0.42)
No particular mood	3.13(1.67)	2.89(1.63)	3.40(1.65)
Age[a]	13.09(2.45)	12.14(2.71)	14.25(3.08)
Reasons			
Curiosity	4.45(0.91)	4.68(0.78)	4.67(0.65)
Peer pressure	3.18(1.44)	2.68(1.43)	2.33(1.44)
To fit in	3.32(1.43)	2.82(1.47)	2.33(1.56)
To look/feel sexy	1.77(1.11)	1.64(1.18)	1.83(1.11)
To look/feel tough[a]	2.82(1.33)	2.32(1.49)	1.67(0.98)
To look/feel grown up[a]	3.09(1.23)	2.81(1.33)	2.00(1.48)
To feel even better	1.91(1.23)	1.45(0.86)	1.25(0.45)
To feel less stressed	1.73(1.20)	1.32(0.89)	1.33(0.65)
Consequences			
Afraid getting caught	2.86(1.39)	3.00(1.45)	2.00(1.41)
Looked silly/stupid	3.27(1.49)	3.68(1.32)	3.50(1.45)
Looked "cool"	2.05(1.17)	1.77(0.97)	1.75(1.06)
Looked adult-like	2.05(1.13)	2.18(1.33)	1.75(0.97)

(continued)

Table 8 (cont'd)

	Nicotine Addicts (SD)	Chippers (SD)	Nonsmokers (SD)
Consequences			
Did not look different	2.57(1.50)	2.00(1.20)	2.33(1.23)
Felt closer	2.68(1.49)	2.77(1.27)	2.08(1.44)
Inhaled	2.14(0.83)	2.05(0.90)	2.58(1.24)
Symptoms			
Number	6.23(1.88)	6.05(2.44)	6.50(2.65)
Expect to get used to	5.45(2.94)	4.64(3.51)	3.67(2.84)
Interpreted as damage	3.82(3.34)	5.14(3.52)	5.75(3.25)
Description-negative[c]	3.27(1.03)[1]	3.45(0.96)[2]	4.42(0.90)[1,2]

Note. Statistical effects refer to tests of differences between groups. Unless otherwise stated, values represent mean ratings on a 5-point Likert scale. Unless otherwise indicated, higher values represent a stronger affirmative response.

[a] $p \leq 0.10$; [b] $p \leq 0.05$; [c] $p \leq 0.01$; [d] $p \leq 0.001$

[1,2] Similar superscripts denote significant differences.

Table 9

Arousability (Means)

	Nicotine Addicts (SD)	Chippers (SD)	Nonsmokers (SD)
	d 1	2	1,2
Experience Seeking	8.86(2.98)	8.45(2.81)	4.68(2.88)
	b 1	2	1,2
Disinhibition	5.86(3.15)	6.00(2.88)	4.00(2.47)
	a 1		1
Cognitive Structure	6.32(2.66)	7.41(2.44)	7.82(1.71)
	b 1	2	1,2
Harm Avoidance	5.82(2.44)	5.86(3.03)	7.73(3.24)
Impulsivity	5.77(2.98)	4.95(3.40)	4.18(2.15)
	a	1	1
Play	7.41(2.68)	7.82(2.63)	6.09(2.52)

Note. Statistical effects refer to tests of differences between groups. Unless otherwise stated, values represent mean ratings on a 5-point Likert scale. Unless otherwise indicated, higher values represent a stronger affirmative response.

a b c d
$p \leq 0.10$; $p \leq 0.05$; $p \leq 0.01$; $p \leq 0.001$

1,2 Similar superscripts denote significant or marginally significant differences.

Table 10

Physiological Reactivity Subject Characteristics and Manipulation Checks (Means)

	Nicotine Addicts (SD)	Chippers (SD)	Nonsmokers (SD)
Subject Characteristics			
Age	23.22(5.26)	21.75(4.92)	20.58(3.50)
Year in school	2.50(1.31)	1.75(0.89)	2.45(2.07)
Years smoking	5.78(5.59)	3.44(1.05)	-
Manipulation Checks			
Prior experience	2.89(1.69)	3.13(1.36)	3.08(1.44)
Challenging	3.44(0.88)	3.13(0.83)	3.50(0.67)
Effort	4.11(0.60)	4.25(0.46)	4.08(0.51)
Number fruit words	9.78(0.44)	9.25(0.46)	9.17(1.27)

Note. Statistical effects refer to tests of differences between groups. Unless otherwise stated, values represent mean ratings on a 5-point Likert scale. Unless otherwise indicated, higher values represent a stronger affirmative response. A "-" indicates that no data were available.

Table 11

Physiological Reactivity

	Nicotine Addicts (SD)	Chippers (SD)	Nonsmokers (SD)
Baseline			
Systolic BP (mmHg)	114.67(12.0)	116.00(9.04)	109.33(8.38)
Diastolic BP (mmHg)	80.22(9.99)	88.50(10.46)	80.17(13.38)
HR (beat/minute)	75.73(7.25)	71.60(7.58)	77.97(13.56)
Reactivity to stressor (peak response)			
Systolic BP (mmHg)	147.67(23.2)	144.50(21.8)	133.42(16.8)
Diastolic BP(mmHg)	102.78(22.9)	111.00(25.3)	96.08(10.2)
HR (beat/minute)	104.47(17.0)	104.16(10.6)	104.97(14.6)
Final period (mean response)			
Systolic BP (mmHg)	^{d} 126.56(12.5)	^{1} 131.63(10.3)	^{1,2} 112.67(8.97)
Diastolic BP (mmHg)	^{a} 91.56(14.6)	^{1} 95.13(13.2)	^{1,2} 80.75(15.0)
HR (beat/minute)	76.98(11.6)	81.30(10.2)	76.79(11.5)

Note. Statistical effects refer to tests of differences between groups.

^{a} $p \leq 0.10$; ^{b} $p \leq 0.05$; ^{c} $p \leq 0.01$; ^{d} $p \leq 0.001$

^{1,2} Similar superscripts denote significant or marginally significant differences.

Table 12

Mean Rating of Affect During Reactivity Study

	Nicotine Addicts (SD)	Chippers (SD)	Nonsmokers (SD)
Before Stressor			
Tense	2.44(1.33)	2.13(0.83)	1.83(0.94)
Stressed	2.67(1.41)	2.00(1.07)	1.92(1.24)
Anxious	2.56(1.01)	2.75(1.28)	2.00(1.13)
During Stressor			
Tense	2.78(1.09)	1.88(0.99)	2.33(1.30)
Stressed	2.00(1.00)	1.88(0.99)	1.58(0.90)
Anxious	3.00(1.41)	2.13(0.99)	2.58(1.08)
After Cigarette/Sitting Quietly			
Tense	2.78(1.20)	2.25(0.89)	1.58(1.24)
Stressed	2.22(1.09)	1.75(0.89)	1.50(0.80)
Anxious	2.33(1.12)	2.00(0.93)	2.00(1.21)

Note. Statistical effects refer to tests of differences between groups. Values represent mean ratings on a 5-point Likert scale. Higher values represent a stronger affirmative response.

Footnote

[1] Subjects were precluded from participating in the laboratory portion of the study as follows: 1) 10 refused; 2) 13 were found positive for cardiovascular potentiators; 3) 1 subject's data were thrown out due to equipment failure; 4) 2 subjects did not achieve baseline; 5) 2 subjects did not appear for their appointment; 6) 2 subjects had since quit smoking; 7) 3 subjects could not be reached; and 8) 4 nonsmokers were not contacted so as not to make the cells too uneven.

Appendix A

INFORMED CONSENT FORM

David Cipriano, M.S., under the direction of Dr. Diane Reddy (Associate Professor, Department of Psychology, University of Wisconsin - Milwaukee) is conducting a study on individuals who use a highly addictive substance (nicotine) at various levels of use (i.e., ranging from low or infrequent use to a high level of use).

I understand that participation in this study requires filling out ten questionnaires that will take between one and three hours for completion. There will be approximately two hundred subjects involved in this study.

I understand that there are no foreseeable physical, psychological, or other risks that should stem from my participation. I realize that my participation in this research project is voluntary and anonymous (i.e., no name or identity is required of me) and that I may withdraw at any time without penalty. I understand that I will receive extra credit toward my course grade commensurate with the amount of time I spend participating in this project. When the study is completed, the results will be made available to me upon request. Finally, I understand that the information I supply will not be divulged in any manner that can identify me.

I have received an explanation of the study and agree to participate. I understand that my participation in this study is strictly voluntary.

Signature_____ Date_____

This research project has been approved by the University of Wisconsin-Milwaukee Institutional Review Board for the Protection of Human Subjects for a one year period.

If you have any complaints about your treatment as a participant in this study, please call or write:

Dr. Barri Forman, D.V.M.
Institutional Review Board for the protection of Human Subjects
Environmental Health and Safety
University of Wisconsin - Milwaukee
P. O. Box 340
Milwaukee, Wisconsin 53201
(414) 229-0616 or (414) 229-6339

Although Dr. Forman will ask your name, all complaints are kept in confidence.

Appendix A (cont'd)

Although Dr. Hoffman will ask your name, all complaints are kept in confidence.

Requests for information or results may be addressed to:

Dr. Diane M. Reddy
Associate Professor
Department of Psychology
Universty of Wisconsin-Milwaukee
P.O. Box 413
Milwaukee, WI 53201
(414) 229-6432

David J. Cipriano, M.S.
Department of Psychology
University of Wisconsin-Milwaukee
P.O. Box 413
Milwaukee, WI 53201
(414) 229-6350

Appendix B

DEMOGRAPHICS, HISTORY OF, AND CURRENT SMOKING BEHAVIOR

1. Age_____
2. Year in school_____
3. Sex (circle one): female male
4. Ethnicity: 1. Native American 4. Hispanic
   2. African American 5. White
   3. Asian 6. Other (specify)_____
5. How much do you smoke? You can answer this in number per day if you are a more regular smoker or in number per week or number per month or year if you don't smoke very regularly.

_____

6. How long have you been smoking this much (in other words, how long have you been smoking the amount of cigarettes that you indicated in # 5)?_____
7. When was the last time you smoked a cigarette?_____
8. Are you currently attempting to quit or cut down on your smoking? (circle one): Yes No
9. Have you attempted to quit smoking in the past? Yes No
10. If you have attemted to quit smoking in the past, please list when (month and year or just year):
   Attempt # 1_____ Attempt # 5_____
   Attempt # 2_____ Attempt # 6_____
   Attempt # 3_____ Attempt # 7_____
   Attempt # 4_____ Attempt # 8_____
11. Have you attempted to cut down on your smoking in the past? Yes No
12. If you have attempted to cut down on your smoking in the past, please list how much you cut down (for example, by half, by one quarter, by three quarters) and when (month and year or just year):
   Attempt # 1 How much?_____ When?_____
   Attempt # 2 How much?_____ When?_____
   Attempt # 3 How much?_____ When?_____
   Attmept # 4 How much?_____ When?_____
   Attempt # 5 How much?_____ When?_____
13. Have you increased the amount of cigarettes that you smoke in the last two years? Yes No
14. If you answered yes to # 13, by how much did you increase the amount of cigarettes that you smoke (answer in number of cigarettes over your usual amount per time period - day, week, month - and list your usual amount at the time)
   Increase # 1_____ Usual amount_____
   Increase # 2_____ Usual amount_____
   Increase # 3_____ Usual amount_____
   Increase # 4_____ Usual amount_____
15. Have you changed your smoking pattern in any way in the last two years? Please describe.

_____

_____

Appendix B (cont'd)

16. When you have stopped or cut down on cigarette smoking, did you experience any of the following within 24 hours (circle all that apply)?

1. craving for tobacco
2. irritability
3. anxiety
4. difficulty concentrating
5. restlessness
6. headache
7. drowsiness
8. stomach or digestive problems
9. other:_____
10. none

17. What brand of cigarette do usually smoke? (write in brand name or if you have no preference, please indicate so).

_____

18. Is this a light brand or regular?
(circle one) Light Regular

19. Do you inhale when you smoke? (circle one) Yes No

Appendix C

CONSEQUENCES OF CONSUMPTION

1. How likely are you to experience a particular allergic or negative physiological reaction (e.g., sore throat, coughing, sneezing, nausea) while smoking a cigarette?

Not at all	Somewhat likely	Moderately likely	More than moderately likely	Very likely
1	2	3	4	5

2. How likely are you to experience a particular allergic or negative physiological reaction after smoking a cigarette?

Not at all	Somewhat likely	Moderately likely	More than moderately likely	Very likely
1	2	3	4	5

3. How likely are you to feel guilty about smoking a cigarette either during or after smoking?

Not at all	Somewhat likely	Moderately likely	More than moderately likely	Very likely
1	2	3	4	5

4. How likely are you to feel anxious about smoking a cigarette either during or after smoking?

Not at all	Somewhat likely	Moderately likely	More than moderately likely	Very likely
1	2	3	4	5

5. How strongly would you say the following people disapprove of your cigarette smoking:

	Not at all	Slightly	Moderately	More than moderately	Very much so
Mother	1	2	3	4	5
Father	1	2	3	4	5
Spouse/Partner	1	2	3	4	5
Brother or Sister # 1	1	2	3	4	5
Brother or Sister # 2	1	2	3	4	5
Brother or Sister # 3	1	2	3	4	5
Best friend	1	2	3	4	5

Appendix C (cont'd)

6. How strongly would you say the following people try to <u>discourage</u> you from cigarette smoking:

	Not at all	Slightly	Moderately	More than moderately	Very much so
Mother	1	2	3	4	5
Father	1	2	3	4	5
Spouse/Partner	1	2	3	4	5
Brother or Sister # 1	1	2	3	4	5
Brother or Sister # 2	1	2	3	4	5
Brother or Sister # 3	1	2	3	4	5
Best friend	1	2	3	4	5

Appendix D

CUES

Please indicate the degree to which you agree or disagree with the following statements:

	Very much so	Moderately agree	Somewhat agree	Slightly agree	Not at all
1. Eating a meal makes me want to smoke a cigarette.....	1	2	3	4	5
2. I am more likely to smoke a cigarette when I am with friends than when I am alone.....	1	2	3	4	5
6. I am more likely to smoke cigarettes when I am with others who are smoking than when I am with cigarette smokers who are not smoking.....	1	2	3	4	5
7. Having fun with other people makes me want to light up a cigarette.....	1	2	3	4	5
8. Drinking alcohol with others makes me want to smoke a cigarette.....	1	2	3	4	5
9. Drinking alcohol alone makes me want to smoke a cigarette....	1	2	3	4	5
10. Drinking coffee or some other caffeinated beverage makes me want to smoke a cigarette.....	1	2	3	4	5
11. Being on break at work makes want to smoke a cigarette.....	1	2	3	4	5
12. Being in the car makes me want to smoke a cigarette.....	1	2	3	4	5
13. Waking up in the morning makes me want to smoke a cigarette....	1	2	3	4	5
14. Being on the phone makes me want to smoke a cigarette.....	1	2	3	4	5
15. Studying makes me want to smoke a cigarette.....	1	2	3	4	5
16. Waiting for someone or something makes me want to smoke a cigarette.....	1	2	3	4	5
17. Having sex makes me want to smoke a cigarette.....	1	2	3	4	5
18. Getting ready to go to bed makes me want to smoke a cigarette.....	1	2	3	4	5
19. Reading makes me want to smoke a cigarette.....	1	2	3	4	5

Appendix E

FAMILY HISTORY OF SUBSTANCE USE

1. Please indicate the degree to which the following people smoked cigarettes while you were growing up:

	Never	Smoked a few cigarettes	Smoked a few cigarettes per month, week, day	Smoked 5-10 cigarettes per day	Smoked 11-20 cigarettes per day	Smoked 21 or more cigarettes per day
Mother	1	2	3	4	5	6
Father	1	2	3	4	5	6
Brother/sister # 1.	1	2	3	4	5	6
Brother/sister # 2.	1	2	3	4	5	6
Brother/sister # 3.	1	2	3	4	5	6
Brother/sister # 4.	1	2	3	4	5	6
Brother/sister # 5.	1	2	3	4	5	6
Other people living in household (e.g., extended family).	1	2	3	4	5	6
Friends (three closest)						
Friend # 1	1	2	3	4	5	6
Friend # 2	1	2	3	4	5	6
Friend # 3	1	2	3	4	5	6

2. Did any of the above listed people smoke in front of you? List who:_____

3. Did any of the above listed people teach you how to smoke (i.e., show you how to hold a cigarette or inhale)? List who:

_____

4. Did any of the above listed people tell you about the effects that cigarette smoking had on them? (please list who and write down the effects that they told you. Use the back of this sheet if necessary).

_____

_____

5. Even if they did not tell you, what effects did you observe that cigarette smoking had on any of the people listed above? List who:_____

_____

6. Did any of the above listed people tell you why he or she smoked cigarettes? (please list who and write down the reasons they told you) _____

_____

Appendix E (cont'd)

7. Even if they did not tell you, why do you think any of the people listed above smoked cigarettes? List who:_____

---

8. To what degree do you think any of the people listed below enjoyed smoking cigarettes:

	Very much enjoyed	Moderately enjoyed	Somewhat enjoyed	Enjoyed very little	Not at all
Mother	1	2	3	4	5
Father	1	2	3	4	5
Brother/sister # 1.	1	2	3	4	5
Brother/sister # 2.	1	2	3	4	5
Brother/sister # 3.	1	2	3	4	5
Brother/sister # 4.	1	2	3	4	5
Brother/sister # 5.	1	2	3	4	5
Other people living in household (e.g., extended family).	1	2	3	4	5
Friends (three closest)					
Friend # 1	1	2	3	4	5
Friend # 2	1	2	3	4	5
Friend # 3	1	2	3	4	5

9. To what degree do you think any of the people listed below smoked to make themselves feel better when worried or upset:

	Very much so	Moderately so	Somewhat so	Slightly	Not at all
Mother	1	2	3	4	5
Father	1	2	3	4	5
Brother/sister # 1.	1	2	3	4	5
Brother/sister # 2.	1	2	3	4	5
Brother/sister # 3.	1	2	3	4	5
Brother/sister # 4.	1	2	3	4	5
Brother/sister # 5.	1	2	3	4	5
Other people living in household (e.g., extended family).	1	2	3	4	5
Friends (three closest)					
Friend # 1	1	2	3	4	5
Friend # 2	1	2	3	4	5
Friend # 3	1	2	3	4	5

Appendix E (cont'd)

10. To what degree do you think any of the people listed below smoked to make themselves feel even better (i.e., to make a good feeling or situation even better):

	Very much so	Moderately so	Somewhat so	Slightly	Not at all
Mother	1	2	3	4	5
Father	1	2	3	4	5
Brother/sister # 1	1	2	3	4	5
Brother/sister # 2	1	2	3	4	5
Brother/sister # 3	1	2	3	4	5
Brother/sister # 4	1	2	3	4	5
	Very much so	Moderately so	Somewhat so	Slightly	Not at all
Brother/sister # 5	1	2	3	4	5
Other people living in household (e.g., extended family)	1	2	3	4	5
Friends (three closest)					
Friend # 1	1	2	3	4	5
Friend # 2	1	2	3	4	5
Friend # 3	1	2	3	4	5

11. Please indicate the degree to which the following people listed below drank alcohol while you were growing up:

	Not at all	Light	Moderate	Heavy
Mother	1	2	3	4
Father	1	2	3	4
Brother or sister # 1	1	2	3	4
Brother or sister # 2	1	2	3	4
Brother or sister # 3	1	2	3	4
Brother or sister # 4	1	2	3	4
Brother or sister # 5	1	2	3	4
Other people living in household (e.g., extended family)	1	2	3	4
Friends (list three closest)				
Friend # 1	1	2	3	4
Friend # 2	1	2	3	4
Friend # 3	1	2	3	4

12. Did any of the above listed people drink in front of you? List who:_____

13. Did any of the above listed people teach you how to drink alcohol (i.e., show you how to make drinks, tell you how much to drink)? List who:_____

Appendix E (cont'd)

14. Did any of the above listed people tell you about the effects that drinking alcohol had on them? (please list who and write down the effects that they told you)_____

_____

_____

15. Even if they did not tell you, what effects did you observe that drinking alcohol had on any of the people listed above? List who:_____

_____

16. Did any of the above listed people tell you why he or she drank alcohol? (please list who and write down the reasons they told you)_____

_____

17. Even if they did not tell you, why do you think any of the people listed above drank alcohol? List who:_____

_____

18. To what degree do you think any of the people listed below enjoyed drinking alcohol:

	Very much enjoyed	Moderately enjoyed	Somewhat enjoyed	Enjoyed only a little	Not at all
Mother.....	1	2	3	4	5
Father.....	1	2	3	4	5
Brother/sister # 1.	1	2	3	4	5
Brother/sister # 2.	1	2	3	4	5
Brother/sister # 3.	1	2	3	4	5
Brother/sister # 4.	1	2	3	4	5
Brother/sister # 5.	1	2	3	4	5
Other people living in household (e.g., extended family)..	1	2	3	4	5
Friends (three closest)					
Friend # 1.....	1	2	3	4	5
Friend # 2.....	1	2	3	4	5
Friend # 3.....	1	2	3	4	5

Appendix E (cont'd)

19. To what degree do you think any of the people listed below drank alcohol to make themselves feel better when worried or upset:

	Very much so	Moderately so	Somewhat so	Slightly	Not at all
Mother	1	2	3	4	5
Father	1	2	3	4	5
Brother/sister # 1.	1	2	3	4	5
Brother/sister # 2.	1	2	3	4	5
Brother/sister # 3.	1	2	3	4	5
Brother/sister # 4.	1	2	3	4	5
Brother/sister # 5.	1	2	3	4	5
Other people living in household (e.g., extended family).	1	2	3	4	5
Friends (three closest)					
Friend # 1	1	2	3	4	5
Friend # 2	1	2	3	4	5
Friend # 3	1	2	3	4	5

20. To what degree do you think any of the people listed below drank alcohol to make themselves feel even better (i.e., to make a good feeling or situation even better):

	Very much so	Moderately so	Somewhat so	Slightly	Not at all
Mother	1	2	3	4	5
Father	1	2	3	4	5
Brother/sister # 1.	1	2	3	4	5
Brother/sister # 2.	1	2	3	4	5
Brother/sister # 3.	1	2	3	4	5
Brother/sister # 4.	1	2	3	4	5
Brother/sister # 5.	1	2	3	4	5
Other people living in household (e.g., extended family).	1	2	3	4	5
Friends (three closest)					
Friend # 1	1	2	3	4	5
Friend # 2	1	2	3	4	5
Friend # 3	1	2	3	4	5

Appendix E (cont'd)

21. Please indicate the degree to which the following people used caffeine (drank caffeinated beverages such as coffee or sodas) while you were growing up:

	Not at all	Light	Moderate	Heavy
Mother	1	2	3	4
Father	1	2	3	4
Brother or sister # 1	1	2	3	4
Brother or sister # 2	1	2	3	4
Brother or sister # 3	1	2	3	4
Brother or sister # 4	1	2	3	4
Brother or sister # 5	1	2	3	4
Other people living in household (e.g., extended family)	1	2	3	4
Friends (list three closest)				
Friend # 1	1	2	3	4
Friend # 2	1	2	3	4
Friend # 3	1	2	3	4

22. Did any of the above listed people drink caffeinated beverages in front of you? List who:_____

---

23. Did any of the above listed people teach you how to drink caffeinated beverages (i.e., show you how to make coffee, tell you how much to drink)? List who:_____

---

24. Did any of the above listed people tell you about the effects that drinking caffeinated beverages had on them? (please list who and write down the effects that they told you)_____

---

25. Even if they did not tell you, what effects did you observe that drinking caffeinated beverages had on any of the people listed above? List who:_____

---

26. Did any of the above listed people tell you why he or she drank caffeinated beverages? (please list who and write down the reasons they told you)_____

Appendix E (cont'd)

27. Even if they did not tell you, why do you think any of the people listed above drank caffeinated beverages? List who:____

---

28. To what degree do you think any of the people listed below enjoyed using caffeine:

	Very much enjoyed	Moderately enjoyed	Somewhat enjoyed	Enjoyed very little	Not at all
Mother	1	2	3	4	5
Father	1	2	3	4	5
Brother/sister # 1.1		2	3	4	5
Brother/sister # 2.1		2	3	4	5
Brother/sister # 3.1		2	3	4	5
Brother/sister # 4.1		2	3	4	5
Brother/sister # 5.1		2	3	4	5
Other people living in household (e.g., extended family)	1	2	3	4	5
Friends (three closest)					
Friend # 1	1	2	3	4	5
Friend # 2	1	2	3	4	5
Friend # 3	1	2	3	4	5

29. To what degree do you think any of the people listed below used caffeine to make themselves feel better when worried or upset:

	Very much so	Moderately so	Somewhat so	Slightly	Not at all
Mother	1	2	3	4	5
Father	1	2	3	4	5
Brother/sister # 1.1		2	3	4	5
Brother/sister # 2.1		2	3	4	5
Brother/sister # 3.1		2	3	4	5
Brother/sister # 4.1		2	3	4	5
Brother/sister # 5.1		2	3	4	5

Appendix E (cont'd)

	Very much so	Moderately so	Somewhat so	Slightly	Not at all
Other people living in household (e.g., extended family)..	1	2	3	4	5
Friends (three closest)					
Friend # 1.....	1	2	3	4	5
Friend # 2.....	1	2	3	4	5
Friend # 3.....	1	2	3	4	5

30. To what degree do you think any of the people listed below used caffeine to make themselves feel even better (i.e., to make a good feeling or situation even better):

	Very much so	Moderately so	Somewhat so	Slightly	Not at all
Mother.....	1	2	3	4	5
Father.....	1	2	3	4	5
Brother/sister # 1.	1	2	3	4	5
Brother/sister # 2.	1	2	3	4	5
Brother/sister # 3.	1	2	3	4	5
Brother/sister # 4.	1	2	3	4	5
Brother/sister # 5.	1	2	3	4	5
Other people living in household (e.g., extended family)..	1	2	3	4	5
Friends (three closest)					
Friend # 1.....	1	2	3	4	5
Friend # 2.....	1	2	3	4	5
Friend # 3.....	1	2	3	4	5

31. How much do others say that your coping style is like your mother's?

Not at all	Somewhat	Moderately	More than moderately	Very much
1	2	3	4	5

32. How much do others say that your coping style is like your father's?

Not at all	Somewhat	Moderately	More than moderately	Very much
1	2	3	4	5

33. How much do you think your coping style is like your mother's?

Not at all	Somewhat	Moderately	More than moderately	Very much
1	2	3	4	5

Appendix E (cont'd)

34. How much do you think your coping style is like your father's?

Not at all	Somewhat	Moderately	More than moderately	Very much
1	2	3	4	5

35. To what degree do you eat any foods (for example, chocolate, potato chips, etc.) when you are upset or worried to make yourself feel better?

Very much so	Moderately so	Somewhat so	Slightly	Not at all
1	2	3	4	5

36. To what degree do you think any of the people listed below ate certain foods when they were upset or worried to make themselves feel better:

	Very much so	Moderately so	Somewhat so	Slightly	Not at all
Mother.....	1	2	3	4	5
Father.....	1	2	3	4	5
Brother/sister # 1.	1	2	3	4	5
Brother/sister # 2.	1	2	3	4	5
Brother/sister # 3.	1	2	3	4	5
Brother/sister # 4.	1	2	3	4	5
Brother/sister # 5.	1	2	3	4	5
Other people living in household (e.g., extended family)..	1	2	3	4	5
Friends (three closest)					
Friend # 1.....	1	2	3	4	5
Friend # 2.....	1	2	3	4	5
Friend # 3.....	1	2	3	4	5

Appendix F

BEHAVIORAL SELF-CONTROL

1. How strongly do you try to limit the number of cigarettes you smoke?

Not at all	Mildly strongly	Moderately strongly	More than moderately strongly	Very strongly
1	2	3	4	5

2. How strongly do you try to restrain yourself from smoking frequently?

Not at all	Mildly strongly	Moderately strongly	More than moderately strongly	Very strongly
1	2	3	4	5

3. Why do you try to restrain yourself from smoking frequently?

---

4. When you do try to restrain yourself from smoking frequently, how successful are you?

Not at all	Mildly successful	Moderately successful	More than moderately successful	Very successful
1	2	3	4	5

5. When you try to limit the number of cigarettes that you smoke, how successful are you?

Not at all	Mildly successful	Moderately successful	More than moderately successful	Very successful
1	2	3	4	5

	Never	Occas-ionally	Moder-ately often	More than moder-ately	Very often
6. How often do you cut down or stop smoking temporarily due to physical illness, or symptoms such as a cold, sore throat or cough?	1	2	3	4	5
7. How often do you cut down or stop smoking temporarily due to mental or psychological symptoms, such as an inability to concentrate, or feeling stressed, tense or edgy?	1	2	3	4	5
8. How often do you limit your smoking?	1	2	3	4	5

Appendix F (cont'd)

	Never	Occas-ionally	Moder-ately often	More than moder-ately	Very often
9. How often do you keep track of how much you smoke by counting the number of cigarettes?	1	2	3	4	5
10. How often do you keep track of how much you smoke by monitoring the time between cigarettes?	1	2	3	4	5
11. How often do you keep track of how much you smoke by monitoring the amount of money you spend on cigarettes?	1	2	3	4	5
12. How often do you keep track of how much you smoke by limiting the amount of a cigarette that you smoke?	1	2	3	4	5
13. How often do you keep track of how much you smoke by limiting the situations in which you smoke?	1	2	3	4	5
14. How often do you keep track of how much you smoke by counting the number of puffs that you take from a cigarette?	1	2	3	4	5

15. Please rank order the following reasons for limiting your cigarette smoking from 1 to 9 (1 being most important and 9 being least important).

___ Avoid disapproval from significant others (e.g., parents, spouse, boy/girlfriend, friend).
___ Avoid diseases associated with smoking
___ Avoid being addicted
___ Avoid exacerbating health problems you already have
___ Avoid social stigma associated with smoking
___ Maintain athletic ability
___ Maintain good health
___ Maintain good looks (e.g., white teeth, fresh breath)
___ Other:_____

Appendix F (cont'd)

16. Please rate the following reasons for limiting your smoking:

	Not at all	Mildly strongly	Moderately strongly	More than moderately	Very strongly
Avoid disapproval from significant others (e.g., parents, spouse, boy/girlfriend, friend)	1	2	3	4	5
Avoid diseases associated with smoking (e.g.,lung cancer, emphysema)	1	2	3	4	5
Avoid being addicted	1	2	3	4	5
Avoid exacerbating health problems you already have	1	2	3	4	5
Avoid social stigma associated with smoking	1	2	3	4	5
Maintain athletic ability	1	2	3	4	5
Maintain good health	1	2	3	4	5
Maintain good looks (e.g., white teeth, fresh breath)	1	2	3	4	5
Other:_____	1	2	3	4	5

17. If you wanted to quit smoking cigarettes, how easy do you think it would be?

Very easy	Moderately easy	Somewhat easy	Somewhat difficult	Very difficult
1	2	3	4	5

18. How successful were you?

Very successful	Moderately successful	Somewhat successful	Moderately unsuccessful	Not at all successful
1	2	3	4	5

19. What length of time did you quit for?_____

20. How much did you smoke before the last time that you quit? (please indicate in number of cigarettes per day or week or whatever time frame is appropriate).

_____

21. How much do you smoke now?_____

22. What was the maximum number of cigarettes that you have ever smoked in one day?_____

23. How strongly do you want to quit smoking?

Not at all	Mildly strongly	Somewhat strongly	Moderately strongly	Very strongly
1	2	3	4	5

Appendix F (cont'd)

24. How strongly do you try to limit the number of alcoholic drinks that you consume?

Not at all	Mildly strongly	Moderately strongly	More than moderately strongly	Very strongly
1	2	3	4	5

25. How strongly do you try to restrain yourself from drinking frequently?

Not at all	Mildly strongly	Moderately strongly	More than moderately strongly	Very strongly
1	2	3	4	5

26. Why do you try to restrain yourself from drinking frequently?

_____

_____

27. When you do try to restrain yourself from drinking frequently, how successful are you?

Not at all	Mildly successful	Moderately successful	More than moderately successful	Very successful
1	2	3	4	5

28. When you try to limit the number of drinks that you have, how successful are you?

Not at all	Mildly successful	Moderately successful	More than moderately successful	Very successful
1	2	3	4	5

	Never	Occas-ionally	Moder-ately often	More than moder-ately	Very often
29. How often do you cut down or stop drinking temporarily due to physical illness, or symptoms such as a cold, fatigue or headache?..	1	2	3	4	5
30. How often do you cut down or stop drinking temporarily due to mental or psychological symptoms, such as an inability to concentrate, or sleep?.....	1	2	3	4	5
31. How often do you limit your drinking?.....	1	2	3	4	5

Appendix F (cont'd)

	Never	Occas-ionally	Moder-ately often	More than moder-ately	Very often
32. How often do you keep track of how much you drink by counting the number of drinks?	1	2	3	4	5
33. How often do you keep track of how much you drink by monitoring the time between drinks?	1	2	3	4	5
34. How often do you keep track of how much you drink by monitoring the amount of money you spend on drinks?	1	2	3	4	5
35. How often do you keep track of how much you drink by limiting the situations in which you drink?	1	2	3	4	5

36. Please rank order the following reasons for limiting your drinking from 1 to 9 (1 being most important and 9 being least important).

___ Avoid disapproval from significant others (e.g., parents, spouse, boy/girlfriend, friend).
___ Avoid legal problems or consequences
___ Avoid gaining too much weight
___ Avoid being addicted
___ Avoid exacerbating health problems you already have
___ Avoid social stigma associated with drinking
___ Maintain athletic ability
___ Maintain good health
___ Other_____

37. Please rate the following reasons for limiting drinking:

	Not at all	Mildly strong-ly	Moder-ately strong-ly	More than moder-ately	Very strong-ly
Avoid disapproval from significant others (e.g., parents, spouse, boy/girl-friend, friend)	1	2	3	4	5
Avoid legal problems or consequences	1	2	3	4	5
Avoid gaining too much weight.	1	2	3	4	5
Avoid being addicted	1	2	3	4	5
Avoid exacerbating health problems you already have	1	2	3	4	5

Appendix F (cont'd)

	Not at all	Mildly strong-ly	Moder-ately strong-ly	More than moder-ately	Very strong-ly
Avoid social stigma associated with drinking	1	2	3	4	5
Maintain athletic ability	1	2	3	4	5
Maintain good health	1	2	3	4	5
Avoid diseases associated with alcohol (liver disease, brain damage)	1	2	3	4	5
Other:_____	1	2	3	4	5

38. If you wanted to quit drinking, how easy do you think it would be?

Very easy	Moderately easy	Somewhat easy	Somewhat difficult	Very difficult
1	2	3	4	5

39. Have you ever tried to quit drinking?_____

40. How many times have you tried to quit drinking?_____

41. How successful were you?

Very successful	Moderately successful	Somewhat successful	Moderately unsuccessful	Not at all successful
1	2	3	4	5

42. What length of time did you quit for?_____

43. How much did you drink before the last time that you quit? (please indicate in number of drinks per day or week or whatever time frame is appropriate)._____

44. How much do you drink now?_____

45. What was the most you have drank in one day (in number of drinks)?_____

46. How strongly do you want to quit drinking?

Not at all	Mildly strongly	Somewhat strongly	Moderately strongly	Very strongly
1	2	3	4	5

47. How strongly do you try to limit the number of caffeinated beverages that you consume?

Not at all	Mildly strongly	Moderately strongly	More than moderately strongly	Very strongly
1	2	3	4	5

48. How strongly do you try to restrain yourself from using caffeine frequently?

Not at all	Mildly strongly	Moderately strongly	More than moderately strongly	Very strongly
1	2	3	4	5

Appendix F (cont'd)

49. Why do you try to restrain yourself from using caffeine frequently?_____

_____

50. When you do try to restrain yourself from using caffeine frequently, how successful are you?

Not at all	Mildly successful	Moderately successful	More than moderately successful	Very successful
1	2	3	4	5

51. When you try to limit the number of caffeinated beverages that you consume how successful are you?

Not at all	Mildly successful	Moderately successful	More than moderately successful	Very successful
1	2	3	4	5

	Never	Occas-ionally	Moder-ately often	More than moder-ately	Very often
52. How often do you cut down or stop using caffeine temporarily due to physical illness, or symptoms such as headache or stomach upset?....	1	2	3	4	5
53. How often do you cut down or stop using caffeine temporarily due to mental or psychological symptoms, such as an inability to sleep?.....	1	2	3	4	5
54. How often do you limit your use of caffeine?.....	1	2	3	4	5
55. How often do you keep track of how much you use caffeine by counting the number of beverages you consume (sodas and coffee)....	1	2	3	4	5
56. How often do you keep track of how much you use caffeine by monitoring the time between caffeinated beverages?.....	1	2	3	4	5
57. How often do you keep track of how much you use caffeine by monitoring the amount of money you spend on sodas and coffee?.....	1	2	3	4	5

Appendix F (cont'd)

	Never	Occas-ionally	Moder-ately often	More than moder-ately	Very often
58. How often do you keep track of how much you use caffeine by limiting the situations in which you use caffeine (e.g., having regular coffee in the morning only)?.	1	2	3	4	5

59. Please rank order the following reasons for limiting your caffeine use from 1 to 6 (1 being most important and 6 being least important).

___ Avoid diseases associated with using caffeine (e.g., migraine headache, heart and stomach problems)
___ Avoid being addicted
___ Avoid exacerbating health problems you already have
___ Maintain athletic ability
___ Maintain good health
___ Maintain good looks (e.g., white teeth, fresh breath)
___ Other:_____

60. Please rate the following reasons for limiting your use of caffeine:

	Not at all	Mildly strong-ly	Moder-ately strong-ly	More than moder-ately	Very strong-ly
Avoid diseases associated with using caffeine (migraine headaches, heart and stomach problems).....	1	2	3	4	5
Avoid being addicted.....	1	2	3	4	5
Avoid exacerbating health problems you already have.....	1	2	3	4	5
Maintain athletic ability.....	1	2	3	4	5
Maintain good health.....	1	2	3	4	5
Maintain good looks (e.g., white teeth, fresh breath)....	1	2	3	4	5
Other:_____....	1	2	3	4	5

61. If you wanted to quit using caffeine, how easy do you think it would be?

Very easy	Moderately easy	Somewhat easy	Somewhat difficult	Very difficult
1	2	3	4	5

62. Have you ever tried to quit using caffeine?_____

63. How many times have you tried to quit using caffeine?_____

Appendix F (cont'd)

64. How successful were you?

Very successful	Moderately successful	Somewhat successful	Moderately unsuccessful	Not at all successful
1	2	3	4	5

65. What length of time did you quit for?_____
66. How much caffeine did you use before the last time that you quit? (please indicate in number of caffeinated beverages per day or week or whatever time frame is appropriate)._____
67. How much caffeine do you use now?_____
68. What was the most caffeine you have used in a one day period?_____
69. How strongly do you want to quit using caffeine?

Not at all	Mildly strongly	Somewhat strongly	Moderately strongly	Very strongly
1	2	3	4	5

70. If you wanted to lose weight, how easy would it be for you?

Very easy	Moderately easy	Somewhat easy	Somewhat difficult	Very difficult
1	2	3	4	5

71. Have you ever tried to diet?_____
72. If so, how many times?_____
73. What length of time did you diet for?_____
74. How successful were you?

Very successful	Moderately successful	Somewhat successful	Moderately unsuccessful	Not at all successful
1	2	3	4	5

75. How much did you weigh before your last diet?_____
76. How much do you weigh now?_____
77. How tall are you?_____
78. Are you male or female?_____
79. What is your ideal weight?_____
80. Do you exercise regularly?_____
81. How often do you exercise?_____
82. How long do you typically exercise for?_____
83. How likely are you to arrange your schedule to fit in exercise?

Very likely	Moderately likely	Somewhat likely	Somewhat unlikely	Not at all
1	2	3	4	5

84. How many hours of sleep per night is a good nights sleep for you?_____
85. How many hours of sleep are you getting these days?_____
86. Do you go to bed most every night at the same time?_____
87. Do you wake up at about the same time most every morning?___
88. Do you set aside certain time for studying each day/week?___

Appendix F (cont'd)

89. How strongly do you stick to these times?

Not at all	Mildly strongly	Somewhat strongly	Moderately strongly	Very strongly
1	2	3	4	5

90. How often do you have difficulty completing your assignments on time?

Never	Occasionally	Moderately often	More than moderately	Very often
1	2	3	4	5

Appendix G

FIRST CIGARETTE EXPERIENCE

1. Were you alone or with someone when you tried your first cigarette? (circle one): Alone With Someone
2. If you were with someone when you tried your first cigarette, who were you with?
 a) friends b) your family members other than parents
 c) your parents d) other (specify)_____
3. How old were you when you tried your first cigarette?_____
4. Where did you get your first cigarette?
 a) took it from friends b) friends gave it to me
 c) took it from parents d) parents gave it to me
 e) took it from family members other than parents f) family members other than parents gave it to me
 g) bought my own h) other (specify)_____
5. What was your number one reason for trying your first cigarette?
 a) curiosity b) peer pressure
 c) wanted to be part of the group (to fit in) d) wanted to look or feel sexy
 e) wanted to look or feel tough f) wanted to look or feel more grown up
 g) wanted to feel even better h) wanted to feel less stressed
6. How strongly did the following affect your trying your first cigarette:

	Very Strong	Moderately strong	Somewhat strong	Slightly strong	Not at all
a) curiosity	1	2	3	4	5
b) peer pressure	1	2	3	4	5
c) wanted to be part of the group (to fit in)	1	2	3	4	5
d) wanted to look or feel sexy	1	2	3	4	5
e) wanted to look or feel tough	1	2	3	4	5
f) wanted to look or feel more grown up	1	2	3	4	5
g) wanted to feel even better	1	2	3	4	5
h) wanted to feel less stressed	1	2	3	4	5

7. Did you get caught smoking your first cigarette? Yes No
8. If you got caught smoking your first cigarette, who did you get caught by?
 a) parent b) teacher
 c) family member other than parent d) other (specify)_____

Appendix G (cont'd)

9. Were you punished for smoking your first cigarette? Yes No

10. If you were punished for smoking your first cigarette, how severe was the punishment?

Very severe	Moderately severe	Somewhat severe	Slightly severe	Not at all severe
1	2	3	4	5

11. How afraid were you of being caught smoking your first cigarette?

Very afraid	Moderately afraid	Somewhat afraid	Slightly afraid	Not at all afraid
1	2	3	4	5

12. To what degree would the following describe your mood on the day you tried your first cigarette?

	Very much so	Moderately so	Somewhat so	Slightly	Not at all
Happy or good mood.....	1	2	3	4	5
Unhappy or bad mood.....	1	2	3	4	5
No particular mood.....	1	2	3	4	5

13. To what degree did you inhale your first cigarette?

Did not inhale at all	Inhaled a little	Inhaled a moderate amount	Inhaled more than moderately	Inhaled deeply
1	2	3	4	5

14. Did you smoke the whole cigarette? (cirlce one) Yes No

15. Indicate the degree to which you agree or disagree with the following statements:

	Very much so	Moderately agree	Somewhat agree	Slightly agree	Not at all
When smoking my first cigarette I looked silly or stupid.....	1	2	3	4	5
When smoking my first cigarette I looked "cool".....	1	2	3	4	5
When smoking my first cigarette I looked adult-like.....	1	2	3	4	5
When smoking my first cigarette I did not look any different...	1	2	3	4	5
When smoking my first cigarette I felt closer to the people that were present at the time..	1	2	3	4	5

Appendix G (cont'd)

16. To what degree were the following present when you smoked your first cigarette (include symptoms you experienced during and after smoking):

	Very much so	Moder-ately	Some-what	Slight-ly	Not at all
Burning nose	1	2	3	4	5
Burning eyes	1	2	3	4	5
Bad taste	1	2	3	4	5
Cough	1	2	3	4	5
Bad smell	1	2	3	4	5
Dizziness	1	2	3	4	5
Burning throat	1	2	3	4	5
Headache	1	2	3	4	5
Nausea (upset stomach)	1	2	3	4	5

17. To what degree did you expect to get used to the effects listed below (do not circle anything for the effects you did not experience)?

	Very much so	Moder-ately	Some-what	Slight-ly	Not at all
Burning nose	1	2	3	4	5
Burning eyes	1	2	3	4	5
Bad taste	1	2	3	4	5
Cough	1	2	3	4	5
Bad smell	1	2	3	4	5
Dizziness	1	2	3	4	5
Burning throat	1	2	3	4	5
Headache	1	2	3	4	5
Nausea (upset stomach)	1	2	3	4	5

18. To what degree did you believe that the effects listed below meant that some damage was being done to your body (do not circle anything for the effects that you did not experience)?

	Very much so	Moder-ately	Some-what	Slight-ly	Not at all
Burning nose	1	2	3	4	5
Burning eyes	1	2	3	4	5
Bad taste	1	2	3	4	5
Cough	1	2	3	4	5
Bad smell	1	2	3	4	5
Dizziness	1	2	3	4	5
Burning throat	1	2	3	4	5
Headache	1	2	3	4	5
Nausea (upset stomach)	1	2	3	4	5

Appendix G (cont'd)

19. How would you describe your first experience with smoking a cigarette?

Very positive	Moderately positive	Slightly positive	Slightly negative	Very negative
1	2	3	4	5

Appendix H

EXPECTANCIES

The following pages contain statements about the effects of cigarette smoking. Read each statement carefully and respond according to your own personal thoughts, feelings, and beliefs about cigarettes now. We are interested in what you think about cigarettes regardless of what other people might think.

Please circle the number 1, 2, 3, 4, or 5 after each statement which most closely represents your degree of agreement, with 1 representing not agreeing at all and 5 representing strong agreement. Regardless of how much you smoke or have smoked, you are to answer in terms of your beliefs about cigarettes. It is improtant that you respond to every question.

	Not at all	Mild-ly agree	Moder-ately agree	More than moder-ately agree	Strong-ly agree
1. Smoking cigarettes makes me look more sexually attractive	1	2	3	4	5
2. Smoking cigarettes makes me look inconsiderate	1	2	3	4	5
3. Smoking cigarettes makes me look impulsive	1	2	3	4	5
4. Smoking cigarettes makes me look sociable	1	2	3	4	5
5. Smoking cigarettes makes me look calm	1	2	3	4	5
6. Smoking cigarettes makes me look more attractive	1	2	3	4	5
7. Smoking cigarettes makes me appear relaxed	1	2	3	4	5
8. Smoking cigarettes makes me look more popular	1	2	3	4	5
9. Smoking cigarettes makes me look more mature	1	2	3	4	5
10. Smoking cigarettes makes me look unhealthy	1	2	3	4	5
11. Smoking cigarettes makes me look intelligent	1	2	3	4	5
12. Smoking cigarettes makes me look ill-mannered	1	2	3	4	5
13. Smoking cigarettes makes me look happy	1	2	3	4	5
14. Smoking cigarettes makes me smell bad	1	2	3	4	5

Appendix H (cont'd)

	Not at all	Mildly agree	Moderately agree	More than moderately agree	Strongly agree
15. Smoking cigarettes makes me feel happy.....	1	2	3	4	5
16. Smoking cigarettes adds a certain warmth to social occasions.....	1	2	3	4	5
17. Time passes quickly when I am smoking cigarettes.....	1	2	3	4	5
18. I feel powerful when I smoke cigarettes, as if I can really influence others to do as I want.....	1	2	3	4	5
19. Smoking cigarettes gives me more confidence in myself.....	1	2	3	4	5
20. Smoking cigarettes makes it easier to concentrate on the good feelings I have at the time.....	1	2	3	4	5
21. Smoking cigarettes decreases my hostilities.....	1	2	3	4	5
22. Smoking cigarettes relieves boredom.....	1	2	3	4	5
23. Smoking cigarettes helps me feel less inferior.....	1	2	3	4	5
24. Smoking cigarettes makes me feel closer to people.....	1	2	3	4	5
25. Smoking cigarettes enables me to have a better time at parties.....	1	2	3	4	5
26. I am not as tense if I am smoking cigarettes.....	1	2	3	4	5
27. Smoking cigarettes helps me relax in a social situation....	1	2	3	4	5
28. Smoking cigarettes helps me feel less angry.....	1	2	3	4	5
29. Smoking cigarettes makes me feel more satisfied with myself.....	1	2	3	4	5
30. There is more camaraderie in a group of people who are smoking cigarettes.....	1	2	3	4	5
31. Smoking cigarettes decreases muscular tension.....	1	2	3	4	5

Appendix H (cont'd)

	Not at all	Mildly agree	Moderately agree	More than moderately agree	Strongly agree
32. After smoking cigarettes, I am usually in a better mood....	1	2	3	4	5
33. Smoking cigarettes helps me get out of a depressed mood....	1	2	3	4	5
34. I feel more coordinated after I smoke cigarettes.....	1	2	3	4	5
35. Smoking cigarettes makes me look more interesting.....	1	2	3	4	5
36. Smoking cigarettes makes me feel less shy.....	1	2	3	4	5
37. Smoking cigarettes makes me feel less afraid.....	1	2	3	4	5
38. Having a cigarette in my hand can make me feel secure in a difficult social situation...	1	2	3	4	5
39. Smoking cigarettes can deaden pain.....	1	2	3	4	5
40. I feel more masculine/ feminine when smoking cigarettes.....	1	2	3	4	5
41. Smoking cigarettes makes it easier to forget bad feelings..	1	2	3	4	5
42. Smoking cigarettes makes me feel more sexually responsive..	1	2	3	4	5
43. Smoking cigarettes makes me feel more outgoing.....	1	2	3	4	5
44. Smoking cigarettes can make me feel more wide awake.....	1	2	3	4	5
45. Smoking cigarettes makes me feel more assertive.....	1	2	3	4	5
46. I tend to be less self-critical when I am smoking cigarettes.....	1	2	3	4	5
47. Smoking cigarettes enables me to have a better time at parties.....	1	2	3	4	5
48. Smoking cigarettes makes me feel more at ease in social situations.....	1	2	3	4	5
49. Smoking cigarettes makes me feel less worried.....	1	2	3	4	5
50. Smoking cigarettes makes me feel more aroused or excited...	1	2	3	4	5

Appendix H (cont'd)

	Not at all	Mildly agree	Moderately agree	More than moderately agree	Strongly agree
51. Smoking cigarettes makes me feel less stressed.....	1	2	3	4	5
52. Smoking cigarettes helps me cope with difficult situations.	1	2	3	4	5
53. Smoking cigarettes gives me a lift or more energy.....	1	2	3	4	5
54. Smoking cigarettes makes me more alert.....	1	2	3	4	5
55. Smoking cigarettes makes me look sophisticated.....	1	2	3	4	5
56. Smoking cigarettes makes me look powerful.....	1	2	3	4	5
57. Smoking cigarettes causes people to look down on me.....	1	2	3	4	5
58. Smoking cigarettes causes people to think negatively of me.....	1	2	3	4	5
59. Smoking cigarettes is harmful to my health.....	1	2	3	4	5
60. Smoking cigarettes may cause me to develop lung cancer.....	1	2	3	4	5
61. Smoking cigarettes may cause me to develop heart disease.....	1	2	3	4	5
62. Smoking cigarettes may cause me to develop emphysema.....	1	2	3	4	5
63. Nicotine is a drug.....	1	2	3	4	5

64. Besides cigarette smoking, what other ways (e.g., drinking alcohol, exercising, eating chocolate, drinking coffee) can you get the same feelings, states or effects (e.g., relaxed, happy, alert) that you get from cigarette smoking?

Way # 1_____

Way # 2_____

Way # 3_____

Way # 4_____

Way # 5_____

Appendix H (cont'd)

Please rate these ways in terms of whether or not they work as well as cigarettes do in helping you get these feelings, states or effects on a scale of 1 to 5 with 1 representing "Doesn't work at all as well" and 5 representing "Works just as well."

	Works somewhat as well	Works moderately as well	Works more than moderately as well	Works just as well	Works better
Way # 1.....	1	2	3	4	5
Way # 2.....	1	2	3	4	5
Way # 3.....	1	2	3	4	5
Way # 4.....	1	2	3	4	5
Way # 5.....	1	2	3	4	5

Appendix J

TELEPHONE SCRIPT

Hi, I'm _____ from the Health Psychology Laboratory at UWM. I'm calling about the questionnaire you filled out on cigarette smoking. I have a few questions I'd like to ask you.

1. How much do you smoke? (in number per day/week/month - whatever is appropriate for the subject's rate of smoking)

---

2. Do you inhale? Yes No

3. Have you ever been diagnosed as having a cardiovascular or heart disease such angina, high blood pressure or low blood pressure? (indicate which)

[If yes to # 3]:

Are you currently on any prescribed medication for any of the above? (indicate name of medication)

---

4. Do either of your biological parents have a history of cardiovascular disease? (indicate who and the nature of the disease).____

5. Are you currently using any over-the-counter medications such as diet pills, allergy medications or caffeine tablets? (specify)_____

6. Are you currently taking any prescription drugs such tranquilizers, oral contraceptives, allergy medications or diet pills? (specify)_____

Research has shown that verifying this information with someone who knows you well increases its reliability. Therefore, is there anyone around right now, for instance a family member, friend or room-mate who it would be alright to ask how much you smoke and if you inhale? [if not]: How about at another time?

Appendix J (cont'd)

Questions for collateral:
I have a couple of questions for you about __(name)'s___ cigarette smoking.
1. How much does __(name)__ smoke?_____

2. Does __(name)__ inhale when he/she smokes? Yes No

[If the subject is not currently being treated for a cardiovascular disease and if his/her parents have no history of cardiovascular disease and if he/she is not taking any medication (either over-the-counter or prescribed) that might affect cardiovascular reactivity, then procede to tell him/her about the lab portion of the study. If the subject does answer positively for any of the cardiovascular potentiators, thank the subject for his/her time and hang up.]

We are performing a further study involving physiological measures while working on concentration and visual-motor tasks among smokers. We would like you to participate. It should only take about 40 minutes of your time and we will pay you ten dollars for participating. Would you be interested?

Scheduled for:_____(also write in appt. book)

Please do not smoke cigarettes or use any nicotine product for at least two hours before your scheduled appointment. Also, please do not use any caffeine or drink any alcoholic beverages for at least two hours before your scheduled appointment.

The Health Psychology Laboratory is in the basement of Pearse Hall. Take the stairs or elevator down and go left through the green arch. Take another left and then a right and room B55 is just down the hall. I will meet you there at room B55. Remember, no cigarettes or nicotine of any kind and no caffeine or alcohol for at least two hours before your appointment. Again, your appointment is ____. See you then.

Appendix L

COPING INDEX

Describe the most bothersome event or issue of the day. It could be something that happened in the past that you thought about today (e.g., the death of a loved one), something that happened today or something that was anticipated to happen in the future (e.g., a future job interview).

Appendix L (cont'd)

We are interested in knowing how the situation you described above was handled. Read over each of the categories below and indicate if you used it to handle your bothersome event. If you did use it, please describe the thought or action that you engaged in. There is no limit on the number of categories you can answer yes to. In other words, if you used three of the categories to handle your bothersome event (or even four, five - however many), indicate which ones you used and describe exactly what the thoughts or actions were that you used.

1. Distraction: Diverted attention away from the problem by thinking about other things or engaging in some activity. (circle one) Yes No If yes, describe:_____

---

2. Situation Redefinition: Tried to see the problem in a different light that made it seem more bearable. (circle one) Yes No If yes, describe:_____

---

3. Direct Action: Thought about solutions to the problem, gathered information about it, or actually did something to try to solve it. (circle one) Yes No If yes, describe:

---

4. Catharsis: Expressed emotions in response to the problem to reduce tension, anxiety or frustration. (circle one) Yes No If yes, describe:_____

Appendix L (cont'd)

5. Acceptance: Accepted that the problem had occurred, but that nothing could be done about it.
(circle one) Yes No If yes, describe:_____

---

6. Seeking Social Support: Sought or found emotional support from loved ones, friends or professionals.
(circle one) Yes No If yes, describe:_____

---

7. Relaxation: Did something with the implicit intention of relaxing. (circle one) Yes No If yes, describe:_____

---

8. Religion: Sought or found spiritual comfort and support. (circle one) Yes No If yes, describe:_____

---

9. Other: Any other way that you handled the bothersome event described above. (circle one) Yes No If yes, describe:

Which of the nine categories was most important in handling the bothersome situation?

Appendix M

INFORMED CONSENT FORM

David Cipriano, M. S., under the direction of Dr. Diane Reddy (Associate Professor, Department of Psychology, University of Wisconsin-Milwaukee) is conducting a study on physiological reactivity among cigarette smokers.

I understand that participation in this study requires approximately forty minutes and that during this time I will be required to fill out three questionnaires and then engage in dual-task performance (i.e., do two things at once). During the performance of the task I realize that my blood pressure and heart rate will be monitored.

I understand that there are no foreseeable physical, psychological, or other risks that should stem from my participation. I realize that my participation in this research project is voluntary and anonymous (i.e., no name or identity is required of me) and that I may withdraw at any time without penalty. I understand that I will receive ten dollars for my participation in this study. When the study is completed, the results will be made available to me upon request. Finally, I understand that the information I supply will not be divulged in any manner that can identify me.

I have received an explanation of the study and agree to participate. I understand that my participation in this study is strictly voluntary.

Date_____ Signature_____

This research project has been approved by the University of Wisconsin-Milwaukee Institutional Review Board for the Protection of Human Subjects for a one year period.

If you have any complaints about your treatment as a participant in this study, please call or write:

Dr. Barri Forman, D.V.M.
Institutional Review Board for Protection of Human Subjects
Environmental Health and Safety
University of Wisconsin - Milwaukee
P. O. Box 340
Milwaukee, Wisconsin 53201
(414) 229-0616 or (414) 229-6339

Although Dr. Forman will ask your name, all complaints are kept in confidence.

Appendix M (cont'd)

Requests for information or results may be addressed to:

Dr. Diane M. Reddy
Associate Professor
Department of Psychology
University of Wisconsin-Milwaukee
P. O. Box 413
Milwaukee, WI 53201
(414) 229-6432

David J. Cipriano, M.S.
Department of Psychology
University of Wisconsin-Milwaukee
P. O. Box 413
Milwaukee, WI 53201
(414) 229-6350

Appendix N

MANIPULATION CHECKS

1. How challenging did you find the Pacman game to be?

1	2	3	4	5
Not at all Challenging	Slightly Challenging	Somewhat Challenging	Moderately Challenging	Very Challenging

2. How much effort did you put into playing the Pacman game?

1	2	3	4	5
Very Little Effort	Mild Effort	Moderate Effort	High Effort	Very High Effort

The following questions have to do with the tape-recorded conversation that you listened to.

3. What was one of the supervisor, Kathy's complaints of the employee, Sally?

---

4. What was one of Sally's other responsibilities besides work?

VITA

David James Cipriano

Dissertation:

Using Addictive Substances Nonaddictively: Implications for Theory and Treatment

Recipient of the American Psychological Association's Dissertation Research Award

Education:

Bachelor of Arts, 1984, University of Illinois at Chicago

Master of Science, 1988, University of Wisconsin-Milwaukee

Doctor of Philosophy, 1992, University of Wisconsin-Milwaukee

Major Department: Psychology (Clinical)

Minor: Physiology

Diane M. Reddy
Major Professor in charge of dissertation

8-6-92
Date