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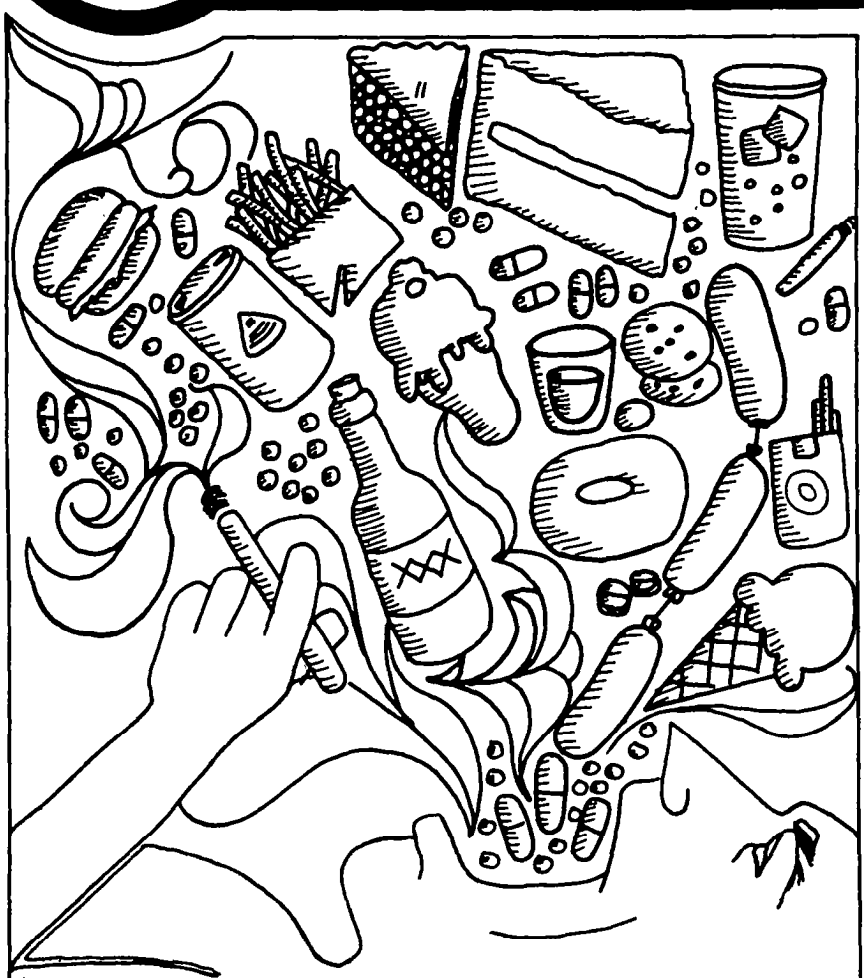

Behavioral Analysis and Treatment of Substance Abuse

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service • Alcohol, Drug Abuse, and Mental Health Administration

Behavioral Analysis and Treatment of Substance Abuse

Editor:

Norman A. Krasnegor, Ph.D.

NIDA Research Monograph 25

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DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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Behavioral Analysis and Treatment of Substance Abuse

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Foreword

Substance abuse, including tobacco use and overeating as well as more "traditional" drug and alcohol abuse, is a concept increasingly central to the concerns of the National Institute on Drug Abuse. The addictive disorders which often result from such abuse are accountable for an enormous share of this nation's burden of illness and premature death. Cigarette smoking takes by far the largest toll, with excessive use of, alcohol ranking second; a smaller number of deaths is related to use of other psychoactive drugs and to overeating. Over a quarter of last year's total of 1.9 million deaths in this country are conservatively attributable to these disorders.

Evidence increasingly suggests that the substance abuse concept is a useful one, that the behavioral patterns involved are basically and not just superficially related. Most individuals involved in any of these behaviors are aware of the negative consequences, frequently would like to alter their behavior, and are unable to do so. These disorders are notoriously difficult to treat, with high attrition during treatment, and high rates of relapse to use, remarkably consistent from substance to substance.

Behavioral treatment programs have proliferated in recent years, more rapidly in some areas, such as obesity and smoking, than in others, such as treatment of heroin addiction; already, prematurely, they tend to fall into fairly standard patterns. Results have been mixed. Often the programs appear to show considerable success, especially in the short run. Yet effective and replicable treatments remain elusive, and little is known of the processes involved in the therapies themselves or in the behaviors they are intended to modify.

This monograph is one product of NIDA's recognition of the importance of the substance abuse concept. It presents a variety of views on both methods of behavioral treatment and the all-important analysis of the addictive behaviors which must provide a foundation for improved theory and treatment strategies. Accomplishments of research completed and underway and needs for future investigation are discussed.

The goal of all this research is, of course, to improve therapeutic outcomes and eventually to reverse the disturbing increase in preventable illnesses resulting from use of psychoactive substances. To this end, researchers are seeking to tease out the elements of those behaviors which form the antecedents, concomitants, and consequences of substance abuse. Multiple types of factors are involved:

affective, biochemical, cognitive, behavioral, situational, and physiological factors at a minimum, and the mix cannot be assumed to be the same for every person. There is need for greater individualization of both treatment goals and treatment methods. For some individuals, the goal may be to regulate rather than totally to suppress the substance use.

The urgency of work on long term maintenance of desired treatment outcomes is being recognized in this area where relapse is the rule. Variables determining adherence to treatment regimens also are beginning to be investigated. More stringent controls and more reliable measures are coming to be used in this research. In the past, understandably, "Let's see what seems to work" has often been the basis for adoption of treatment components. In seeking optimal interventions, the necessary and sufficient conditions for effecting and maintaining changes in addictive behaviors are being explored. Components of the treatment "package," which typically includes strategies to provide social support, cognitive restructuring, and development of coping skills, need to be separately tested and evaluated.

It is our hope and expectation that as the base of knowledge about substance abuse behavior expands, there will be a clearer view of what the important theoretical and practical issues are, and better treatment outcomes will follow. This monograph is offered as part of NIDA's effort in that direction.

William Pollin
Director
National Institute on Drug Abuse

Contents

Chapter 1

Introduction

Norman A. Krasnegor, Ph.D.

This monograph is the fifth in a series of related works published by the National Institute on Drug Abuse. These Research Monographs (Nos. 17, 18, 20, 23, and 25) address different aspects of an emerging area of research on what we call substance abuse. The term encompasses four behavioral patterns: overeating, cigarette smoking, alcohol abuse, and drug abuse. From the public health point of view, these four lifestyle factors form a set because epidemiologists have implicated then in the etiology of the major chronic diseases in the United States. Thus substance abuse behavior has been shown to contribute significantly to the onset of cardiovascular, pulmonary, hepatic, and neoplastic disease and impacts importantly upon health care and associated costs to our society.

The above-stated definition is a descriptive one based upon a public health perspective. Fran the scientific and operational viewpoints, a question of great importance is whether these four behavioral patterns can be shown to be related empirically. That is, can one demonstrate experimentally that there are fundamental principles which underpin these four consumatory behaviors and thus provide a data-based rationale for grouping them as a set? Toward this end, NIDA supports the Committee on Substance Abuse and Habitual Behavior of the National Research Council. The mandate of this committee is to analyze the existing data in different scientific disciplines across the four domains of drug abuse, overeating, cigarette smoking, and alcohol abuse, and synthesize this information in order to identify empirically derived commonalities.

In addition, NIDA has begun to organize the scientific research data on the behavioral aspects of substance abuse. The present monograph is a product of this effort. The papers contained in it are based on presentations made at a NIDA-sponsored conference held in Reston, Virginia, in September 1978. The conference was designed to bring together a group of scientists who are working in the area of substance abuse treatment and to produce a monograph which could

serve as a focus for examining what has been done and as a stimulus for generating new research ideas.

A basic assumption inherent in the papers presented in this monograph is that substance abuse is learned, and the mechanisms which govern the usage patterns observed are fundamentally the same. A logical extension of this premise is that a valid understanding of the necessary and sufficient conditions which lead to the acquisition and maintenance of substance use and abuse can be obtained through a scientific analysis which employs the principles of operant and respondent conditioning. Once this assumption is employed as a point of departure, a research strategy for studying substance abuse can be derived from the established tactics of the experimental analysis of behavior and applied behavior analysis.

Briefly, this approach posits that behavior is an observed activity of an organism. The behavior is held to have a finite probability of occurrence whose expression is functionally related to and dependent upon two features of the organism's environment. These are termed, respectively, antecedents and consequents. This triad (antecedents, behaviors, and consequents) forms the essential unit for carrying out an experimental analysis of behavior and is the fundamental. building block for the design of behavioral treatment. A behavioral analysis of substance abuse conceives of drugs, food, cigarettes, and alcohol as powerful reinforcers. The principles of operant and Pavlovian conditioning are employed by scientists and clinicians to study how these reinforcers come to exert control over behavior and to design effective treatment for these behavioral disorders.

The monograph is divided into four parts. 'Drugs are the subject of Part One. A set of experiments to measure behavioral aspects of the "addictive personality" is detailed by Dr. Charles Wallace. The use of behavior therapy in connection with narcotic antagonist therapy is presented in chapter 3, by Dr. Richard Rawson and his colleagues. Dr. Roy Pickens, from the University of Minnesota, describes the behavioral program employed by him and his coworkers at his inpatient facility. A behavioral analysis of methadone detoxification failures based upon the concept of anxiety and a behavioral method to treat this problem are outlined by Dr. Sharon Hall in her paper entitled, 'The Abstinence Phobia." The final chapter in part One presents data collected by Dr. Maxine Stitzer and her colleagues at Baltimore City Hospital. She provides an account of her research on the use of contingency management to achieve abstinence from drug use and includes discussions of methodological, conceptual, and practical issues in this research domain.

Part Two comprises four papers on research issues related to cigarette smoking. Dr. Terry Pechacek's paper on modification of smoking behavior presents an informative overview of the research on the behavioral methods employed to achieve cessation. The paper by Dr. Edward Lichtenstein reviews the relevance of social learning

for cigarette smoking and relates this concept to the field of substance abuse treatment research. Methodological, conceptual, and treatment issues are also discussed. Dr. Lee Fredericksen's paper entitled "Controlled Smoking" provides a review of his contributions utilizing this approach to treat cigarette smoking. The final paper is authored by Dr. Ovide Pomerleau, who has been intimately involved in the behavioral analysis and treatment of substance abuse in his role as director of the Behavioral Medicine Clinic at the University of Pennsylvania. His exposition on the commonalities inherent in substance abuse behavior Puts into focus many of the treatment and research issues germane to this field of inquiry.

Part Three is devoted to papers on alcohol abuse. Dr. William Miller's paper details his and others' work on behavioral treatment of problem drinkers. The work of Drs. Peter Nathan and Thomas Lipscomb shows how psychophysical methods can be applied to elucidate ethanol blood level discrimination deficits in alcoholics. The paper by Dr. G. Alan Marlatt presents an overview of abstinence across the various types of substance abuse and suggests a cognitive behavioral model which can guide research designed to determine how to maintain abstinence once it has been achieved.

In Part Four, three papers deal with the topic of obesity. Dr. Terence Wilson provides an extensive review of the literature and discusses conceptual and therapeutic issues related to the behavioral treatment of obesity. The work of Dr. Kelly Brownell focuses on a central issue in treatment, that of compliance, and how such adherence problems affect treatment success. The final paper, by Dr. Susan Wooley, presents a provocative series of counter-intuitive, data-based findings concerning obesity that should change the way we conceive of this behavioral disorder.

I am extremely pleased that the National Institute on Drug Abuse has taken the lead in developing the knowledge base in the field of substance abuse. It is our hope that this and other NIDA Research Monographs will serve as both a reference and a basis for further inquiry in this field of biobehavioral research which is so directly relevant to the public health.

Part I Drugs

Chapter 2

The Effects of Delayed Rewards, Social Pressure, and Frustration on the Responses of Opiate Addicts

Charles J. Wallace, Ph.D.

In the search for factors that may influence the etiology and maintenance of opiate addiction, two viewpoints have prevailed. One posits that addiction is a learned behavior and the appropriate methodology for studying addiction is the same as that used for studying any learned behavior (Lynch, Stein, & Fertziger 1976; Wikler & Pescor 1967; Woods & Schuster 1971). The other posits that addiction is an "abnormal" behavior whose etiology and maintenance can be explained by reference to personality variables such as insecurity, poor self-esteem, and sociopathy. The appropriate research methodology is that of general personality theories: group studies that use as dependent variables responses to interviews and personality tests such as the Minnesota Multiphasic Personality Inventory (MMPI).

It is this latter view which seem to have been dominant in both research and treatment. The thrust of numerous investigations of opiate addiction has been to delineate differences between addicts and nonaddicts using standard personality tests (e.g., Rorschach, TAT, MMPI, 16PF, I-E scale, EPPS, CPI)[1] or questionnaires developed strictly for use with addicts (Cavior, Kurtzberg & Lipton 1967: Monroe &Hill 1958: Haertzen et al. 1970; Resnick, Fink & Freedman 1970; Haertzen & Hooks 1969). Sane authors (Sutker 1971; Gilbert & Lombardi 1967) propose that there is a unique constellation of personality characteristics that predisposes an individual to addiction. Others propose that addiction is part of a general sociopathic disorder with characteristics that are shared in by all individuals who engage in proscribed behaviors (Platt 1975; Gendreau & Gendreau 1970, 1971, 1973). The evidence is contradictory; several studies have found differences between addicts and other deviant groups (e.g., Kurtines, Hogan &Weiss 1975, Sutker 1971; Sheppard et al. 1975) while other studies found no differences when variables such as age, IQ, education, and marital status were controlled (Platt 1975; Gendreau & Gendreau 1970, 1971, 1973; Sutker & Allain 1973).

Irrespective of any solution to the issue of addiction "proneness," the results of these studies have been used to speculate about the components of an effective treatment program for addicts. For example, Kurtines. Hogan & Weiss (1975), based on results indicating low scores for addicts on the Socialization and Responsibility scales of the CPI, suggested

that "rehabilitation procedures for addicts might be more profitably concerned with values and personal responsiblity than with social effectiveness or a sense of personal worth" (page 89). Berzins et al. (1974), using a sophisticated clustering technique with MMPI scores, identified two subgroups of addicts and predicted that their Type I patients (peaks on 4, 8, and 2 for females and 2, 4, and 8 for males) would be more responsive to therapeutic techniques, particularly those that involve peer pressure.

The usefulness of these speculations rests on the assumptions that the tests validly measure those personality characteristics enumerated by the authors and that these characteristics predict different behaviors in different treatment methods. Neither assumption is well supported; indeed, there is very little data exploring the relationship between "personality characteristics" and the behavior of addicts. The objective of this research is to explore that relationship by determining if opiate addicts can be distinguished from nonaddicts on the basis of three "personality characteristics" using as dependent measures specific, quantifiable behaviors. The three "personality characteristics" are: delay of gratification, susceptibility to peer pressure, and expression of aggression. These three were chosen because they have been frequently mentioned as being important in the etiology and treatment of addiction.

It has frequently been hypothesized that addicts are either unable to delay gratification of their interpersonal and material needs, or that they lack sufficient behavioral skills to obtain gratification (Torda 1968; Dohner 1972; Fort 1954; Sharoff 1969). Laskowitz (1965) has speculated that addicts act as if there were only a "here and now." Pittel (1971) has indicated that both abusers of opiates and abusers of psychedelics can be characterized as immature and impulsive, engaging in long term relationships only to satisfy their own needs. Ranbolt and Bratten (1974) describe the addict as hedonistically seeking instantaneous gratification, while Winslow, Hankins, and Strachan (1977) note that addicts seek the immediate gratification available with drugs.

There is some evidence derived from questionnaire and interview responses that supports this hypothesis. Many studies have found that addicts have an elevated score on the Pd scale of the MMPI. This presumably reflects their sociopathic traits, a major component of which is impulsivity and the inability to delay gratification (Berzins et al. 1974; Sutker 1971; Astin 1959; Gilbert & Lombardi 1967; Olson 1964). Hekimian and Gershon (1968) diagnosed 68 percent of narcotic addicts newly admitted to a psychiatric hospital as sociopathic. This was considerably more than the incidence of sociopathy for amphetamine or hallucinogen users, who were most frequently diagnosed as schizophrenic. Torda (1968), using a three hundred item biographical questionnaire, found that male heroin addicts, in contrast to matched nonaddict controls, described themselves as never having learned the skills necessary for gratification.

However, Sutker & Allain (1973) and Hill, Haertzen, & Davis (1962) found no differences on the Pd scale when incarcerated addicts who have been drug free for at least two years are compared to nonaddict prisoners. Both groups score within normal limits on all clinical scales of the MMPI, indicating that the presumed sociopathy differences may reflect the immediate effects of attempting to secure drugs on the "street" rather than enduring personality differences. Corroborative evidence has also

been found by Haertzen and Hooks (1969) in a longitudinal study of prisoners who volunteered to become chronic morphine users in a controlled setting. Repeated administration of the MMPI indicated that there were no variations in the Pd scale in either chronic use or withdrawal phases.

The second frequent hypothesis is that addicts are susceptible to pressure from peers to begin and continue taking drugs (Fort 1954: Sharoff 1969; Dohner 1972; Hekimian & Gershon 1968; Sheppard et al. 1972). For example. Dohner (1972) has indicated that the influence of friends was a major reason for the addiction of over one-half of a sample of Chicano addicts he interviewed. Hekimian & Gershon (1968) found similar figures, particularly in reference to marijuana usage. Sheppard et al. (1972) point out that a major component of the MMPI-derived heroin addiction scale (Cavior, Kurtzberg & Lipton 1967) is loyalty to a small group of heroin-addicted peers. Laskowitz (1965) has proposed that the heroin addict associates with a limited number of peers (two or three) with whom he can share both the risks and rewards of addiction and who, in effect, provide social reinforcement for continuing addiction. Fort (1954) has indicated that the use of drugs allows entrance into a group bound by a common ritual, language, and code of behavior. Winslow, Hankins, and Strachan (1972) postulate that peer presure and acceptance is the major reason for etiology and maintenance of addiction.

The supporting evidence for the social pressure hypothesis comes principally from responses to interviews such as those used by Dohner (1972). A few experiments have been performed to test the social pressure hypothesis, and the results have been equivocal. Diamond (1956) compared the responses of adolescent heroin addicts and nonaddict schizophrenics to an Asch type group pressure situation. Results indicated that schizophrenics were not influenced by group pressure, while addicts were influenced. A normal control group would have helped considerably in interpreting these results. Singer (1962) used the Rod and Frame Test to compare the responsiveness to environmental influences of adolescent heroin addicts and matched delinquent and nondelinquent controls. He found no differences. Haertzen and Hooks (1969), in their longitudinal study of chronic morphine use, found that chronic use was associated with a withdrawal from social activityand greater irritation and boredom withothers.

The third frequent hypothesis is that aggression is a critical factor in opiate use. There are, however, two rather different views of the relationship between addiction and aggression. It has been suggested that addiction represents a direct expression of aggression toward authority figures and a rebellion against rules and authority (Smith 1973; Dohner 1972; Sheppard et al. 1972; Winslow, Hankins & Strachan 1972). Smith's (1973) results, based on personality inventories and questionnaires administered annually to 15,000 Boston school children, indicate that the best predictor of future drug use in a sample of fourth grade to twelfth grade students is rebelliousness to authority figures. The more rebellious, the greater the potential for the later use of drugs. Dohner (1972) has indicated that adolescents may begin the use of drugs as "part of the need to defy societal or parental authority" (page 321). Sheppard et al. (1972) have indicated that one of the major factors of the MMPI-derived heroin addiction scale concerns feelings of resentment to authority figures and an enjoyment of flouting the rules.

On the other hand, it has been suggested that addiction is initiated and maintained as an escape from the stress generated by aggressive feelings

which the addict is unable to express (Torda 1968; Fort 1954; Fischmann 1968). Fort (1954) postulates that the most significant factor in heroin addiction is "the enormity of the addict's aggression," from which the addict escapes by using drugs. Torda (1968), based on the results of a 300-item biographical questionnaire, proposes that the addict dreads the expression of aggression and injects heroin as a relief from the panic that such dread elicits. Fischmann (1958) views narcotics in particular as an avoidance of aggression.

Laskowitz (1965) has suggested that the relationship between aggression and addiction may be different for different types of addicts. Laskowitz proposes that, for one type, drug injection acts as a cue for the expression of anger which would otherwise not be admitted. For another type, drug use may decrease almost constant feelings of anger and irritability. Reith, Crockett, and Craig (1975) found that addicts have both high aggressivity and a high need for succorance as measured by the Edwards Personal Preference Schedule. They note that these are contradictory needs, involving a conflict that would be extremely difficult to resolve.

In spite of this mass of findings there is a dearth of evidence that relates these interview and questionnaire responses to behavior in a well-controlled laboratory situation, let alone in more clinically relevant, less controlled situations. The objective of this research was to determine if addicts could be differentiated from nonaddict delinquents and nonaddict nondelinquents on the basis of their behavior during three experimental tasks. The tasks were designed to measure the three 'personality characteristics" of ability to delay gratification, susceptibility to social pressure, and ability to cope with frustration. A second objective was to determine if ethnicity is a significant predictor of differences in either the questionnaire responses or in the laboratory behavior. Ethnicity has been given little attention except for an occasional differential prediction in the clinical literature (Dohner 1972).

METHOD

Subjects

A total of 45 males and 30 females participated in the procedures. For both sexes, the participants consisted of 15 nonaddict nondelinquents and 15 addicts; the male subjects included an additional 15 nonaddict delinquents. Each group of 15 was composed of 5 Anglos, 5 blacks, and 5 Chicanos.

The addict subjects' participation was solicited on the day of their admission to a community-based detoxification center. If they agreed to participate, the procedures were administered at the center on the fourth and fifth days of their planned 14-day stay.

The nonaddict delinquent males were selected from participants in a prerelease program at a local state prison, all of whom had been incarcerated for a minimum of two years. All subjects were classified as nonaddicts based on two criteria: (1) case records did not indicate an arrest for an offense involving the use or possession of drugs; (2) a self-report of not now or in the past having consistently used cocaine, morphine, heroin, barbiturates, amphetamines, or alcohol for a period of more than one year.

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The nonaddict nondelinquent subjects were solicited through ads placed in the local college newspapers and in the newsletter of a local neuropsychiatric facility. In addition to fulfilling the criteria for classification as a nonaddict, subjects were classified as nondelinquent based on their self-report of not having been arrested for more than a misdemeanor, nondrug-related traffic offense.

The originial sampling plan had specified that nonaddict delinquents would be selected from the rolls of local probationers and from enrollees in a work furlough program operated by the local probation department. However, an inspection of the case records indicated that approximately 95 percent of the potential subjects had been convicted of drug use as a primary or secondary offense. Officials of the probation department further indicated that probably more than 95 percent were currently using drugs. They suggested that the only delinquents not involved in drug use might be those individuals who had been incarcerated because of relatively serious offenses. Officials of the state prison system were contacted and, although they endorsed the project, no administrator of a prison for female offenders would allow recruitment of subjects. The only administrator of a prison for male offenders to agree to solicitation of subjects restricted recruitment to prerelease prisoners.

Procedures

The procedures were administered in two sessions. For the first session, subjects were asked to complete a demographic questionnaire plus several personality tests including the MMPI-168, the Emotions Profile Index (EPI), the Self Control (Sc) and the Socialization (So) scales of the California Psychological Inventory (CPI), the Slosson IQ test, the Institute for Personality and Aptitude Testing (IPAT) Anxiety Test, and the State Trait Anxiety Inventory (STAI). Subjects were given the standard written instructions for each test; questions were answered by referring subjects to the relevant sections of the instructions.

For the second session, which was generally administered on the following day, subjects participated in three tasks designed to test the hypotheses of the project. Al three tasks were operationalized using a custom-built human test console controlled by a minicomputer (PDP8-A). The console, which was 24" x 21" x 23", was placed on a desk, with subjects seated directly in front of it. The console consisted of several different manipulanda, reinforcement dispensers, and stimulus display devices.

After subjects were acclimated to the testing situation, they were administered Task 1. The task provided subjects with 30 choices between a small, inmediately delivered reward and a larger, delayed reward. The small reward was a nickel, which was dispensed as soon as the subjects made their choices. The delayed reward was a token which was eventually exchanged for a dime. The token was dispensed as soon as the subjects made their choices; the exchange was delayed until 10 days after completion of the session. Subjects indicated their choices by pulling one of two Lindsley manipulanda. The relationship between the manipulanda and the rewards alternated from trial to trial so that pulling one manipulandum dispensed a nickel on one trial, and a token on the next trial, with the opposite relationship in effect for the other manipulandum. To inform subjects of the alternation, discriminative stimuli were used such that

a red light signaled one relationship between manipulanda and rewards and a white light signaled the opposite relationship. Subjects not only read detailed instructions about the alternation, but they were reminded of the relationships by labels placed just above each manipulandum.

Completion of the first task generally took from 7.5 to 10 minutes; subjects then participated in the second task, which operationalized the social pressure conditions. The task was a modified Asch task in which subjects were asked to select from four vertical lines the one they thought matched a vertical line they had just viewed. 'The four vertical lines and a standard line were presented on slides projected onto a 3.75" x 3.75" rear projection screen located on the console immediately in front of the subjects. The slide of the standard line was exposed for 7 seconds followed by presentation of the slide of the four lines, which was not-removed from view until subjects made their choices. Unlike the Asch task, the four lines were drawn so that there was no correct choice and the difference between the lines was extremely small (a maximum of 1/32" when the lines were drawn to a scale of 8" long). There were forty different pairs of standard and choice slides; pretesting indicated that, for all pairs of slides, no one alternative was chosen significantly more often than would be expected on the basis of chance responding (25 percent).

Two independent variables were implemented within this paradigm, and all subjects participated in all levels of both variables. One variable was the mount of social pressure. Subjects were told that the task required an extremely difficult perceptual discrimination and, to assist them, they would be given the answers of four other subjects who had previously taken the test and who had presumably agreed to make their answers known. The answers were displayed on a 4 x 4 matrix of lights which was placed just above the rear projection screen. There were four levels of social pressure: all four of the others presumably agreed on one alternative; three of the others agreed on one alternative but the fourth disagreed; two of the others agreed on one answer with the other two disagreeing with the first two and between themselves; no two of the four agreed on one answer. Subjects indicated their answers by pressing one of four pushbuttons located just above the 4 x 4 matrix of lights. Of the forty sets of slides, ten were presented under each level of social pressure.

The other variable was type of social pressure, i.e., answers presumably left by peers and answers presumably left by nonpeers. To operationalize these two conditions, subjects viewed video tapes in which the four who had left their answers gave brief descriptions of themselves. For the peer condition, subjects viewed same sex and ethnicity confederates who, depending upon the subject's classification, described themselves as either going to college (nonaddict, nondelinquent), in trouble with the law but not using drugs (nonaddict, delinquent), or in trouble with the law and using opiates (addicts). The same confederates, who ranged in age from 21 to 28, were used for all variations.

For the nonpeer condition, all subjects regardless of sex, ethnicity, or classification, viewed a tape of two nurses, a businessman, and a research sociologist briefly describing themselves and their jobs. Subjects viewed one of the tapes and then responded to the forty sets of slides; after a 5 minute break, they viewed the remaining tape and

responded to the same forty sets of slides which had been duplicated and arranged in another slide tray in a different order.

Completion of the second task took from 40 to 60 minutes. Subjects were given a 15-minute break and then administered the third task, which gave them the opportunity to earn money at the rate of one cent for every five pulls on one of the Lindsley manipulanda. The money that subjects earned was displayed on a three-digit counter which was placed in the middle of the console at approximately eye level. The task was divided into four time periods: two during which the subjects earned money (reinforcement) and two during which the pulls did not result in earning (extinction). The phases were of different duration and were arranged so that the task began with 202 seconds of reinforcement followed by 160 seconds of extinction, followed by 181 seconds of reinforcement ending with 132 seconds of extinction. Subjects were not informed of the alternation of conditions, but they were told that there was nothing wrong with the machine even though it might seem as if there was a malfunction. At an average of 12 seconds, with a range of from 3 to 26 seconds, a sonalert on the console was sounded which emitted an unpleasantly loud noise (4000Hz, 86db at 1 meter). Subjects could terminate the noise either by pressing a pushbutton switch or by hitting a palm switch which had been modified to resemble a "punching bag." The palm switch had been covered with a leather pouch stuffed with foam rubber, and the original spring had been replaced with a relatively stiff mattress coil. Thus, subjects could terminate the aversive noise either by a response whose topography was "aggressive" or by a response whose topography was "nonaggressive."

At the end of the third task, subjects provided a urine sample for analysis. The data for any subject whose analysis indicated the presence of any morphine-based drug was eliminated. Two subjects' data were so eliminated and replaced by new subjects. All subjects were paid $10 in cash for their participation plus the money earned in Task 3 and the nickels chosen in Task 1. Arrangements were made to exchange the tokens chosen in Task 1.

RESULTS

Personality Test

Males. To analyze the results of the male subjects' personalty tests, raw scores for each scale of each test were analyzed using a completely randomized factorial analysis of variance (ANOVA) with two independent variables; subject status with three levels (addict, nonaddict delinquent, nonaddict nondelinquent), and ethnicity with three levels (Anglo, black, and Chicano). A significant main effect of either status or ethnicity was further analyzed using Tukey's HSD test. A significant interaction was analyzed using a test of simple main effects followed by a Tukey's HSD test to analyze the significant simple main effects.

Table 1 summarizes the outcomes of these analyses for the main effect of subject status.

TABLE 1

Means of raw scores and significant differences between groups for male subjects.

SCALE		GROUP		
		Addicts	Nonaddict Delinquents	Nonaddict Nondelinquents
Slosson IQ Test	a	92.73	96.0	104.33
STAI-x1	a b	50.33	38.0	34.52
STAI-x2	a b	48.93	33.8	37.78
CPI-So	a	25.53	28.93	30.90
CPI-Sc	b	21.6	29.0	25.47
IPAT-Q3		6.2	4.4	4.53
IPAT-C		5.47	3.93	4.27
IPAT-L		3.2	3.33	3.27
IPAT-O	a	10.0	6.13	7.27
IPAT-Q4	a b	10.53	5.87	7.07
IPAT-Self	a b	35.4	23.0	26.67
MMPI-168-K		4.6	6.53	4.67
MMPI-168-F		5.07	3.53	6.13
MMIP-168-Hs	a b	9.13	3.33	5.33
MMPI-168-D	a b	18.87	11.33	13.33
MMPI-168-Hy	b	13.4	9.0	11.33
MMPI-168-Pd	a b	14.6	10.53	10.67
MMPI-168-Mf	b	10.67	14.0	11.27
MMPI-168-Pa		4.87	4.47	4.47
MMPI-168-Pt	a b c	9.8	3.6	6.3
MMPI-168-Sc	a b c	6.47	1.93	4.53
MMPI-168-Ma	b	11.4	9.0	10.33
MMPI-168-Si		7.4	6.27	7.33

Table 1. Continued

SCALE	GROUP		
	Addicts	Nonaddict Delinquents	Nonaddict Nondelinquents
MMPI-168-L b c	1.07	2.53	1.47
EPI-TR	20.33	23.2	21.33
EPI-DY	11.33	9.8	12.8
EPI-TI	15.73	17.13	15.27
EPI-DE	5.87	5.53	5.47
DPI-DI	7.67	7.0	6.0
EPI-CO	18.87	18.73	17.8
EPI-AG	8.2	5.87	6.6
EPI-GR	15.2	17.13	16.93
EPI-BII	34.27	37.4	39.07

a= significant difference between addicts and nonaddict non-delinquents

b= significant difference between addicts and nonaddict delinquents

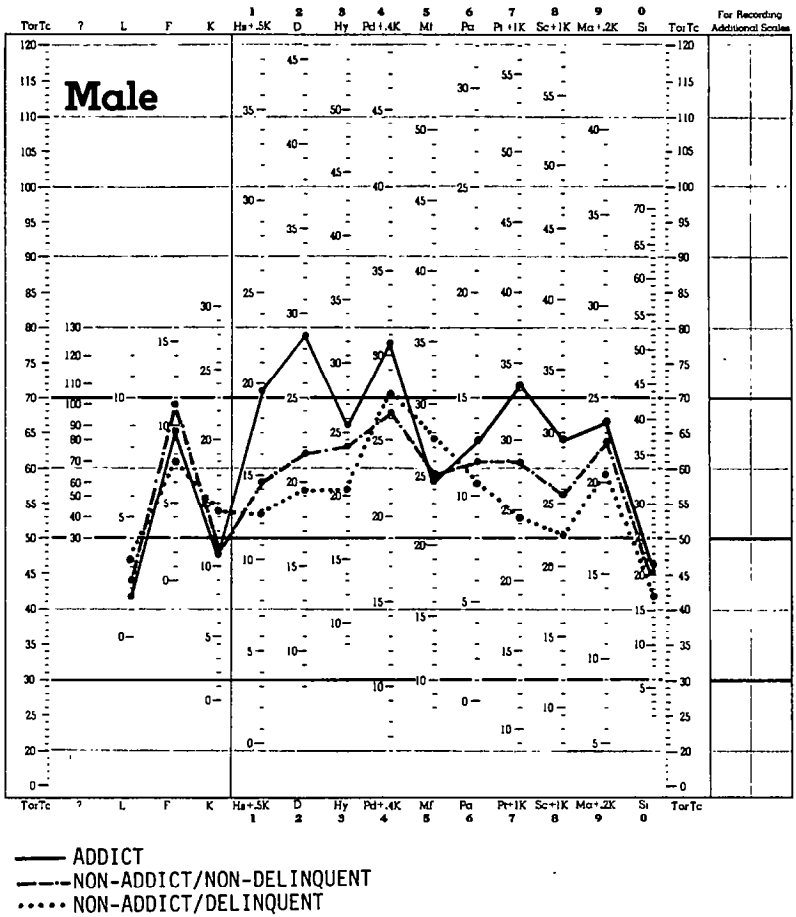
c= significant difference between nonaddict delinquents and nonaddict nondelinquents

Figure 1 depicts the MMPI profiles for the three groups. The differences between the addicts and nonaddict nondelinquents were generally in accord with the differences found in other studies. However, the only significant differences between the nonaddict delinquents and the nonaddict nondelinquents were that the latter group$_2$scored lower on the Pt and Sc scales and higher on the L scale of the MMPI-168. These results are similar to those reported by Hill et al. (1962) and Sutker and Allain (1973) for prisoners who had been incarcerated for at least two years.

The results for the So scale of the CPI indicate that the nonaddict nondelinquents Were relatively low in socialization (high in delinquency) by comparison to the appropriate normative samples. However, the mean score matches closely the mean score reported by Kurtines et al. (1975) for self-professed, undergraduate marijuana users.

Ethnicity was a significant factor in the results of four Scales. Specifically, Anglos scored significantly higher than Chicanos on the STAI State Anxiety scale and significantly lower than Chicanos on the So and Sc scales of the CPI and on the L scale of the MMPI-168, with no significant differences between blacks and Anglos or between blacks and Chicanos.

FIGURE 1



There was only one significant interaction. For the Anglo subjects on the Ma scale[2] of the MMPI-168, nonaddict delinquents scored significantly lower than either the addicts or the nonaddict nondelinquents with no differences between the later two groups. For the black and Chicano subjects, there were no significant differences among the three groups.

Females: The same completely randomized factorial ANOVAs were used to analyze the results of the female subjects' personality tests, except that the independent variable of subject status consisted of only two levels (addict and nonaddict nondelinquent). Table 2 summarizes the outcomes of these analyses for the main effect of subject status.

TABLE 2

Means of raw scores and significant differences between groups for female subjects.

SCALE		GROUP: Addicts	GROUP: Nonaddict Nondelinquents
Slosson IQ Test	*	86.93	96.83
STAI-x1	*	52.8	36.28
STAI-x2	*	51.33	42.28
CPI-So	*	25.73	35.6
CPI-Sc	*	19.53	25.01
IPAT-Q3		8.27	7.0
IPAT-C	*	6.87	4.35
IPAT-L		4.73	4.55
IPAT-O	*	12.07	8.82
IPAT-Q4	*	11.73	7.95
IPAT-Self	*	43.8	32.3
MMPI-168-K	*	3.07	4.99
MMPI-168-F	*	8.67	3.15
MMPI-168-Hs	*	12.0	3.95
MMPI-168-D	*	18.73	12.8
MMPI-168-Hy	*	14.27	9.69
MMPI-168-Pd	*	16.07	9.5
MMPI-168-Mf	*	15.53	18.3
MMPI-168-Pa	*	6.4	4.02
MMPI-168-Pt	*	11.87	5.63
MMPI-168-Sc	*	8.33	3.4
MMPI-168-Ma	*	12.93	10.3
MMPI-168-Si		6.87	6.61
MMPI-168-L		1.13	1.67
EPI-TR		23.0	21.27
EPI-Dy		13.13	13.18
EPI-TI		13.4	15.12
EPI-DE	*	6.2	3.75
EPI-DI		8.53	5.76
EPI-CO		16.47	18.49
EPI-AG	*	11.45	5.02
EPI-GR		15.0	13.43
EPI-BII		32.0	32.33

* = significant difference between the two groups

FIGURE 2

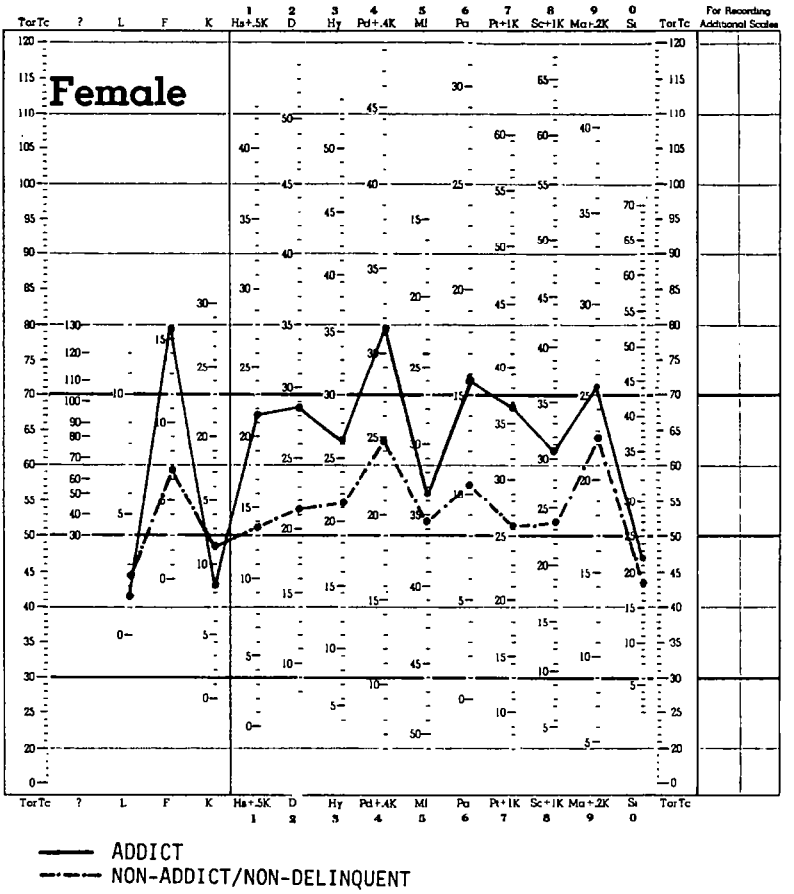


Figure 2 depicts the MMPI profiles for the two groups. As with the males, the differences between the two groups were in accord with differences found in other studies. Corroborating the results for the male subjects, significant differences were found between the two groups of female subjects for all scales on which significant differences were found among the three groups of male subjects (except for the L scale). In addition, differences between the two groups of female subjects were found on the C scale of the IPAT Anxiety Test and the K, F, and Pa scales of the MMPI-168 with the addicts scoring in a more pathological direction than the nonaddict nondelinquents.

Ethnicity was a significant factor only for IQ with blacks scoring significantly lower than either Anglos or Chicanos with no significant differences between the latter two. There were no significant interactions.

Task 1

The dependent variable was the number of choices of the delayed reward. Results were analyzed separately for the male and female subjects using the same completely randomized factorial ANOVAs as those used to analyze the results of the personality tests. The outcomes of these analyses are presented in Table 3 and indicate that for both males ($F(2, 36) = 6.94$, $p < .01$) and females ($F(1, 24) = 4.75$, $p < .05$), addicts chose significantly fewer delayed rewards than either nonaddict delinquents or nonaddict nondelinquents. Neither ethnicity nor the interaction between status and ethnicity was significant. Although females chose fewer delayed rewards than males, the differences were not significant when analyzed with a completely randomized factorial ANOVA with sex, status, and ethnicity as the independent variables ($F(1, 48) = 2.63$, $p > .10$).

TABLE 3

Mean number of choices of the delayed reward.

Sex	GROUP		
	Addict	Nonaddict Delinquent	Nonaddict Nondelinquent
Male	7.73	23.33	19.27
Female	4.13	-	12.15

Task 2

The dependent variable was the number of times that each subject chose answers that were in agreement with the majority's answers. The results were analyzed separately for males and females using split plot factorial ANOVAs with two between subjects variables (status and ethnicity) and two within subjects variables (type of social pressure and amount of social pressure). The analysis for males resulted in significant main effects for amount of social pressure ($F(2, 72) = 16.49$, $p < .01$) and for type of social pressure ($F(1, 36) = 21.21$, $p < .01$) plus a significant interaction between status and type of pressure ($F(2, 36) = 6.86$, $p < .01$). The main effect of amount of social pressure was further analyzed with a Neuman-Keuls test that indicated that all subjects agreed least with the majority in the 2-1-1 condition, with a significant increase in agreement in the 3-1 condition, and with another significant increase in the 4-0 condition compared to both the 2-1-1 and the 3-1 condition. The significant interaction of the type of pressure with subject status was analyzed with a test of simple main effects which indicated that addicts agreed significantly more often with the nonpeers than with the peers. In contrast, there were no significant differences between agreement with peers and nonpeers for either the nonaddict delinquents or the nonaddict nondelinquents. Furthermore, there were no significant differences between the three groups under the peer pressure condition; in the nonpeer condition, however, the addicts agreed significantly more

often with the majority than either the nonaddict delinquents or the nonaddict nondelinquents. Tables 4 and 5 present the results for both male and female subjects.

TABLE 4

Mean number of choices in agreement with the majority (subject status x type of pressure interaction)

Group	Males		Females	
	Peer	Nonpeer	Peer	Nonpeer
Addicts	7.8	13.41	9.8	13.73
Nonaddict Delinquent	8.93	9.93	-	-
Nonaddict Nondelin-quent	9.4	10.65	11.5	12.78

TABLES 5

Mean number of choices in agreement with the majority (amount of pressure)

Sex	Condition		
	2-1-1	3-1	4-0
Males	5.37	6.42	8.24
Females	6.18	7.95	9.79

The analysis for females resulted in a significant main effect for amount of social pressure ($F(2, 48) = 16.84$, $p < .01$) and for type of social pressure ($F(1, 24) = 13.53$) $p < .01$). The results were exactly the same as those for the male subjects. The interaction of subject status with type of pressure was not significant ($F(1, 24) = 3.62$, $.05 < p < .10$), but the trend was the same as that for male subjects.

Task 3

There were two dependent variables: the number of lever pulls per second and the proportion of presentations of the aversive noise terminated by the use of the punching bag. The results for each were analzyed separately for males and females using split plot factorial ANOVA's with two between-subjects variables (status and ethnicity) and one within-subject variable (time periods with four levels reflecting the four Periods of the ABAB, withdrawal design). The results for both males and females for the proportion of use of the punching bag indicated that the ANOVA's could not be conducted due to significantly heterogeneous variances (Males, $F\max = 600.00$, $p < .001$, df = 4; females, $F\max = 55.5$, $p < .05$). Inspection of the individual subjects' results-indicated that many subjects pressed either the button or the bag, resulting in a set of binomial scores. In addition, several subjects did not either press the button or punch the bag to terminate the noise; they simply let it continue until the task ended. Since these results were considerably different from those found by Hutchinson and Hake (1970) in their extinction-induced frustration task, it seemed as though this task did not properly operationalize the frustration condition, and the results for the proportions of aggressive responses were not further analyzed.

The results for the male subjects for the rate of lever pulling indicated a significant interaction between status and time period ($F(6, 108) = 6.37$, $p < .01$). This was analyzed with a test of simple main effects which indicated that addicts pulled at a significantly faster rate than the nonaddict nondelinquents during both the extinction periods, with the nonaddict delinquents' scores falling in between and not significantly different from the other two groups. There were no significant differences between the three groups for either of the two reinforcement periods. Table 6 presents the response rates for both male and female subjects across the four time periods.

TABLE 6

Mean rates of lever pull per second

Sex	Group	Time Periods			
		Reinforce. 1	Extinction 1	Reinforce. 2	Extinction 2
Males	Addicts	3.79	3.60	3.64	3.38
	Nonaddict Delinquents	3.31	2.80	2.94	2.38
	Nonaddict Nondelin-quents	3.41	2.40	2.98	2.26
Females	Addicts	3.09	2.78	3.16	2.87
	Nonaddict Nondelin-quents	3.22	2.62	2.97	2.39

The results for the female subjects indicated no significant main effects or interaction. However, the mean response rates, presented in Table 6, tend to support the results found with the males. Except for the first reinforcement period, the addicts pulled at a higher rate than the nonaddict nondelinquents with the difference approaching significance on the last extinction period ($F(1, 24) = 4.07$, $.05 < p < .10$).

DISCUSSION

The results of the personality tests indicated that, in comparison with the findings reported in other studies, the three groups of male subjects and the two groups of female subjects were relatively typical of the populations from which they were presumably selected. The characteristics of the addicts were similar to those reported for addicts undergoing detoxification (e.g., Haertzen & Hooks 1969). The characteristics of the nonaddict delinquents were similar to those reported by Sutker & Allain (1973) for their prisoners who had been incarcerated for two years and whose scores on the MMPI scales were within "nomal" limits. The characteristics of the nonaddict. nondelinquent males were similar to those reported by Kurtines, Hogan & Weiss (1975) for undergraduate, self-professed marijuana users. The characteristics of the nonaddict nondelinquent females were all well within "normal" limits. Thus there did not seen to be any unique constellation of characteristics that would either confound the results or make them inapplicable to the general area of the relationship between personality characteristics and opiate addiction.

The results of Task 1 confirmed the results of the personality tests. Both male and female addicts chose the immediate reward significantly more often than the other two groups in spite of the fact that the delayed reward was scheduled to be delivered fairly soon after the testing sessions and before the addicts were scheduled to leave the detoxification center. In addition, since the sessions were conducted at the center on a daily basis, the addict subjects had frequent casual contact with the experimenter and could have easily assured themselves that the exchange would take place. Perhaps different combinations of the amount of the rewards and the interval of the delay might have changed these results; however, these are simply task parameters that should be systematically changed in order to determine their interaction with subject status. Interestingly, the order of the means of the Sc scale CPI, which presumably measures impulsivity, were in accord with the results of Task 1.

The results of Task 2 partially confirmed the results of the personality tests. All subjects' responses were influenced by the social pressure manipulation; indeed there was a direct relationship between the amount of social pressure and the degree of agreement with the majority. For nonaddict delinquents and nonaddict nondelinquents, this relationship was the same for pressure given either by peers or by nonpeers. For male addicts, and to a lesser extent, for female addicts, the effect of the social pressure was enhanced when nonpeers were the source of the pressure. Thus, addicts were differentially susceptible to sources of pressure, but the source to which they were more sensitive was the opposite of the one that had originally been predicted. The reason for this contradictory finding may possibly be explained by reference to the manner in which the task was presented. Subjects were told

that the task involved a difficult perceptual discrimination. Perhaps addicts reacted to the nonpeers as though they were experts who might know the answers better than theirpeers, who, like themselves, were physically distressed while undergoing detoxification and might be perceived as unlikely to be able to make the required discriminations. 'Thus, the results seem to indicate that addicts may be susceptible to social pressure but that the nature of the specific situation may define the type and source of pressure to which they are susceptible.

Although Task 3 did not properly operationalize the aggression condition, the results of the rate of responding provide data that contradict a contention that addicts lack endurance and persistence (Reith, Crockett, & Craig 1975; Sheppard et al. 1975). For the male addicts and, to a lesser extent, for female addicts, responding was equal to that of nonaddict delinquents and nonaddict nondelinquents during the reinforcement periods and was higher than either of the other groups during both extinction periods. Rather than indicating a lack of persistence and endurance, the data corroborate a clinical observation that, given the "correct" stimulus (e.g., drugs, money) addicts work as hard and as persistently as anyone else.

The results also indicated that ethnicity was not a significant factor in either responses to the personality tests or behavior in the laboratory tasks. The few differences found for ethnicity on the personality tests for males were not replicated for females, and no differences were found on the three tasks. Furthermore, no tentative statement can be made about the effects of addiction per se. The nonaddict delinquents had been incarcerated for a long enough period of time that they did not provide a potential control for the effects of leading the delinquent lifestyle necessary to obtain drugs. Of course, the conclusions that can be drawn from any such comparison, including the ones that have been drawn from this study, have to be tempered in view of the ex post facto methodology.

The objective of this research was to determine if presumed differences in 'personality characteristics" among addicts, nonaddict delinquents, and nonaddict nondelinquents would be apparent in behavior in specific laboratory tasks. The tasks were designed from a quasi operant perspective; the results indicated that the differences in characteristics were associated with differences in behavior. The results also indicated that task characteristics were obviously critical in influencing behavior. Unfortunately, task characteristics are often forgotten in the sweeping speculations made about the components of treatment programs that might remedy deficient "personality characteristics." Perhaps further studies that define the behavioral differences between these groups may assist in developing effective-assessment devices and treatment programs.

FOOTNOTES

1. TAT - Thematic Apperception Test
   16PF - 16 Personality Factor Questionnaire
   I-E scale - Internal-External Locus of Control Scale
   EPPS - Edwards Personal Preference Schedule
   CPI - California Psychological Inventory

2. Scales of MMPI-168: Pt - Psychasthenia; Sc - Schizophrenia; L - Lie; Ma - Hypomania

REFERENCES

Astin, A.W. A factor study of the MMPI Psychopathic' Deviate scale. J Consult Psychol , 23:550-554, 1959.

Berzins, J.E., Ross, W.F., English, G.E., and Haley, J.V. Subgroups among opiate addicts: A typological investigation. J Abn Psychol, 83:65-75, 1974.

Cavior, N., Kurtzberg, R.L., and Lipton, D.S. The development and validation of a heroin addiction scale with the MMPI. Int J Addict, 2:129-137, 1967.

Diamond, M.D. The ability of schizophrenics to modify responses in an interpersonal situation. J Consult Psychol, 20:441-444, 1956.

Dohner, V.A. Motives for drug use: Adult and adolescent. Psychosomatics, 13:317-324, 1972.

Fischmann, V.S. Stimulant users in the California Rehabilitation Center. Int J Addict 3:211-234, 1968.

Fort, J.P. Heroin among young men. Psychiatry, 17:251-259, 1954.

Gendreau, P., and Gendreau, L.P. The "addiction prone" personality: A study of Canadian heroin addicts. Can J Beh Sci 2:18-25, 1970.

Gendreau, P., and Gendreau, L.P. Research design and narcotic addiction proneness. Can Psychiat Ass J, 16:265-267, 1971.

Gendreau, P., and Gendreau, L.P. A theoretical note on personality characteristics of heroin addicts. J Abn Psychol, 82(1):139-140, 1973.

Gilbert, J.G.. and Lombardi, D.N. Personality characteristics of young male narcotic addicts. J Consult Psychol, 31:536-538, 1967.

Haertzen, C.A., and Hooks, N.T. Changes in personality and subjective experience associated with the chronic administration and withdrawal of opiates. J Nerv Ment Dis 148(6):606-614, 1969.

Haertzen, C.A., Monroe, J.J., Hooks, N.T., and Hill, H.E. The language of addiction. Int J Addict, 5:115-129, 1970.

Hekimian, L.J., and Gershon, S. Characteristics of drug abusers admitted to a psychiatric hospital. J A M A 205:125-130, 1968.

Hill, H.E., Haertzen, C.S., and Davis H. Au MMPI factor analytic study of alcoholics, narcotic addicts, and criminals. Quart J Stud Alcohol 23:411-431, 1962.

Kurtines, W., Hogan, R., and Weiss, D. Personality dynamics of heroin use. J Abn Psychol, 84(1):87-89, 1975.

Laskowitz, D. Psychological characteristics of the adolescent addict. In Harms, I.E., ed., Drug Addiction in Youth. New York: Pergamon Press, 1965.

Lynch, J.J., Stein, E.A., and Fertziger, A.P. An analysis of 70 years of morphine classical conditioning: Implications for clinical treatment of narcotic addiction. J Nerv Ment Dis, 163(1):47-58, 1976.

Monroe, J.J., and Hill, H.E. The Hill-Monroe inventory for predicting acceptability for psychotherapy in the institutionalized narcotic addict. J clin Psychol, 14:31-36, 1958.

Olson, R.W. MMPI sex differences in narcotic addicts. J Gen Psychol, 71:257-266, 1964.

Pittel, J. Psychological aspects of heroin. J Psychedelic Drugs, 4:40-45, 1971.

Platt, J.J. "Addiction proneness" and personality in heroin addicts. J Abn Psychol, 84(3):303-306, 1975.

Ranbolt, R.R. and Bratten, T.E. The methadone addict. J Drug Educ, 4:51-60, 1974.

Reith, G., Crockett, D., and Craig, K. Personality characteristics in heroin addicts and nonaddicted prisoners using the Edwards Personal Preference Schedule. Int J Addict, 10(1):97-112, 1975.

Resnick, R., Fink, M., and Freedman, A.N. A cyclazocine typology in opiate dependence. Am J Psychiatry, 126:1256-1260, 1970.

Sharoff, R.L. Character problem and their relationship to drug abuse. The Am J Psychoanalysis, 2:186-193, 1969.

Sheppard, C., Ricca, E., Fracchia, J., Rosenberg, N., and Merlis, S. Cross validation of a Heroin Addiction scale from the Minnesota Multiphasic Personality Inventory. J Psychol, 81:263-268, 1972.

Sheppard, C., Ricca, E., Fracchia, and Merlis, S. Needs conflicts of suburban narcotic abusers who apply to a county methadone maintenance Program. J Clin Psychol, 31:140-145, 1975.

Singer, L.J. An investigation of the relationship between perceptual mode and impulse control among juvenile delinquents. Unpublished doctoral dissertation, Yeshiva University, 1962.

Smith, G.M. Personality traits predict drug use. HEW News Release 4/4/73.

Sutker, P.B. Personality differences and sociopathy in heroin addicts and nonaddict prisoners. J Abn Psychol, 75:237-251, 1971.

Sutker, P.B. and Allain, A.N. Incarcerated and street heroin addicts: A personality comparison. Psychol Rep, 32:243-246, 1973.

Torda, C. Comments on the character structure and psychodynamic processes of heroin addicts. Percept Mot Skills, 27:143-146, 1968.

Wikler, A., and Pescor, F.T. Classical conditioning of a morphine abstinence phenomenon, reinforcement of opiod-drinking behavior and "relapse" in morphine addicted rats. Psychopharmacologia, 10:255-284, 1967.

Winslow, T., Hankins, W., and Strachan, A. Drug involvement. J. Drug Educ. 2:269-279, 1972.

Woods, J.H., and Schuster, C.R. Opiates as reinforcing stimuli. In Thompson, T., and Pickens, R., ed. Stimulus Properties of Drugs. New York: Appelton-Century-Crofts, 1971.

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Chapter 3

Naltrexone and Behavior Therapy for Heroin Addiction

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Therapeutic approaches to heroin addiction can be aimed at either the physical or psychological aspects of the addiction. Medical treatments have generally offered heroin substitutes to allay the strong drug urges associated with abstinence while psychological approaches have, for the most part, attempted to bring about personality change in the addict. While these approaches have met with some success, the shortcomings of presently available treatments have motivated research on new ways of dealing with addiction. Two promising new treatments are naltrexone, one of a class of narcotic antagonists or opiate-blocking agents, and broad spectrum behavior therapy.

As opposed to heroin substitutes such as methadone, naltrexone is used to prevent the euphoric consequences which would normally result from using heroin. Since the drug is taken only after the addict is already opiate-free, it is primarily used as a tool to promote continued abstinence. It is hoped that during the period of opiate blockage the addict will experience the extinction or diminution of drug urges and drug-seeking behaviors while he has a chance to develop a "straight" lifestyle with normalization of family, social, recreational, and vocational involvements (Wikler 1976). Naltrexone has been administered to over 1000 addicts and has been found to be well tolerated, physically safe, and to produce a highly effective blockade against opiates (Julius and Renault 1976). There is general agreement by those evaluating the clinical effectiveness of naltrexone that while an addict is receiving the antagonist he rarely if ever challenges the blockade with heroin or other opiates, even if the opiate is made available to him in an experimental setting (Altman et al. 1976; Callahan et al. 1976; Hurzeler, Gewirtz, and Kleber 1976; Greenstein et al. 1976). Additional empirical support for the antagonist rationale canes from subjective reports of addicts receiving naltrexone, which indicate that the antagonist rapidly reduces cravings and urges for opiates (Greenstein et al. 1976; Meyer et al. 1976).

Behavior therapies have been advocated as approaches to teaching addicts new prosocial and adaptive coping methods in life management and stabilization (Copemann and Shaw 1976); yet a summary of the early applications of behavioral approaches to drug abuse reveals a dearth of scientific

documentation of the efficacy of these procedures (Callahan and Liberman 1976). Other critical reviews of the use of behavior therapy with drug addicts point to a lack of multilevel and replicable dependent measures, the need for more representative drug subjects, the lack of followup assessments, and a need for more stringent experimental control procedures (Callner 1975; Gotestam, Melin, and Ost 1976). Because of the therapeutic possibilities of naltrexone and behavior therapy and the need for adequate evaluation, a study was designed to compare naltrexone and behavior therapy, alone and in combination, as outpatient treatments for narcotic addiction. This article is a report of the results of the three years of the project's work with addicts in an experimental comparison of three groups, utilizing multilevel measures of outcome.

METHOD

Setting and Subjects

The Heroin Antagonist and Learning Therapy (H.A.L.T.) Project was located in the city of Oxnard, on the Pacific Coast, approximately 50 miles north of Los Angeles. With a population of 85,000, it is the largest city in Ventura County, an agricultural and industrial area of 450,000 people. The cities of Oxnard and Ventura, with a combined population of approximately 150,000, are the major sources of clients for the program. Ethnically, the area is approximately 65 percent white, 30 percent Chicano and 5 percent black. The addiction rate in Ventura County is approximately 3 percent, the fourth highest in California. The ethnic breakdown of the clients interviewed for intakes at H.A.L.T. is shown in table 1.

TABLE 1

Number of Clients Assigned to Each Treatment Group

Ethnic Group	Behavior Therapy	Naltrexone	Naltrexone/ Behavior Therapy	Total
White	32	23	16	71
Black	7	5	4	16
Chicano	32	27	35	94
Total	71	55	55	181

As can be seen from this table, although Chicanos make up 30 percent of the catchment area population, they make up 54 percent of the addicts interviewed at H.A.L.T. This is indicative of the disproportionately high heroin problem which is almost endemic in the Chicano community. All subjects accepted into the study were men, since the FDA had not approved naltrexone for use with women. Table 2 shows sane of the demographic characteristics of the clients interviewed at H.A.L.T.

TABLE 2

Demographic Characteristics

	Ethnic Group			
	White	Black	Chicano	Total
Age	24.9	30.7	25.8	25.9
Education	11.5	11.2	10.3	10.8
Age first use of Heroin	18.9	17.7	17.5	18.0
Years addicted to Heroin	6.3	12.7	8.3	7.9

The H.A.L.T. project had a staff of 10 people, including 3 psychologists, 3 B.A. level counselors, 1 exaddict counselor, an administrative assistant, and a parttime physician and psychiatrist. The major portion of treatment was carried out by the counselors under the direct supervision of the staff psychologists, who also had caseloads. The entire program was supervised by the psychiatrist, who reviewed each client with the entire staff on a weekly basis. The physician's duties were limited to giving each client a physical exam prior to his admission into the program.

Program Description

Following the intake interview and signing of the informed consent form, clients were randomly assigned to one of the three treatment programs described below.

Naltrexone Alone Program

Naltrexone is a narcotic antagonist, similar to naloxone and cyclazocine but with the advantage of having a longer duration of effect than naloxone and fewer noxious side effects than cyclazocine. A 50 mg dose of naltrexone will block the effect of any opiate-based drug for at

least 24 hours. Clients in this group received blocking doses of naltrexone for up to 40 weeks. They also had access to a vocational preparation and placement program. However, for any extensive counseling or psychotherapy, the clients Were referred to a local mental health facility

For the first two Weeks in the program, subjects received a 50 mg dose daily. For the next 6 Weeks, clients received 50 mg doses Monday - Friday and a 100 mg dose on Saturday. After these first 2 months in the program, the clients Were allowed to take 100 mg doses on Monday and Wednesday and a 150 mg dose on Friday. They remained on this schedule for sixteen Weeks, followed by another 16-week period in Which the clients were faded-off naltrexone. The fading Was done either by scheduling periods of one, two, three, and finally four Weeks of no naltrexone-taking interspersed With one-week periods on naltrexone, or by gradually decreasing the size of the doses of naltrexone.

Behavior Therapy Program

The behavior therapy program at H.A.L.T included a variety of techniques for the treatment of addiction. Contingency contracting (Boudin et al. 1976) provided program structure by specifying the level of performance required to maintain active status in the program. Behavioral techniques such as relaxation training and desensitization, covert sensitization, and self-control procedures were used following an assessment of aclient's particular needs. In addition, since most pressing issues for clients were lack of legal income, extremely poor living conditions, and being surrounded by friends and relatives who used heroin, the primary approach used by H.A.L.T. became that of assisting the client in issues of life management. These techniques included instructions and role playing sessions on how to get on Welfare or unemployment, which Were often important in providing clients with the means of procuring the resources necessary to move out of the most heavily heroin-saturated areas. In group sessions involving role playing and video tape feedback, clients learned how to turn down a fix or refuse a request to buy heroin Without violating any mores of the heroin subculture. Handling these personal, financial, and social problems and helping the client get through a variety of crises constituted the major portion of the initial intervention With clients in this group.

When the client had begun receiving some sort of financial support and had acquired social skills necessary to turn down heroin, the treatment emphasis was switched to expanding the client's interests and experiences in the straight world and ensuring continued regular contact with the H.A.L.T. program. To promote new interests, clients Were given behavioral assignments with staff members role playing situations and accompanying the client on new activities in the community. In addition, approximately 1-3 hours per Week of traditional behavior therapy techniques Were used When relevant. However, the primary contribution to therapeutic progress made by these clients was the active, intensive, involvement of the staff in dealing with clients' severe social, economic, and interpersonal problems.

Throughout treatment, counselors stayed in regular contact With the behavior therapy clients by requiring scheduled daily phone calls during Which the clients reported their past, present, and planned activities,

and their drug cravings. Clients in the behavior therapy condition also were able to earn the privilege of participating in the vocational placement program.

Naltrexone/Behavior Therapy Program

The clients in the combined naltrexone/behavior therapy program received both kinds of treatment just described. One difference in the behavior therapy orientation for the clients in the combined program was that slightly less emphasis was placed on those techniques designed to reduce immediate drug urges. This allowed for a greater amount of time to be placed on the development of non-drug-related interests. The reason for this was that almost all clients reported a marked decrease or cessation in drug-related thoughts and urges once they started taking naltrexone.

Dependent Measures

TABLE 3

The Multilevel process and Outcome Measures used to Assess H.A.L.T. Clients

Dependent Measures	Level of Assessment	When Administered
Program entry	Behavioral motivation	At end of two-week probationary period
Treatment duration	In-treatment survival	At termination or dropout
Therapeutic assignments	In-treatment behavioral progress	During treatment of behavioral therapy and naltrexone/ behavior therapy groups only
Naltrexone doses	In-treatment compliance	During treatment of the two naltrexone groups only
Urinalysis	Drug use	Twice weekly during treatment and at follow up
Legal status	Criminal activity	During treatment and followup

A comprehensive multilevel battery of process and outcome measures was used during treatment and at followup points (see table 3). These measures assessed:

1) Program entry. For clients to gain active client status, they were required to complete a two-week probationary period. This could be done in one of two ways. First, and most commonly, they could complete a one-week inpatient detoxification program. Upon completion of detoxification, they then had to give three clean urines over the next seven days and carry out other requirements such as taking naltrexone and attending therapy sessions. The second method of earning entry was to spend the entire two weeks on the "street" give clean urines every two days, and attend appointments and start naltrexone if required.

2) Treatment duration. Time in treatment was expressed in the number of weeks clients remained in contact.

3) Therapeutic assignments. During the course of treatment, clients in the behavior therapy and naltrexone/behavior therapy groups were required to fulfill various responsibilities such as keeping therapy appointments, attempting assignments in the community, and completing assignments at home as outlined in contingency contracts. A comparison of the number of responsibilities assigned and completed provided some indication of the relative number of therapy demands on the two groups and of the degree to which clients successfully met treatment requirements.

4) Naltrexone doses. The actual number of 50 mg dosage days that clients took naltrexone was considered in the data analysis of the two naltrexone groups.

5) Urinalysis. The analyses were done by a thin layer chromatography analysis for confirmation. The urines were screened for opiates, methadone, barbiturates, and amphetamines. Subjects in all groups were required to give three urine samples per week, supervised by staff, for the entire time they were in the program. On occasion the necessity of taking a sample was precluded by a subject's admission of recent heroin use. Data of this sort were included in the urinalysis as if a sample had been taken and analyzed as being heroin positive.

6) Followup data. The followup plan at H.A.L.T. was designed to obtain monthly indications of heroin use and legal status. In all cases, when an outside person or agency was contacted it was done only with the subject's written consent. All followup contacts

and interviews were carried out by a staff member who was only marginally involved in the treatment program at H.A.L.T.

Whenever possible the client was contacted 24 hours prior to the follow-up interview and told that the interviewer would be visiting the next day. In those cases where substantial travel was required, several days' notice was often given to ensure the client's presence at the interview. All missed appointments were rescheduled for the following week. The followup data presented in this report are based upon contacts with the clients at sane point between 9 and 15 months post treatment. It was not possible to contact all clients at 12 months post treatment, primarily due to budgetary considerations. Clients who moved a substantial distance from Oxnard were contacted for followup when it was convenient for a staff member to be in their area.

RESULTS

Program Entry Data

Not all clients who were assigned to treatment made an active attempt to enter treatment. An attempt at entering treatment is operationally defined as returning to the project following the intake interview to write an entry probation contract. As can be seen in table 4, a greater proportion of clients assigned to the naltrexone (77 percent) and naltrexone/ behavior therapy groups (82 percent) attempted entry than clients assigned to the behavior therapy group (62 percent).

TABLE 4

Program Entry Data

	Behavior Therapy	Naltrexone	Naltrexone/ Behavior Therapy
Number of Clients Assigned to Group	71	55	55
Number of Clients Attempted Entry	44	43	45
Number of Clients Completed Entry Probation	15	23	20

Although this difference is not statistically significant, it does suggest that the two naltrexone treatment groups may have been slightly more attractive as treatment approaches than the behavior therapy treatment.

Of those clients who did return to make an attempt at program entry, the naltrexone clients were most successful at earning entry (53 percent), followed by the naltrexone/behavior clients, 44 percent of whom earned entry. The behavior therapy clients were least successful at earning entry, with only 34 percent succeeding. Overall, 44 percent of those subjects attempting entry into H.A.L.T. were successful. Differences in rates of entry between the three treatment groups were not statistically significant ($X^2 = 2.06$, $p<0.1$).

A summary of the program entry data suggests that fewer clients attempted entry into the behavior therapy group; of those who did, fewer completed the two week entry requirements than clients in the two groups receiving naltrexone. Overall, of those clients assigned respectively to naltrexone, naltrexone/behavior therapy, and behavior therapy alone, 42 percent, 36 percent, and 21 percent earned entry into treatment. The comparison between the naltrexone vs. behavior therapy group was statistically significant, ($X^2 = 6.14$, $p<.025$) and the difference between the naltrexone/behavior therapy group and the behavior therapy group approached significance ($X^2 = 3.55$, $.05>p<0.1$). there was no significant difference between the two naltrexone groups.

Treatment Duration

Once in treatment, clients in the naltrexone and naltrexone/behavior therapy groups stayed in treatment nearly twice as long as did clients in the behavior therapy group. Mean treatment duration for clients in the three groups was: naltrexone, 29.6 weeks; naltrexone/behavior therapy, 29.1 weeks; behavior therapy, 16.1 weeks. The difference in treatment duration was statistically significant ($F (2.55) = 4.02$, $p<.025$), with the naltrexone and naltrexone/behavior therapy clients staying in treatment significantly longer than the behavior therapy clients ($p<.05$ in both cases). However, there was no difference in treatment duration between the two groups of clients receiving naltrexone.

Almost two-thirds of all clients receiving naltrexone stayed in treatment over 24 weeks. In the naltrexone group, 14 of 23 (61 percent) and in the naltrexone/behavior therapy group, 13 of 20 (65 percent) stayed in treatment for at least 24 weeks. Over the course of the program, the percentage of clients staying in treatment for 24 weeks or more increased dramatically in both naltrexone groups. Fifty percent (14 of 28) of those clients starting naltrexone in the project's first 14 months stayed in treatment for at least 24 weeks. However, of those clients who started naltrexone in the last 11 months of the program, 87 percent (13 of 15) stayed in treatment 24 weeks or more.

Therapeutic Assignments

Because the specific therapy responsibilities varied from subject to subject, it did not appear appropriate to compare these levels statistically. Since clients in the naltrexone alone group had no therapy responsibilities, they are not included in this section.

Table 5 presents the assignment completion statistics.

TABLE 5

Therapy Assignments Given and Completed

	Behavior Therapy	Naltrexone/ Behavior Therapy
Mean Total Number of Therapy Assignments per Subject	30.8	44.8
Mean Total Number of Therapy Assignments Completed per Subject	17.4	30.6
Mean Number of Therapy Assignments per Subject per Week	2.1	1.8
Mean Number of Therapy Assignments Completed per Subject per Week	1.2	1.2
Percentage of Total Therapy Assignments Completed per Subject	56%	68%

As these data indicate, clients in the naltrexone/behavior therapy group were given more assignments and completed more assignments. However, since the naltrexone/behavior therapy clients Were in the program longer, these figures must be computed per Week in treatment. On a Weekly basis, the clients in the behavior therapy group Were given a slightly higher number of assignments, but completed about the same number as those in the naltrexone/behavior therapy group.

Overall, the clients in the naltrexone/behavior therapy group completed a slightly higher percentage of therapy assignments than did clients in the behavior therapy group (68 percent vs. 56 percent). For example, clients in the naltrexone/behavior therapy group missed fewer scheduled therapy appointments than did subjects in the behavior therapy group, suggesting that the clients in the naltrexone/behavior therapy group Were more reliably active in treatment. These data support the contention that naltrexone may be of assistance in facilitating therapeutic behavior changes.

Naltrexone Doses

The mean number of days on naltrexone for clients in the naltrexone and naltrexone/behavior therapy groups were 102.6 and 113.8 "dosage days," respectively. The lack of statistically significant difference between

the amounts of naltrexone taken by clients in the two groups is at odds with earlier data reported from H.A.L.T. (Callahan et al. 1976). In that earlier report, based on data compilation up to May 1976, clients in the naltrexone plus behavior group had taken significantly more naltrexone than clients in the naltrexone alone group. To illustrate the use of naltrexone over time, table 6 presents a comparison of the days on naltrexone for clients who started naltrexone in the two groups during three successive 7-month periods of naltrexone use at H.A.L.T.

TABLE 6

Mean Number of Dosage Days on Naltrexone
for Clients Starting Naltrexone During
Three Successive 7-Month Blocks

Group	Clients Taking First Dose Beteen 3/1/75 & 9/30/75	Clients Taking First Dose Between 10/1/75 & 4/30/76	Clients Taking First Dose Between 5/1/76 & 11/30/76
Naltrexone	43 n=4	91 n=9	165 n=6
Naltrexone/ Behavior Therapy	88 n=9	110 n=6	184 n=4

(It should be noted that four naltrexone group clients and one naltrexone/behavior therapy client started after the end of the last 7-month block presented. Their data are included in the dosage day group means presented above, but are omitted from table 6, since their treatment termination was effected by the program's closing in the summer of 1977.) Although clients in the naltrexone/behavior therapy group have taken naltrexone consistently longer than those in the naltrexone group, it is clear that the magnitude of difference decreased as the project matured.

One possible explanation for the reduction in difference between groups is that the behavior therapy was a useful adjunct in keeping clients in naltrexone treatment during the early stages of the program when there was a great deal of uncertainty about the new experimental drug. Clients in the

naltrexone/behavior therapy group had much more staff contact, which may have helped to increase their confidence in the staff. This may in turn have helped to allay some of their anxieties about naltrexone. Clients in the naltrexone group had much less contact With staff and were given less support, which may have resulted in their early termination during the initial months of the program. Once the "street word" circulated that naltrexone worked and was safe, this supportive factor provided by behavior therapy may have become much less critical.

Another explanation for the reduction in the difference between the two groups concerns the confidence and sophistication of the staff in using naltrexone. Over the duration of the whole project, the issues essential in keeping clients on naltrexone became familiar to the staff and may have been applied to all naltrexone-taking clients regardless of group assignment. It should be stressed that although clients in the naltrexone alone group did not receive any standard (behavior therapy) techniques, they did receive staff time, staff support, assistance in obtaining employment, special arrangements for receiving late or missed doses of naltrexone, and "nurse's station advice." It is possible that although naltrexone-alone clients spent only one-third as much time in the clinic as did clients in the naltrexone/behavior therapy group, the interactions they had with the staff may have because progressively more effective at promoting naltrexone-taking as the staff became more experienced With naltrexone. This might explain Why clients in both groups Were retained longer on naltrexone during the later stages of the project.

A review of a number of factors such as heroin use history, employment status, ethnic group, and socioeconomic level suggests no apparent differences between clients starting naltrexone over the three 7-month blocks. If there were no differences in the types of clients, one can speculate that there was an increased acceptance of naltrexone by the addict population and/or an increased ability of the H.A.L.T staff to keep clients on the drug. Regardless of the reason, it is clear from those 10 clients started in the period from May to November 1976 that it is possible to keep addicts on naltrexone for substantial periods of time.

Urinalysis Data

The mean number of urines given per subject per Week is shown with other urinalysis data in table 7. Subjects in all three subgroups averaged about two urine samples given per Week. All subjects were required to give three urines per week. The data reveal that over one-third of the scheduled urines Were missed. Reasons for these missed samples include instances Where the subjects missed appointments for unexcused or valid excused reasons, and instances of staff oversight. There was no indication of any systematic difference between the treatments with regard to reasons for missing urine samples.

Table 7 shows that subjects in the naltrexone/behavior therapy group had significantly more opiate-free urines than those in the behavior therapy group ($F = 4.03$, $p<.05$). A Newman-Keuls comparison (Winer 1962) indi-

TABLE 7

Urinalysis Data

	Behavior Therapy	Naltrexone	Naltrexone/ Behavior Therapy
Mean Number of Weeks in Treatment	16.1	29.6	29.1
Mean Number of Urine Samples Given	31.5	54.7	59.5
Mean Number of Urine Samples S per Week	1.96	1.85	2.04
Mean Number of Opiate-Free Urines	22.7	51.5	55.6
Mean Number of Opiate-Positive Urines	7.7	3.2	3.7
Percentage of Opiate-Free Urines	72%	94.1%	93.4%
Mean Number of Urine Samples Positive for "Other" Drugs per Client	1.1	2.2	1.4

cated that the naltrexone/behavior therapy group differed significantly from the behavior therapy group ($p<.05$), but that the other comparisons were not statistically significant. In addition, subjects in the naltrexone/behavior therapy and naltrexone groups gave significantly fewer opiate-positive urines than did subjects in the behavior therapy-p ($F = 5.92$, $p<.01$). Newman-Keuls analysis indicated that both naltrexone groups differed significantly from the behavior therapy group ($p<.01$). Finally, the superiority of the two naltrexone groups was also indicated by their significantly higher percentage of opiate-free urine samples as compared to the behavior therapy group. A chi square test comparing the ratio of opiate-free to opiate-positive urines indicated a significant difference in percentages ($X^2 = 8.15$, $p<.025$). Individual chi square comparisons indicated that the two

naltrexone groups gave a significantly higher percentage of opiate-free urines than the behavior therapy group ($p<.025$, in both cases).

Data on urines positive for barbiturates, amphetamines or methadone reveal (table 7) that there were between one and two urine samples per subject showing these substances. This result dispels the concern that clients staying free of heroin on naltrexone immediately switch to other illicit drugs. Since the urine samples were not screened for marijuana or alcohol, use of these substances is unknown. Anecdotal reports from clients, relatives, and staff support the view that only a minority of naltrexone clients increased their use of alcohol and marijuana.

In summary, these data indicate that naltrexone and naltrexone plus behavior therapy are superior to behavior therapy alone in maintaining heroin-free urines. Behavior therapy clients gave approximately one opiate-positive urine sample every two weeks. The comparable figures for naltrexone and naltrexone/behavior therapy were one/nine weeks and one/eight weeks respectively.

Followup Data

Of the 57 clients treated at H.A.L.T. only 10.5 percent were not reached for 12-month followup contact. The analysis in table 8 provides the most critical data of treatment outcome for each of the three treatment approaches.

TABLE 8

Followup Status at 12-Month Posttreatment

	Behavior Therapy Total # of clients Treated = 15	Naltrexone Total # of Clients Treated = 23	Naltrexone/ Behavior Therapy Total # of Clients Treated = 20
Opiate-Free Urine Samples	4	10	8
Opiate-Positive Urine Samples	4	4	3
Incarcerated	6	6	4
In other Treatment	0	1	1
Out of Contact	0	2	4
Dead	1	0	0
Total	15	23	20

The first three rows of this table indicate that only 28 percent of the behavior therapy clients were opiate-free at followup, while 72 percent were opiate-positive or in jail. In contrast, 48 percent of the naltrexone clients and 50 percent of the naltrexone/behavior therapy clients were opiate-free at 12-month followup. Although these percentage differences are not statistically significant ($X^2 = 1.59$, $p>0.1$), they do suggest that the heroin use and legal problems of clients in the behavior therapy program were greater than those of clients in the naltrexone groups.

The apparently better followup status of the naltrexone clients cannot at this time be pinpointed. It should be noted, however, that across. all groups, the mean treatment duration of clients who gave opiate-free urine samples at 12-month followup was greater than for those who were either opiate-positive or incarcerated.

TABLE 9

Mean Number of Weeks in Treatment
According to 12-Month Followup Status

	Behavior Therapy	Naltrexone	Naltrexone/ Behavior Therapy
Opiate-Free Urine Sample at 12-Month Followup	24.8 n=4	39 n=10	34.6 n=8
Opiate-Positive Urine Sample or Incarcerated at 12-Month Followp	14.2 n=10	23.1 n=10	29.9 n=7

Table 9 presents the mean treatment durations of clients in the three groups divided according to 12-month followup status. Although increased time in treatment appears to be related to opiate-free status at 12-month followup in all three treatment groups, the differences are not statistically significant ($F<1$).

DISCUSSION

H.A.L.T. was designed to compare naltrexone and behavior therapy, alone and in combination, as outpatient treatment programs for heroin addiction. The results strongly suggest that naltrexone can be an effective

means of keeping addicts off heroin and in treatment. In addition, the process and followup data indicate that the two groups of clients receiving naltrexone used less heroin in treatment and following treatment than did clients receiving behavior therapy alone. In general, the results from the two naltrexone groups were substantially better than the results achieved by the behavior therapy treatment. The addition of behavior therapy to the naltrexone treatment produced little effect except during early stages of the program.

One encouraging finding was the demonstrated ability of naltrexone to promote longer stays in treatment. The average treatment durations of 29.6 and 29.1 weeks for the naltrexone and naltrexone/behavior therapy clients respectively are especially impressive in light of the nature of the H.A.L.T. clients, who were for the most part hard-core street addicts. It should be noted that the figures for time in treatment represent that period during which the clients were actively involved in H.A.L.T. Clients in the naltrexone groups did not take naltrexone continuously during their time in treatment. Periods of one week off naltrexone were scheduled at times to allow the clients to "test" their ability to remain abstinent. Clients were also off naltrexone during the entire "fading" period when they were discontinuing treatment, during periods of illness or reported side effects, and when they took trips out of the area. Except for the latter reason, urine samples were taken on the regular three day per week schedule during off-naltrexone periods and Were often collected on an even more frequent basis; fewer missed urine samples were allowed, since it was critical to monitor heroin use during these periods. Therefore, the 29 weeks of treatment, during which clients gave 94 percent clean urine samples, represent a substantial period of virtual heroin abstinence.

The behavior therapy aspects of the H.A.L.T. project were discouraging. Less than 25 percent of those clients who were assigned to the behavior therapy group eventually earned their way into active status. Of the 15 clients who did earn entry, only 2 completed 24 weeks of treatment. While in treatment, such clients often did not complete behavioral assignments and many continued to use heroin. As an adjunct to naltrexone, the behavior therapies employed at H.A.L.T. did serve to increase staff-client contact. This may have been an important factor in keeping clients on naltrexone in the early stages of the program. The followup data suggest, however, that there were few long term benefits produced by these behavioral techniques.

The ineffectiveness of the behavioral components of the H.A.L.T. program is disappointing. It contrasts sharply with the results of Boudin et al.'s (1976) behavior therapy program in which clients staved in treatment for well over 6 months and continued to be heroin free during the followup. The discrepancy between the results may be due to demographic variables. Boudin's client pool was primarily middle class, many had college educations, and most were employed. In Oxnard, the clients were much poorer, few had finished high school, and over 60 percent were on welfare. In contrast with Boudin's clients, many of whom were college students in a university town and new to the local heroin scene, many of the H.A.L.T. clients were second generation addicts and had been deeply involved in the heroin subculture in the Oxnard area for many years.

This history makes staying heroin free much more difficult, particularly when all of one's friends and relatives are using heroin.

The relative ineffectiveness of the behavior therapy alone approach is consistent with the meager results of a similar outpatient drug treatment program reported from Munich, Germany (Copemann 1975). Of 20 patients entering an 11-month behavioral program, only 6 completed the course, and only 4 were drug free at l-year followup. Earlier reports of the success of behavior therapy with narcotic addicts may be related to the fact that in almost all of these cases, the clients treated were middle class, educated addicts, or the reports were of "process" data from inpatient programs (Copemann and Shaw 1976; Callner 1975; Gotestam, Melin, and Ost 1976).

The results of the H.A.L.T. Project indicate that in a community like Oxnard, California, behavior therapy is not a useful outpatient treatment approach for heroin addiction. On the other hand, the data suggest that naltrexone is a promising new treatment approach. In view of the followup data collected, there is a definite need to devise sane new strategies for promoting the generalization of intreatment abstinence to the posttreatment situation. Succcessful and long term abstinence is likely to be minimized when the treatment program--such as being on naltrexone—is easily discriminable from the posttreatment situation.

One cannot assume that the temporary reduction of heroin cravings and heroin taking will generalize to the nonnaltrexone situation. The behavioral methods employed at H.A.L.T. may not have gone far enough to expose the clients to relevant stimuli in order to facilitate extinction. It may be necessary to elicit behaviors involved in heroin seeking and heroin taking in order to promote the process of extinction.

It is likely that any extinction procedure should be used in conjunction with a program designed to shape and reinforce new alternative non-drug-related behaviors. Specifically, an attempt should be made to provide the client with the skills necessary to obtain reinforcement from the areas of employment and leisure time activities. Unless there is sane payoff for remaining opiate-abstinent, it is unlikely that the behavior changes which occurred while on naltrexone will be maintained. Providing this payoff might be accomplished by employing a variety of techniques which can be tailored to the individual needs of the client, as suggested by Copemann (1975). The results of the H.A.L.T. project indicate that naltrexone can help to provide a period of heroin abstinence during which these techniques can be employed.

REFERENCES

Altman, J.L.; Meyer, R.E.; Nivins, S.M.; et al. Opiate antagonists and the modification of heroin self-administration behavior in man: An experimental study. Int J Addict, 11:485-500, 1976.

300-345 0 - 79 - 4

Boudin, H.M., Regan, E.J., and Ruiz, M.F. Contingency contracting with drug abusers in the maternal environment. In: Callahan, E.J., (chair). Symposium on Behavior Therapy in Heroin Addiction Clinics: Current Outcome Evaluations. Washington, D.C.: Presented at the 84th meeting of the American Psychological Association, 1976.

Callahan, E.J., and Liberman, R.P. Behavior analysis and therapy in drug abuse. Unpublished manuscript.

Callahan, E.; Rawson, R.; Glazer, M.; McCleave, B; and Arias, B. Comparison of two naltrexone treatment program: Naltrexone alone versus naltrexone plus behavior therapy. In: Julius, D.A., and Renault, P.F., eds. Narcotic Antagonists: Naltrexone. National Institute on Drug Abuse Research Monograph 9. DHEW Pub. No (ADM)76-387. Washington, DC.: Superintendent of Documents, U.S. averment printing Office, 1976. pp. 150-157.

Callner, D.A. Behavioral treatment approaches to drug abuse: A critical review of the research. Psychol Bull, 82:143-162, 1975.

Copemann, C.D. Drug addiction: I. A theoretical framework for behavior therapy. Psychol Rep, 37:947-958, 1975.

Copemann, C.D., and Shaw, P.L. A behaviorally oriented treatment program for drug addiction: A preliminary report. Am J Public Health 66: 286-287, 1976.

Feldhage, F.J.; Krauthan, G.; Schulze, B.; et al. Research program of the drug dependence project: Results of an outpatient "Breitbandprogramm" on the treatment of drug dependent youth. Report to the United Ministry for Youth, Family, and Health, 1977. Obtainable from the authors at the Max-Planck Institute fur Psychiatrie, Munich, West Germany, 1977.

Gotestam, K.G., Melin, L., and Ost, L.G. Behavioral techniques in the treatment of drug abuse: An evaluative review. Addict Behav, 1:205-225, 1976.

Greenstein, R.; O'Brien, C.; Mintz, J.; Woody, G.; and Hanna, N. Clinical experience With naltrexone in a behavioral research study. In: Julius, D.A., and Renault, P.F., eds. Narcotic Antagonists: Naltrexone. National Institute on Drug Abuse Monograph 9. As above.

Hurzeler, M., Gewirtz, D., and Kleber, H. Varying clinical contexts for administering naltrexone. In: Julius, D.A. and Renault, P.F., eds. Narcotic Antagonists: Naltrexone. National Institute on Drug Abuse Research Monograph 9. As above.

Johnston, L.D., Nurco, D.N,, and Robins, L.N., eds. Conducting Follow-up Research on Drug Treatment Programs. National Institute on Drug Abuse Treatment Program Monograph 2. DHEW Pub No. (ADM)78-487. Washington, D.C.: Superintendent of Documents, 1978.

Julius, D.A., and Renault, P.F., eds. Narcotic Antagonists: Naltrexone. National Institute on Drug Abuse Research Monograph 9. DHEW Pub. No. (ADM)76-387. Washington, D.C.: Superintendent of Documents, 1976.

Meyer, R.; Randall, M.; Barrington, C.; Mirin, S.; Greenberg, I. Limitations of an extinction approach to narcotic antagonist treatment. In: Julius, D.A., and Renault, P.F., eds. Narcotic Antagonists: Naltrexone. National Institute on Drug Abuse Research Monograph 9. As above.

Winer, B.J. Statistical Principles in Experimental Design. New York: McGraw Hill, 1952.

Wikler, A. The theoretical basis of narcotic antagonists. In: Julius, D.A., and Renault, P.F. Narcotic Antagonists: Naltrexone. National Institute on Drug Abuse Research Monograph 9. As above.

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Chapter 4

A Behavioral Program for Treatment of Drug Dependence

Roy Pickens, Ph.D.

In 1965, Ayllon and Azrin described a program for treatment of behavior problems in institutionalized adults. They found desirable behavior could be established and maintained in hospitalized patients by means of a token-economy system. Based on principles of operant conditioning, tokens were given to patients contingent on desirable behavior and taken away for undesirable behavior. Subsequently, other programs have been similarly effective in treating behavior problems with this same approach (Phillips 1968; Thompson and Grabowski 1972).

A ward program patterned after that of Ayllon and Azrin has been employed at the University of Minnesota since 1973 for the treatment of drug dependence. The purpose of this paper is to describe the behavioral procedures used, and to present preliminary data showing outcome results.

WARD PROGRAM

The program is located on one of the psychiatry wards of University Hospital. On the 13-bed ward, 8 beds are occupied by drug-dependent patients, with the remaining 5 beds housing primarily patients with eating disorders (anorexia nervosa). The entire ward is managed as a behavioral treatment unit, employing basic learning principles in the establishment of desirable behavior and elimination of undesirable behavior.

The program is operated in a manner similar to that originally described by Ayllon and Azrin (1965), except that points are used instead of tokens for reinforcement. For drug-dependent patients, the general treatment goals are establishment of new behaviors related to more independent personal functioning and elimination of old behaviors related to drug abuse.

In the program, desired behavior is reinforced by point gain while undesired behavior causes point loss. Points earned are exchangeable for a variety of goods and services. All point transactions are recorded in a booklet which the patient is issued daily. Daily records are kept of each patient's performance in the behavioral system.

Points are earned by patients for three general classes of behavior: participating in therapeutic activities, participating in ward activities, and personal care. Therapeutic activities include work on the specific treatment plan which is developed for each patient during the first week of hospitalization. Points are also given for attending individual and group therapy sessions, which involve assertiveness training, rational--emotive therapy, problem-solving, and classical chemical dependency counseling. Ward activities that gain points include completing assigned tasks, such as preparing lunch, attending scheduled classes, watering plants, etc. Classes are scheduled for patients throughout the ward day and consist of 45-minute sessions on a variety of topics, including bicycle repair, consumer buying, cooking, karate, etc. Personal care activities that earn points include cleaning room, picking up and washing clothes, taking shower, etc.

Extra points can be earned by patients for being on time to classes and other scheduled activities, and also for the patient's degree of participation in each. For example, a patient may earn 20 points for attending a group therapy session, an additional 5 points for being on time, and 20 points more for significant participation, as judged by the group leader.

Points are lost by patients for being in bed inappropriately, verbal abuse, assault, theft, etc. For drug-dependent patients, points may also be lost for drug use or other activities detailed in the patient's specific treatment plan. Points may be spent by patients for snacks, supplies, TV rental, extra staff time, visitors, overnight passes, etc. On discharge, all unspent points are exchangeable for trading stamps that can be redeemed outside the hospital for merchandise. More details on the ward program are given in Pickens, Errickson, Thompson, Heston and Eckert (1978).

Figure 1 shows a representative treatment plan for one patient, dealing with the problem of chronic alcoholism. The treatment goal for this patient was total abstinence, although with some patients controlled drinking, following the approach outlined by Miller and Munoz (1976), has also been employed. In addition to chemical dependency counseling and attending AA meetings, the patient was allowed to spend increasingly longer intervals off the ward, without specifying activities to be engaged in during this time. Upon returning to the ward, however, the patient was given a breathalyzer test to determine if drinking had occurred during the pass. If not, the patient was allowed another pass for the following day. If drinking had occurred, the patient was to be incarcerated, as a condition of a court order.

Figure 2 shows a representative treatment plan for a middle-aged housewife with sedative abuse problems. Since the patient lived in a small rural town, her drug-abuse problem could be readily controlled by the cooperation of the family physician. The treatment plan consisted primarily of getting the patient involved in activities outside the home and reducing her dependence upon her spouse for mediation of other reinforcers.

It should be apparent from the above description that our drug dependence treatment program is not entirely behavioral. Classical psychotherapeutic and chemical dependency counseling techniques are employed in parts of the program. While both behavioral and nonbehavioral

FIGURE 1

Name: Treatment Plan Effective:

Primary Team:

Problem #	Presenting Behavior	Desired Behavior	Approach	Reinforcement
1	Chronic alcoholism	Abstinence from alcohol use	a) C.D. counseling with Allison	a) Negotiate with Allison
			b) Ward C.D. group	b) General ward program
			c) Attend AA meetings (Tuesdays) April 11 - escorted with Allison April 18 - unescorted April 25 - unescorted	c) 50 points
			d) Increasing time off unit without alcohol or drug use Schedule: 4/7 to 4/12: confined to unit 4/12 to 4/21: escorted with staff After 4/21: unescorted (once/day) 1/2 hr (4/21-4/25) 1 hr (4/25-5/2) Open (after 5/2) Requirements: On ward: do ward jobs stay out of bed (8 am-9 pm) attend 80% of classes Off ward: tell staff where going sign contract & sign out return on time, sign in take breathalyzer test	d) If meets requirements, patient earns privileges for next day. If breath-alizer test is positive (>.01), then violation of parole. Court sends patient to St. Peter or Still-water.

FIGURE 2

Name: Treatment Plan Effective:

Primary Team:

Problem #	Presenting Behavior	Desired Behavior	Approach	Reinforcement
1.	Staying at home, few outside activities.	Plan activities either alone or with others outside of hospital or home.	a) Make a weekly schedule listing at least three outside activities by 9/25. b) Unescorted two or more hours a day, away from ward.	a) 25 points b) 75 points on completion. Loss of 50 points if doesn't leave before 8 pm.
2.	No expressed joy in life. Not identifying personal needs.		Make a self-growth list by 9/25. (Follow-up on subsequent treatment plan.)	25 points
3.	Overweight	Goal weight of 150 pounds.	a) Daily weight in the AM before breakfast in pajamas. b) Issue calorie counting guide, discuss dieting with patient. c) Ride exercycle twice a day at minimum of 15 mph.	a) Weight loss: 20 points per 1/4 pound. Weight gain: Loss of 10 points per 1/4 pound. c) 10 points per 5 min riding time.
4.	Overly dependent on others (husband).	Learn to drive car	Get driver's permit by 9/29. (Follow-up on subsequent treatment plan.)	100 points for passing written exam. Loss of 50 points if she fails exam. Must re-take.

therapies may be involved in patient treatment, it is important to recognize that the entire program is managed on a behavioral basis. The ward's general behavioral program is used to insure patient attendance and participation in the nonbehavioral treatment approaches. Thus, the program may be viewed as serving two different functions: it is useful as a treatment approach in its own right, and it improves patient contact with other therapeutic approaches that also may prove beneficial.

CONTINGENCY CONTRACTING

On the ward, extensive use is made of another behavioral technique -- the contingency contract. This is a written statement of agreement between a patient and staff member specifying a behavior that is to be changed and establishing contingencies for accomplishing the change. Initially, the staff member provides the patient with a frequency count of the behavior in question and gets agreement from the patient that improvement would result from the behavior change. Contingencies are arranged to reinforce the behavior if it is to be increased in frequency, or to extinguish or punish the behavior if it is to be decreased. A method is also devised for measuring the behavioral change. The plan is then formalized as a written agreement signed by both parties, becoming the contingency contract.

As an example of how contingency contracts are used, a staff member observes that a patient rarely states her opinion on family matters in weekly meetings with her husband. When the patient admits she would like to be more assertive, a plan is devised where each assertive statement by the patient in family discussions results in extra pass time being given to the patient during the coming week. The agreement between patient and staff member is then formalized as a written and signed contract, which in effect is a statement from the staff member to the patient saying, "If you'll be more assertive around your husband, I'll grant you more pass time."

With a point-economy program, it is relatively easy to make use of contingency contracting, as both approaches are based on the same behavioral principles, Points are convenient reinforcers in both the ward program and contingency contract system. The individual treatment plans in the general ward program are, in effect, contingency contracts, as they identify problem behaviors, specify desired behaviors, establish the approach to be used in the behavioral change, state the reinforcement to be employed, and are agreed to and signed by both patient and staff members. Contingency contracts are also frequently involved in the program as a condition for overnight and weekend passes.

With patients who are physiologically dependent on sedative drugs and must be detoxified, we have recently used contingency contracts to allow these patients to withdraw themselves safely from the drugs. This self-detoxification procedure is in sharp contrast to the procedure normally employed in sedative withdrawal, which typically involves a physician's control of all drug administration, with initial estimation of the patient's degree of physiological dependence and subsequent gradual reduction in the daily drug intake until detoxification is complete. Since our patients were subjects in a research project involving ad lib pentobarbital self-administration prior to detoxification (Pickens, Cunningham, Heston, Eckert and Gustafson 1977), their in-

dividual maintenance dosage of pentobarbital was known. With the drug freely available for self-administration throughout detoxification, the patient was allowed to contract to take one less drug capsule each day until detoxification was complete. Patients earned points for meeting this requirement each day. While they were allowed to remain at the same dosage level for two days with no point loss, points were lost if the patients remained at the same level for more than two days, increased their drug intake over the most recent lowest level, or decreased drug intake by more than one capsule per day. Figure 3 shows the contingency contract used in the self-detoxification procedure.

FIGURE 3

SELF-DETOXIFICATION CONTRACT

I understand the purpose of this procedure is to allow me control over my own rate of drug detoxification from my original addicted state. I have received a schedule to guide me in undergoing detoxification safely and gradually. I will assume all-responsibility for regulating my drug intake, and the credit will be all mine for the accomplishments I make.

Today I agree to take _____ capsules of medication. The number of capsules I took yesterday was _____. I understand that if the number of capsules taken today is one less than the number taken yesterday, I will receive _____ points at midnight tonight. If the number of capsules taken today is the same as the number of capsules taken yesterday, I will receive no points. In no case, however, can I remain at the same drug level for more than two successive days without losing points. If I take more drug than today than I did yesterday, or if I take less drug today than is recommended on the guide sheet, or if I remain at the same drug level for more than two successive days, I will be required to pay _____ points for each capsule over or under the recommended number at midnight tonight. In following the guide sheet, I am also entitled to any bonuses that I have earned.

_____ Date

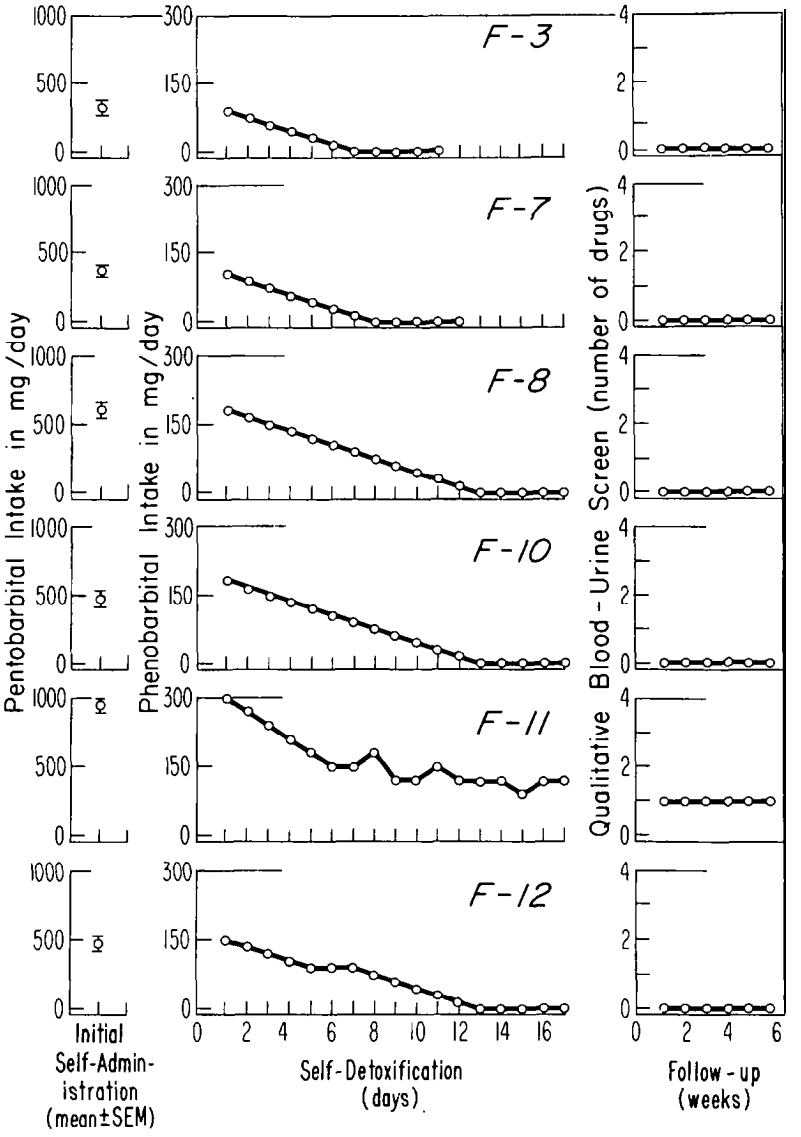
_____ Patient's Signature

_____ Staff's Signature

Figure 4 shows the effects of contingency contracting on drug intake of six subjects (F-3, F-7, F-8, F-10, F-11, and F-12). All were females with confirmed histories of sedative abuse. The graphs along the left side of the figure show the subjects' mean daily drug intake over the last three days of self-administration. Pentobarbital intake of subjects ranged from 400-1000 mg/day, a level typically capable of producing physiological dependence. At the start of detoxification, phenobarbital was substituted for pentobarbital (15 mg phenobarbital

equivalent to 50 mg pentobarbital) for three days of self-administration. Subjects were then given points for successfully reducing their drug intake by one 15 mg phenobarbital capsule each day, but lost points for remaining at a given level for more than two days, increasing their drug intake, or reducing their intake by more than one capsule per day.

FIGURE 4



The results are shown in the middle column of graphs in the figure. No subject reduced drug intake at a rate greater than one capsule per day. Most subjects (F-3, F-7, F-8 and F-10) met the contract contingencies, reducing their drug intake by one capsule per day until detoxification was complete. This required longer for some subjects than for others, because of differences in initial levels of drug intake. One subject (F-12) remained at the same drug level for two days but otherwise showed consistent reductions in drug intake. At no time did these subjects increase their level of drug intake, although the original maintenance dose of drug was freely available to the subject each day for self-administration. The final subject (F-11) showed consistent decreases in drug intake over the first six days of detoxification, but thereafter showed no further decrease. Drug self-administration did not return to pre-detoxification level, however, but remained at about one-half the original level. Detoxification was completed for this subject by restricting drug access. Later followup showed this patient had returned to drug use, although no drug use was found in the five subjects successfully completing the self-detoxification procedure. (See graphs on right side of Figure 4.)

Two other subjects have undergone sedative detoxification using pentobarbital as the withdrawal drug. Both successfully decreased drug intake by one capsule per day until detoxification was complete, without remaining at the same dose for more than two successive days, increasing their drug intake, or decreasing their intake too rapidiy. One of these subjects was self-administering a mean of 1000 mg of pentobarbital per day prior to the start of withdrawal. Three additional subjects successfully completed sedative self-detoxification with diazepam, decreasing drug intake by one capsule per day throughout the withdrawal procedure. While both of the pentobarbital subjects showed evidence of drug use during the first six weeks after hospital discharge none of the three diazepam subjects showed evidence of drug use during this time.

Interpretation of the results should be guarded, however. They do not necessarily indicate that the reduction in drug intake obtained during the detoxification period was due to the contingency imposed by the contingency contract. The reduction may have been due, in fact, to the information supplied in the document. Telling a person that detoxification can be safely accomplished by a reduction of one capsule per day in drug intake may be sufficient to explain the obtained effect. To show that the effect was due to the contingency relation, a control group must be employed which gets the same information that is given in the contract, but without a contingency placed on drug intake and the gain or loss of points.

More data are needed to determine if self-detoxification offers advantages over other forms of detoxification in terms of avoiding future relapse to drug use. This finding would have definite implications in the treatment of smoking and obesity as well. Research is also needed to determine which sedative drug is most effective behaviorally as the detoxifying agent, in that some drugs may yield more reliable reductions in drug intake than others, and thus produce more successful self-detoxification results. Using food as-an analogy, reductions of caloric intake might be accomplished more easily if the subject's diet is restricted to relatively unpreferred foods as opposed to highly

FIGURE 5

SEDATIVE OUTPATIENT CONTRACT

The purpose of this agreement is to assist _____ in establishing new behavior which is incompatible with drug use. To accomplish this goal, she will need the cooperation of _____ since it is recognized that her problem is, in reality, their problem and that both must work together in its solution. This agreement is attempt to allow both individuals to gain significantly from _____ drug abstinence, but jointly lose if she, the wife, fails to do so. It is believed that in this way, each will become more aware of the needs and actions of the other, in particular as they relate to the problem of drug use.

For Patient:

I, _____, understand that I will be allowed to exercise the Compromise Agreement without qualification for one week after my hospital discharge. Thereafter, I agree to return to Station 61, University Hospitals, on _____ at _____ each week for _____ weeks starting on _____ for the purpose of meeting with the station staff and allowing a blood sample to be obtained. I understand that a chemical test will be performed on the blood sample to determine the presence or absence of sedative or other drugs, and that the results of this test will be made known to me on the following day. I understand that if the result of the test shows no evidence of drug use during a given week, I will be allowed to exercise the Compromise Agreement for the following week. I further understand that if the chemical test shows positive evidence of drug use, I will not be allosed to exercise the Compromise Agreement for the following week. I also agree to report promptly and honestly all failures on the part of my husband to honor the Compromise Agreement, when such is in effect as defined by the terms of this contract.

For Spouse:

I, _____, agree to write _____ personal checks for $ _____ each, payable to _____, and to leave the checks with the station staff at the time of my wife's discharge. I agree not to stop payment on the checks for any reason. I also agree to allow my wife to exercise the Compromise Agreement without qualification for the first week after her hospital discharge, and that I will assist her as necessary in returning to Station 61 each week for the blood tests. I understand that if the result of my wife's blood test shows positive evidence of drug use, or if for any reason I fail to abide by the Compromise Agreement according to the terms of this contract, I will forfeit one of my checks by having it sent by the station staff to the above organization as a contribution in my name. In such an event, however, I will be under no obligation to abide by the Compromise Agreement during the following week. I am aware that failure of my wife to appear at the scheduled time for the blood test will be considered by the staff as positive evidence of drug use and will be treated accordingly.

We enter into this agreement in good faith, and agree to honor all terms as set forth in this contract.

_____ Date

_____ Patient's Signature

_____ Spouse's Signature

_____ Staff's Signature

_____ Staff's Signature

Telephone number for reporting blood test results to patient: _____

Dates of blood tests: _____

Station telephone number: __ __ __-__ __ __ __

preferred foods. The same may also be true with smoking, in that it may be easier to quit smoking if the person is smoking cigarettes with low nicotine content rather than with high nicotine content.

Contingency contracts are also used in our program to provide a gradual transition from the highly controlled environment of the hospital ward to the less controlled environment of the outside world. The purpose of these contracts is to help insure that the patient will remain drug--free during the critical first six weeks after hospital discharge. If the patient's spouse is expected to sabotage the patient's efforts to remain drug-free, he or she is also included in the contract. A contract is then arranged so that both parties gain from the patient's drug abstinence, while both parties lose from the patient's drug use. Since points can no longer be used, other reinforcers must be found. One highly effective reinforcer we have found for some of our patients is a change in the behavior of their spouse. When the patient has decided on the aspect of the spouse's behavior to be changed, the spouse is contacted and asked to make the desired change in behavior contingent on the patient's abstinence from drug use. If the spouse agrees, then the patient purchases the behavior change from the spouse each week by avoiding drug use. If the spouse does not agree, a compromise agreement is sought or other reinforcers must be found. If we suspect the spouse will not honor the terms of the contract, a monetary deposit is requested, which the spouse then earns back by honoring the contractual agreement (Boudin 1972). An example of a contingency contract used with married, middle--aged women with drug-abuse problems is shown in Figure 5.

Since similar behavioral processes are involved in drug abuse, alcoholism, smoking, and obesity, the techniques that prove effective in reducing drug and alcohol use may be effective in reducing smoking and over--eating as well. We have had success in reducing smoking by charging patients points for each cigarette smoked and awarding points for waiting longer between cigarettes. We have also accomplished weight loss in patients by teaching calorie-counting and giving points for each pound of weight loss. Finally, Elke Eckert has been treating anorexia nervosa successfully on our ward for several years with behavioral techniques. If this eating disorder is also an instance of substance abuse, it would be interesting to determine if the same techniques that are effective in accomplishing weight gain would also be effective in accomplishing weight loss.

REFERENCES

Ayllon, T., and Azrin, N.H. The Token Economy. New York: Appleton-Century-Crofts, 1965.

Boudin, H.M. Contingency contracting as a therapeutic tool in the deceleration of amphetamine use. Beh. Ther., 3:604-608, 1972.

Eckert , Elke. Personal Communication.

Miller. W.R., and Munoz, R.F. How to Control Your Drinking. Englewood Cliffs, N.J.: Prentice Hall, 1976.

Phillips, E.L. Achievement place: Token reinforcement procedures in a home-style rehabilitation setting for "pre-delinquent" boys. J. Appl. Beh. Anal., 1:213-223, 1968.

Pickens, R., Cunningham, M., Heston, L., Eckert, E., and Gustafson, L. Dose preference during pentobarbital self-administration by humans. J. Pharm. Exp. Ther., 203:310-318, 1977.

Pickens, R., Errickson, E., Thompson, T., Heston, L., and Eckert, E. MMPI correlates of performance on a behavior therapy ward. Behav. Res. and Ther., 1978, in press.

Thompson, T., and Grabowski, J. Behavior Modification for the Mentally Retarded. New York: Oxford Press, 1972.

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Chapter 5

The Abstinence Phobia

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This paper presents some thoughts about and data related to new therapeutic approaches to "reaching zero dose," a task fraught with difficulty for many who misuse substances.

DETOXIFICATION FROM HEROIN USING CONTINGENT PAYMENT

There is general agreement that outpatient detoxification from heroin has three treatment goals: 1) termination of heroin use, 2) completion of detoxification, 3) and entrance into longer term rehabilitation treatments.

Outcome data are sparse. However, those data available indicate few clients, generally between 3 and 20 percent, terminate heroin use during detoxification treatment (Wilson, Elms, and Thompson 1975; Sheffet, Quinones, Lavenhar, Doyle and Praeger 1976). Treatment completion rates (defined as attending clinic for the prescribed number of days) are generally less than 40 percent (Wilson et al. 1975; Guess and Tuchfeld 1977). With failure to meet these first basic treatment goals it is not surprising that only very rarely do clients enter into more intensive rehabilitation after detoxification (Sheffet et al. 1976). Our project aimed at improving outcome with respect to the first two goals of detoxification (Hall, Bass, Hargreaves and Loeb 1978).

We used a contingency system that combined payment for desired outcome with feedback about treatment progress. Subjects could earn up to 55 dollars for morphine-and barbiturate-free urines ("drug-free urines") during detoxification and for completing detoxification.

The subjects were 81 clients recruited from the Outpatient Methadone Detoxification Clinic at San Francisco General Hospital, which was the only detoxification clinic providing methadone-assisted detoxification from heroin in the city of San Francisco. The clinic, therefore, drew from the entire city and attracted a varied population of clients. We attempted to recruit 85 clients. Only four clients refused to participate, so the sample was representative of the detoxification clinic population.

The clinic provided a 16-day detoxification regimen with gradually decreasing doses of methadone (40 milligrams in split doses on day one to 5 milligrams on day 16).

Subjects ware recruited into the study on the first day of treatment. If they agreed to participate, they completed assessment instruments and were randomly assigned either to the standard treatment control or the contingent payment group. Control subjects were simply asked to leave a urine specimen daily and were paid one dollar for each urine given. In the contingent payment condition, subjects were paid for drug-free urines left on Mondays, Wednesdays, and Fridays. Urines left on Tuesdays and Thursdays were not eligible for payment, providing a within-group comparison. Payment was arranged so that it was highest on days when the probability of drug-free urines was the lowest, according to earlier data obtained from the clinic. The sequence of potential payments was thus arranged from $10 to $4, with the highest payments at beginning and end of treatment and the smallest payments in the middle of treatment. Subjects ware paid $15 to complete detoxification.

In both groups, to be assured the urines received from subjects were valid, the urines were tested for methadone as well as for morphine and barbiturates. A urine had to be positive for methadone and negative for other opiates and barbiturates in order to be eligible for payment. We also used a variant of the temperature verification method to guard against substitute urines (Judson, Himmelberger and Goldstein, personal communication).

An analysis of covariance with number of urines given as the dependent variable indicated that contingent payment subjects produced significantly more drug-free urines than standard treatment subjects ($F=4.56$, $df=1/78$, $p<.05$). These results are shown in figure 1. For nonpaid days, differences between contingent payment and the standard treatment control were not significant ($F=2.61$, $df=1/78$). The data for nonpaid days are shown in figure 2.

As these results indicate, we found we could influence heroin use by payment, and by relatively small payments at that. However, a more important question, and one that is central todetoxification amplетion, is whether or not clients terminate heroin use during treatment. we assessed this by examining length of sequence of drug-free days clients ware able to attain in the two conditions: frequencies with which subjects were able to obtain either zero drug-free days, 1-4 drug-free days, 5-8 drug-free days, or 9-11 drug-free days in each treatment condition were compared. As table 1 indicates, differences between the two conditions were significant ($X^2=13.08$).

TABLE 1

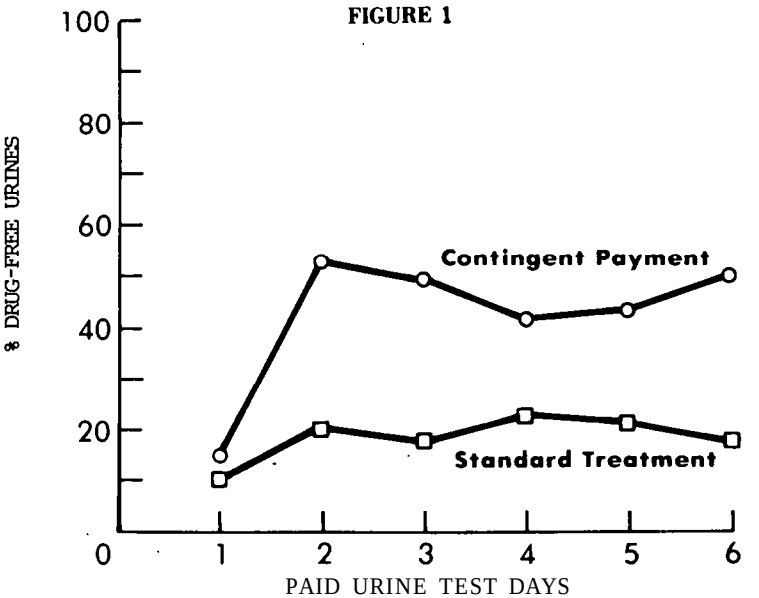
FREQUENCY OF MORPHINE/BARBITURATE-FREE URINES BY TREATMENT CONDITIONS EXPERIMENTAL CONDITIONS

DAYS	CONTINGENT PAYMENT	STANDARD TREATMENT	
	Frequency (percent)	Frequency (percent)	
0	14	19	
1-4	10	20	$X^2=13.08$, DF=3, p<.01
5-8	13	0	
9-11	3	2	

Especially notable is the finding that subjects in the contingent payment condition were able to obtain relatively long sequences of drug-free days (5-8 days) as compared to the control condition. Subjects in the latter condition were more likely to obtain relatively short sequences of drug-free days (1-4, if any at all). These data indicate that clients attained some period of heroin abstinence via contingent payment. In light of the treatment completion data discussed below, it occured to me to reconsider the data with respect to abstinence at treatment termination as a second criterion for abstention. We arbitrarily chose five abstinent days at the end of treatment as the criterion for termination of heroin use. Here, the results are less impressive. Two of the control subjects and five of the experimental subjects were able to meet this criterion.

The failure of the subjects to abstain near the end of treatment may be reflected in the treatment completion data. Contingent payment subjects had lower premature termination rates (62.5 percent) than standard treatment subjects (51 percent) but the differences were not statistically significant (X^2=1.09, df=2). A life table analysis indicated essentially no difference in proportion of terminators in each condition during days 1-14 (t<1, all days). On days 15-16 differences were noted but were of marginal significance (t=1.13, df=79, p<.15 and probably are not of clinical importance. The retention curves for the two treatments are shown in figure 3.

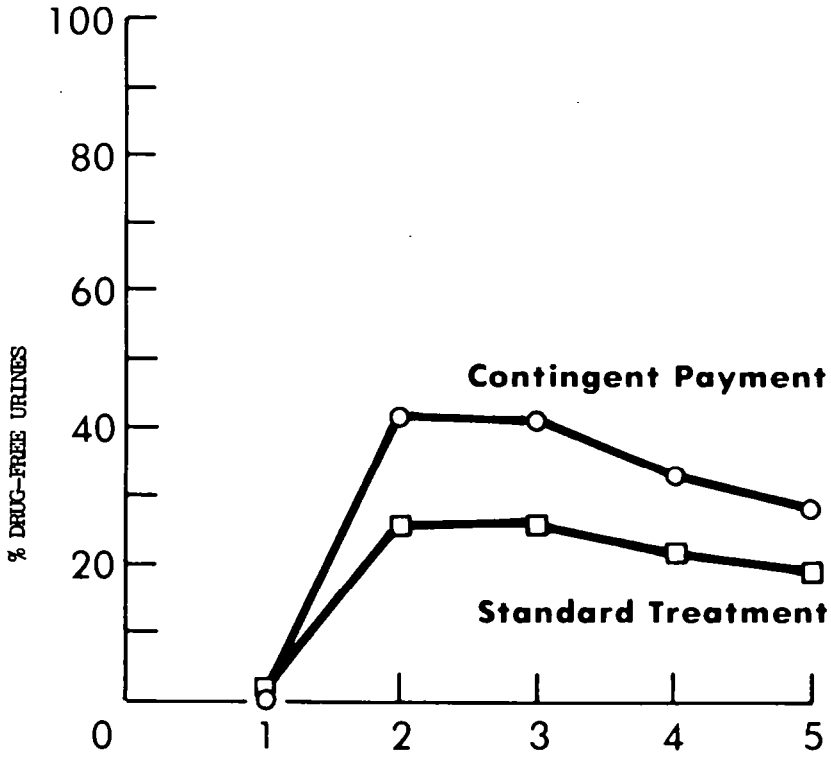
FIGURE 1



Percent Drug-Free Urines
For Contingent Payment and Standard Treatment Controls
On Paid Urine Test Days

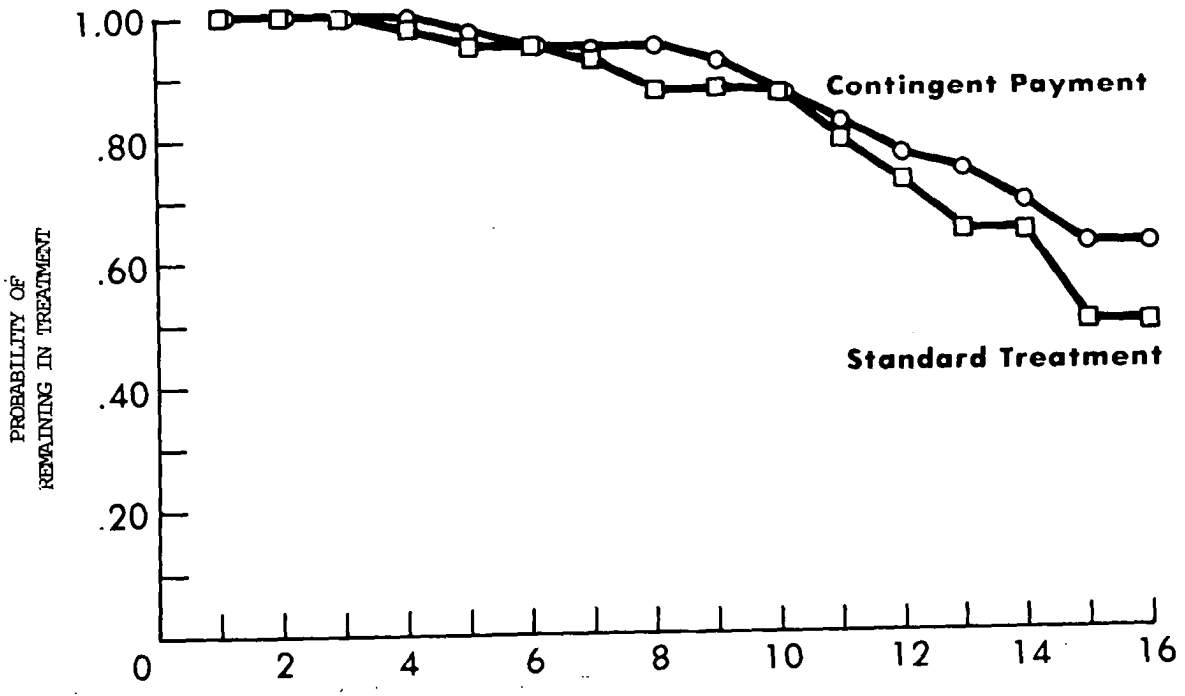
300-345 0 - 79 - 5

FIGURE 2



Percent Drug-Free Urines for Contingent Payment and Standard Treatment Controls on Non-Paid Urine Test Days

FIGURE 3



Probability of Remaining in Treatment For Contingent Payment Standard Treatment Controls As a Function of Days in Treatment

In summary, we were able to influence heroin use but did not produce termination of heroin use or significantly higher treatment completion rates.

It was unfortunate that data on anxiety or emotional changes were not collected, for we observed a common pattern in clinic patients as detoxification progressed that shed some light on the failure to become abstinent at treatment termination. Repeatedly clients who had been abstinent throughout treatment, as treatment ended and low doses of methadone were reached, became increasingly anxious about the mild withdrawal symptoms they were experiencing, and about their fate after detoxification. These observations, and later clinical experience with the same population, led me to search the literature on changes in anxiety during detoxification from heroin, but I met with little success. I did, however, find a literature on the processes occuring during detoxification from methadone maintenance. The remainder of the data are from studies of patients detoxifying from methadone maintenance. I suspect these data are applicable in principle to heroin detoxification.

ANXIETY AND DETOXIFICATION

Reports on methadone maintenance uniformly indicate emergence of a particular symptom complex as tapering proceeds. The symptoms can be divided into three categories: the first includes smarting eyes, increased lacrimation and rhinorrhea (Muskelly 1972; Mintz, O'Brien, O'Hare and Goldschmidt 1975). These symptoms are clearly somatic in origin: it is hard to see how they would be influenced by psychological states. Their importance in relapse is questionable. We do not often hear an addict report resumption of heroin use due to a runny nose. A second diverse class of symptoms includes anorexia (Muskelly 1972; Kremen and Bayer 1973), impotence (Riordan and Rapkin 1972; Muskelly 1972), sleeplessness and nausea (Muskelly 1972; Riordan and Rapkin 1972; Cushman and Dole 1973; Kreman and Bayer 1973; Rasnick et al. 1975). We can argue that these symptoms are exacerbated by, if not caused by, anxiety. Anxiety itself is among the most commonly reported symptoms of methadone detoxification (Muskelly 1972; Riordan and Rapkin 1972; Cushman and Dole 1973; Kreman and Bayer 1973). It may take the form of a general constant heightened level of anxiety or acute anxiety attacks (Riordan and Rapkin 1972). It is indicated indirectly in many ways - for example, by increased irritability, and increased alcohol intake (Muskelly 1972; Riordan and Rapkin 1972; Mezritz et al. 1975). We also have evidence from controlled studies that much of the discomfort experienced during detoxification from methadone is the result of expectations and anxieties about detoxification rather than dose-related (Seney, Dorus, Goldberg and Thorton 1977).

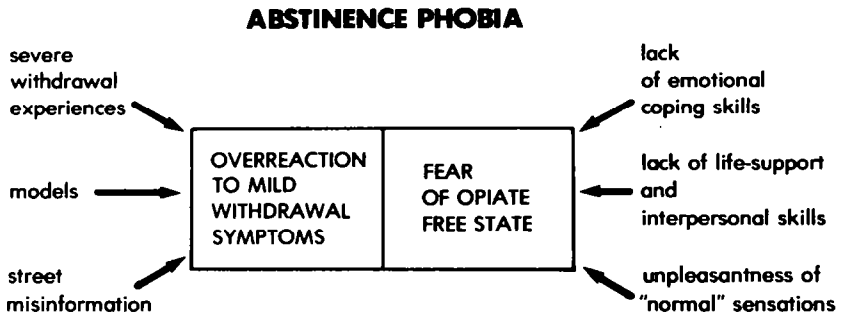
Given the anxiety accompanying detoxification, it is not surprising that zero dose is reached only by a minority of detoxifying clients; for example, one study which sampled from two methadone maintenance clinics at San Francisco found 35 percent of the clients labeled themselves as detoxifying from methadone, but such individuals did not differ from nondetoxifying clients in dose changes over a four-month period, even in conditions where they were given the opportunity to self-regulate dose or ware given incentives for dose reduction (Havassy, Hargreaves and De Barros, in press). These experimental results coincide with several

clinical reports which indicate successful detoxification is the exception, not the rule: generally between 25-40 percent of detoxifying clients reach zero dose (Riordan and Rapkin 1972; Chappel et al. 1973, Kremen and Bayer 1973: Stimmel, Rubin and Engel 1973; Rubin and Stimmel 1974; Brown et al. 1975; Resnick et al. 1975). In light of these two phenomena - heightened anxiety and avoidance of zero dose - it seems reasonable to propose that excessive anxiety about becoming drug free, the "abstinence phobia," is a block to detoxifying for many addicts.

THE ABSTIENCE PHOBIA

Based on clinical experience and the available data, the anxiety that detoxifying methadone maintenance clients experience can be divided into at least two components. These are shown in figure 4.

FIGURE 4



Two Components of the Abstinence Phobia
In Tapering methadone Maintenance Clients

The first component is overreaction to relatively mild withdrawal symptoms. this may occur because such mild symptoms have previously been followed by severe withdrawal (e.g. due to forced withdrawal in jail), because of models, or because of the tremendous amount of misinformation that circulates on the streets about drug effects. A second component is related to becoming drug-free. This component reflects the severe lack of effective social and interpersonal skills addicts experience. To some extent it is also related to the experience of the sensations of the normal state as strange and anxiety-provoking when one has used a strong narcotic for a long period of time. Also involved may be a lack of skills for coping with emotions; since emotions are blunted by the opiate, the addict may never learn, or may lose through disuse, skills and cognitive mechanisms to control anger, anxiety, or other unpleasant emotions.

Following the model of a phobia, it would seem that the strength of the abstinence phobia should differ at different tines (e.g., as the client gets closer to zero dose) and also differ with respect to the cues that elicit it. Treatments must be designed to deal with these appropriately. As an initial effort, we can break the process of detoxifying for methadone clients into three stages. These are shown in table 2.

TABLE 2

Stages of Detoxification in Methadone Maintenance Clients

STAGE	CHARACTERISTICS	INTERVENTIONS
Early Detoxification	Client identifies self as detoxifying (Variable dose) Anxiety diffuse	1. relaxation training & other anxiety reduction 2. Dose reduction Planning 3. Rethinking withdrawal symptons. 4. Begin vocational rehabilitation, if needed
Middle Detoxification	Clients feel mild withdrawal symptoms (20 mg.) Anxiety about withdrawal symptoms prepotent	continue 1-4 5. Assertion & other social interperson al skills training.
Late Detoxification	Dose has minimal pharmacological effects for tolerant users (5 mg) Anxieties about being Drug free Prepotent	6. Drug holidays 7. Follow up support

In the first stage, "early detoxification", clients simply identify themselves as detoxifying. Anxiety is relatively mild and non focused because zero dose is so far away. At this point, relaxation training, planning for dose reduction, and ways of redefining withdrawal symptoms should be introduced as an aid to move clients into the next stage. Long term treatment planning is also important at this stage. Therapeutic modalities which take a long tine to bear fruit such as vocational rehabilitation, e.g., Hall et al. 1977) should be introduced. All of our work to date relates to stage one. At second stage, "middle detoxification," clients enter into that dose level (some say below 20 milligrams) that usually elicits initial signs of the abstinence phobia, especially those components related to mild withdrawal. At this point treatment emphasizes redefinition of withdrawal symptoms. At this point also we would assumes that the client would be motivated to develop life skills such as those provided by assertiveness training. The final stage is late detoxification. Here, methadone dose has reached that level where it has minimal pharmcological results for tolerant individuals. The dose is probably somewhere between 0 and 5 milligrams. Treat-

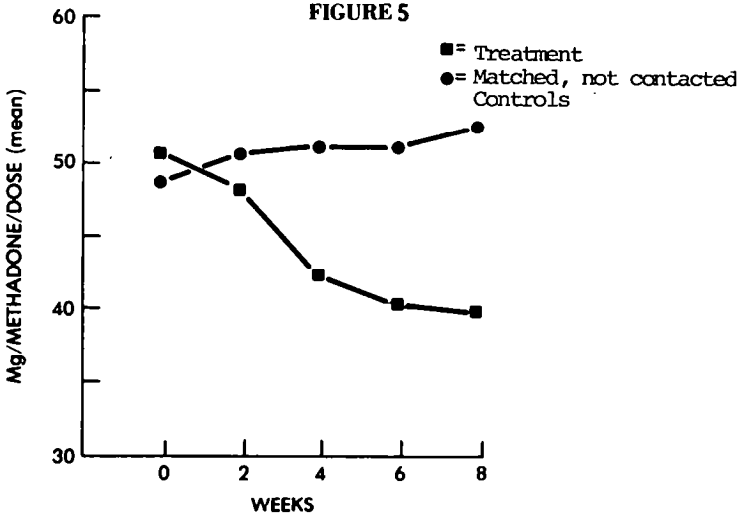
treatment would emphasize a continuation of skill training and techniques targeted at the drug free state: for example, "drug holidays" - i.e. short periods such as one to two days the client goes without methadone and is given therapeutic assistance in handling the effects of being drug free.

PILOT STUDY RESULTS

We have piloted a treatment package to enhance dose reduction during stage 1. We plan shortly to have a controlled trial comparing this treatment with a nonspecific treatment condition. The three elements of the pilot treatment program are: 1) Redefinition of withdrawal symptoms: We assume that anxiety is generated by the client's interpretation of the somatic changes accompanying decreasing doses as uncontrollable , and as symptoms of illness or precursors of catastrophic changes. During treatmet subjects are encouraged to think about increases in aches and pains and to some extent increases in anxiety as normal~butseemingabnormdl because of the subject's previously narcoticized state. The ultimate controllability of the symptoms emphasized, particularly via anxiety reduction and also via assurances that treatment will only be terminated voluntarily. 2) Intensive relaxation training: We use cognitive relaxation training (Beary, Benson and Klemchuck 1974) because it seems to have a good degree of client acceptability. Progressive muscle relaxation (Jacobsen 1938) is also included, primarily to increase the subject's awareness of the difference between tense and relaxed states. 3) Anxiety-cued relaxation: Relaxation is a goal in itself but is also used as a self-control device when anxiety occurs. Clients are taught to recognize cues and situations related to anxiety and to practice the relaxation response when confronted with these cues.

Results of a pilot trial of these methods are shown in figure 5.

FIGURE 5



Methadone Dose Reduction in Treatment Condition and Nominated Matched Controls

As figure 5 shows, treatment subjects decrease their methadone doses at the rate of about 3 percent a week. When these results are compared with nonrecruited, matched control subjects who also state that they are detoxifying, we note the inability of such subjects to reduce their dose and significant differences between the two groups (analysis of covariance with initial dose as covariate $F=4.52$, $df=1/12$, $p<.05$). Also, in spite of decreased methadone dose, treatment subjects did not increase heroin abuse from baseline to the end of treatment ($t<1$) and did not differ from control subjects ($F<1$).

THE ABSTINENCE PHOBIA AND SUBSTANCE ABUSE

I would like to propose that we observe "abstinence phobias" in many substance users and abusers wherever they seek to reduce or abstain from substance use, particularly when abstention is the goal, since this is cognitively a more drastic change than reduced use. Across substances, anxiety about abstention should be a problem to the extent to which severe withdrawal symptoms occur or are believed to occur and /or to the extent that use of the substance somehow interferes with learning of important interpersonal and social skills. It should be greatest in heroin addicts, somewhat less but still present in specific subgroups of alcoholics (the "bar culture" may have specific rules and rites, much like street culture) and probably of least importance with cigarette smokers. A similar process may also be operative in obese people who attempt to lose weight. I have seen obese clients in clinical situations who plateaued at a weight greater than desired. They did not have the social skills to handle a normal body size, especially those skills needed to handle sexual advances, and admitted to fears about this social deficit and its consequences. These clients had to be desensitized to changes in body image and given social skills training before they could continue weight loss.

I would suggest abstinence phobia will be greatest the goal is abstinence rather than controlled use because the cognitive change is greatest. For some individuals, periods of controlled substance use may provide an informal desensitization to, and skills training in, dealing with the world in a different chemical state. For example, some controlled drinkers who are abstinent at followup in controlled drinking studies may well use this period to desensitize themselves to situations where they previously used alcohol. This leads to the suggestion that, even when the treatment goal is abstinence, a period of controlled use might be useful to provide desensitization, especially if relearning experiences are programmed in rather than left to occur haphazardly. A final implication is that it may be advantageous to deal with these anxieties prior to abstinence. Maintenance may often be poor because anxiety is so great during initial abstinence that performance of adaptive skills is inhibited.

This model reflects a general orientation which assumes specific symptoms and correlates of a disorder must be taken into account when behavioral treatments are designed (Hall 1978). In many respects behavioral psychologists have taken the opposite course from, others in the health fields who tend to emphasize studying one particular disease syndrome rather than looking at principles applicable across disorders. We have generally developed multimodal programs based on behavioral principles and attenpted to apply these programs to many disorders with little

understanding of the reality of each disorder. As a result, clients are asked to participate in time consuming treatments only a few components of which are effective. We thereby lose our credibility and our clients are put on a partial reinforcement schedule, which is not strong enough to maintain adherence, especially after treatment is terminated. Adherence to behavioral treatments during maintenance can be conceptualized as adherence to a health regimen (Hall 1978). This conceptualization leads to an examination of the medical compliance Literature, which indicates that the simpler the self-administered treatment, the higher the probability of compliance, and the more immediate and salient the beneficial change experienced, the higher is the probability of continued adherence (Kasl 1975). Our current treatments are devised so that neither simplicity nor immediate change as frequently as it should. We would do well to keep this in mind as we try to increase the effectiveness of our treatment programs in the future.

REFERENCES

Beary J.F., Bensen, H. with Klemcheck, H.P. A simple psychophysiological technique which elicits the hypometabolic changes of the relaxation response. Psychosom Med, 1974, 36: 115-120.

Brown, E.M., Benanta, M., Greenberg, M. and MacArther, M. Studies of methadone terminations Brit J Addict, 1975, 70: 83-88.

Chappel, J.N., Skolnick, V.B. and Senay, E.C. Techniques of withdrawal from methadone and their outcome over six months to two years. Proceedings Fifth National Conferences of Methadone Treatment, 1973, 5: 482-489.

Cushman, P. and Dole, V.P. Detoxification of well rehabilitated methadone maintained patients. Proceedings Fifth National conference on methadone Maintenance, 1973, 5: 262-269.

Guess, L.L. and Tuchfeld, B.S. Manual for Drug Abuse Treatment Program Self Evaluation Supplement II: CODAP Tables. National Institute on Drug Abuse, 1977.

Hall, S.M. Self-management and maintaining therapeutic change. In Karoly, P. and Steffan, J. (Eds.) Modification and Metamorphasis: Maintenance of Therapeutic change. New York: Gardner, 1978, in press.

Hall, S.M., Bass, A., Hargreaves, W.A., and Loeb, P. Contingencies and information feedback in outpatient heroin detoxification. Unpublished manuscript, university of California - San Francisco, 1978.

Hall, S.M., Norton, J., Loeb, P., and Yang, R. Increasing Vocational placement in drug treatment clients: A pilot study. Addict Behav, 1977, 15: 438-441.

Havassy, B. Hargreaves, W.A. and De Barros, L. Self-regulation of dose in methadone maintenance with contingent privileges. In press, Addict Behav.

Jacobsen, E. You Must Relax, 1938, Chicago: University of Chicago Press, 1938.

Kasl, S.V. Social psychological characteristics of behaviors which reduce cardiovascular risk. In A.J. Enelow and J.B. Henderson (Eds.) Applying Behavioral Science to Cardiovascular Risk, Seattle: American Heart Association, 1975, 173-190.

Kremen, E. and Bayer, R. New choices form methadone maintenance patients Planned, voluntary, long-term detoxification. Proceedings Fifth National Conference on Methadone Treatment, 1973, 1: 667-674.

Mazritz, M., Slobetz, F., Kleber, H. and Riordan, C. A follow up Study of successfully detoxified methadone maintenance patients. In E. Senay, V. Shorty and H. Alksne (Eds.) Developments in the Field of Drug Abuse, Cambridge: Schenkman, 1975, 336-343.

Mintz, J., O'Brien, C.P., O'Hare, K., and Goldschmidt, J. Double bind detoxification of methadone maintenence patients. Intern J Addict, 1975, 10: 815-824.

Muskelly, T.E. Motivationals and their relationship to methadone maintenance withdrawal problems. Proceedings 'Fourth' National Conference on Methadone Treatment, 1972, 177-179.

Resnick, R., Destenbaum, R., Gaztanaga, P., Volanka, J. and Freedman A. Experimental techniques for rapid withdrawal from methadone maintenance Results of pilot trials. In E. Senay, V. Shorty and H. Alskne (Eds.) Developments in the Field of Drug Abuse, Cambridge: schenkman, 1975.

Riordan, C.E. and Rapkin, R. Detoxification as a final step in treating the successful long term methadone patient. Proceedings Fourth National conference on methadone Treatment, 1972, 219-221.

Rubin, J. and Stimmel. B. A follow-up of patients discharged from methadone maintenance. In E. Senay, V. Shorty and H. Alksne (Eds.) Developments in the Field of Drug Abuse. Cambridge: Schenkman, 1974, 171-176.

Senay, E., Dorus, W., Goldberg, F., and Thorton, W. Withdrawal from methadone maintenance. Arch Gen Psychiatry, 1977, 34: 361-367.

Sheffet, A., Quinones, M., Lavenhar, M.E., Doyle, K. and Praeger, C. An evaluation of detoxification as an initial step in the treatment of heroin addiction. Am J Psychiatry, 1976, 270-274.

Stinmel, B., Rubin, J. and Engel; C. The prognosis of patients detoxified from methadone maintenance: A follow-up study. Proceedings Fifth National conference on methadone Maintenance, 1973, 270-274.

Wilson, B.D., Elms, R.R. and Thompson, C.P. Outpatient versus hospital methadone detoxification: An experimental comparison Intern J Addict, 1975, 10: 13-21.

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Chapter 6

Reinforcement of Drug Abstinence: A Behavioral Approach to Drug Abuse Treatment

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BACKGROUND

The defining behaviors in drug and substance abuse, those which we seek to modify in treatment, involve the acquisition and ingestion of drugs. Drug use may be influenced indirectly by focusing therapeutic efforts on the teaching of skills which may result in improved social, personal and emotional adjustment of addicts. Alternatively, drug use may be influenced by focusing treatment interventions directly on drug acquisition and ingestion behaviors. This paper will discuss a direct approach to the treatment of drug abuse, namely the use of abstinence incentives or contingent reinforcement procedures to promote reductions in drug use. Abstinence incentive Interventions derive from an operant behavioral approach to the analysis and treatment of substance abuse. Such an approach seeks to .alter behavior by altering the environmental consequences which maintain and support the behavior. In the present case, environmental consequences of drug use are manipulated by offering incentives or positive reinforcement for drug abstinence.

This discussion will proceed in three parts. First we will present a review of previous research which has utilized contingency management or reinforcement procedures to treat drug and substance abuse. Second, data will be presented concerning the efficacy of abstinence incentives to promote reductions in supplemental drug use among methadone maintenance clients; these data were gathered within a methadone maintenance outpatient clinic as part of a treatment research project seeking to identify variables that control and modify drug use in order to develop more effective treatment interventions. Third and finally, abstinence incentives or reinforcement procedures will be discussed in terms of their practical and conceptual implications for drug abuse and substance abuse treatment.

Contingency Management in Substance Abuse Treatment

There are ample precedents for the use of operant behavioral approaches in the treatment of mental health and substance abuse problems. Originally, contingency management procedures were developed in the

form of token economies for use in hospital wards and other institutional settings where staff attention, institutional privileges, and goods and services are readily available for use in contingent arrangements to promote therapeutic behavioral change. In these institutional settings, behavior modification techniques have been employed to promote socially productive and acceptable behaviors among schizophrenic and mentally retarded individuals with gross behavioral deficits (Birnbrauer 1976; Paul and lentz. 1977; Stahl and Leitenberg 1976; Thompson and Grabowski 1977). Fran these beginnings, contingency management techniques have spread to all levels of mental health care from psychotherapy to self-help manuals as well as to industrial and educational settings. Thus, these techniques have been used successfully to pronote improved social and personal adjustment in juvenile- delinquents (Burchard and Harig 1976), used in classman settings both to modify inappropriate or disruptive behavior of students and to improve academic performance (O'Leary and O'Ieary 1976). and used in the ham. both as an aid to child rearing and discipline (Birnbrauer 1976. Foxx and Azrin 1974; Whaler 1976) and as an adjunct in marital rehabilitation (Patterson et al. 1976); Behavioral contingency management procedures have also been incorporated into treatment of various types of substance abuse problems including obesity (Stuart and Davis 1972; Stunkard and Mahoney 1976), cigarette smoking (Bernstein and McAlister 1976; Pomerleau and Pomerleau 1977), alcoholism (Miller 1976; Nathan 1976) and drug abuse (Gotestam et al. 1975; Bigelow et al. 1978).

In the area of narcotics drug abuse, methadone maintenance has been the treatment of choice for a number of years; however, the need for ancillary therapy for addicts in addition to methadone is repeatedly emphasized (Brill and Chambers 1973; Dole and Nyswander 1976; Goldstein 1976). Contingency .management procedures have been applied occasionally to encourage improved social and personal adjustment among addicts. Several investigators have utilized token economies or less structured contingency management program to promote improved behaviors with addict populations on inpatient hospital wards (Ericksson et al. 1975; Glicksman et al. 1971; Melin et al. 1975; O'Brien et al. 197I). Thus, for example, in a study by Melin et al. (1975), narcotics addicts undergoing methadone dose alterations during an inpatient stay could earn points which allowed then access to ward privileges. The point system promoted an increase in specified "socially acceptable" behaviors such as getting up in the morning, attending classes and ward meetings, and making one's bed. Contingency management procedures have also been applied in the treatment of drug abuse patients in outpatient settings. Boudin et al. (1977) have described the use of contingency contracting to enhance socially acceptable behaviors in drug users, while Hall et al. (1977) and Bigelow et al. (1976) report individual case studies in which contingency contracting was used successfully with methadone maintenance clients for several specific behavioral problems, and Stitzer et al. (1977) report use of contingent reinforcement to improve counseling attendance among methadone maintenance clients. All of these studies have demonstrated that contingent reinforcement techniques could be used with addict patients, but they did not demonstrate the usefulness of these techniques when targeted specifically on behaviors leading to drug ingestion.

Alcoholism

Of particular relevance to the present discussion are studies Which have utilized abstinence incentives to promote reduced ingestion of drugs, alcohol and cigarettes. The alcohol literature provides some particularly elegant examples of controlled studies in Which contingency managenent and contingency contracting procedures have influenced substance use by altering its environmental consequences. In controlled laboratory settings, alcohol consumption can be markedly influenced by operant strategies. Money rewards (Cohen et al. 1971a), the opportunity to participate in enriched environments (Cohen et al. 1971b_), and access to visitors or Weekend passes (Griffiths et al. 1978) have been used as reinforcers for decreased drinking, While contingent access to social and activity reinforcers has been shown repeatedly to exert a marked effect on drinking (Bigelow et al. 1975; Griffiths et al. 1978). Operant techniques have also been applied successfully in outpatient situations. One study by Miller (1975), for example, arranged to provide chronic skid row alcoholics With goods and services at the Salvation Army and other cummunity agencies only When they were abstinent from alcohol rather than When they Were drunk, as was the usual case. This contingent arrangement resulted in marked reductions in alcoholic drinking. In a case study, Miller et al. (1974) used blood alcohol levels to assess drinking and reinforce nondrinking in an alcoholic individual. A monetary incentive delivered for 0.00 blood alcohol readings during contingent phases of the study resulted in marked reductions in drinking. Finally, a study by Hunt and Azrin (1973) employed vigorous therapeutic interventions to improve Work, marital, recreational, and social adjustment in a group of chronic alcoholics. Barked reductions in drinking which occurred in the experimental group were attributed to the contingent arrangements between nondrinking and access to reinforcers, although these reductions could also have been due to the enhancement of behaviors Which served as alternatives to smoking.

Smoking

Abstinence incentives have also been used to help people stop smoking. Elliot and Tighe (1968) developed an abstinence incentive program in Which smokers provided a monetary deposit Which was returned to then over a 16-week period only if they maintained abstinence from tobacco products. The program was highly successful, with 84% of smokers Who participated achieving the 16 Weeks of abstinence. Winett (1973) demonstrated in a controlled study that When a money deposit Was returned contingent upon reductions in smoking, this-resulted in better compliance to the smoking reduction schedule as well as higher abstinence rates than When deposits were returned simply for attendance at group counseling and data collection sessions.

Drug abuse

Drug abuse can also be influenced by contingencies. Boudin (1972) used contingency contracting to influence drug use in an amphetamine abuser. Hall et al. (1977) report a controlled case study in Which morphine-free urines of a methadone maintenance patient increased dramatically

during periods of time when various program privileges and incentives were delivered contingent upon drug-free urine samples. Similarly, Bigelow et al. (1976) present several case reports in which use of either opiate or benzodiazepine drugs was influenced by providing reinforcers contingent upon reductions in drug use. Thus, there are several case reports in the drug abuse field as well as controlled studies with other varieties of substance abuse which attest to the efficacy of providing reinforcement directly contingent upon abstinence from or reductions in substance use.

Contingency management procedures, then, are potentially valuable tools for treatment of substance abuse. These techniques may be particularly valuable for providing ancillary treatment to drug abusers enrolled in methadone maintenance clinics. The methadone clinic possesses several natural advantages as a site for contingency management intervention programs. First, these clinics tend to attract and maintain addicts in treatment for relatively long periods of time, thus allowing for long term treatment contact. Second, methadone clinics allow treatment to occur while the client continues to function in his or her normal social and work environment. Finally, clinics provide a variety of services and privileges which are available for use as reinforcers in contingent therapeutic arrangements.

Methadone delivery itself is one very potent reinforcer available at the treatment clinic. This was demonstrated in a study by Liebson et al. (1973, 1978) in which the focus of intervention was excessive alcohol drinking among a group of methadone maintenance clients. For clients assigned to the experimental treatment, delivery of a full daily methadone dose was contingent upon ingesting a dose of disulfiram (Antabuse), while clients assigned to the noncontingent control procedure were given a supply of disulfiram and encouraged to take it on their own. Differences in alcoholic drinking between the two groups were dramatic and clearly demonstrated the efficacy of the methadone dose as a reinforcer.

Two investigations (Stitzer and Bigelow 1978a; Yen 1974) used surveys to identify program privileges other than methadone itself which might serve as reinforcers for methadone maintenance clients. Potential reinforcers identified in these survey studies included methadone take-home privileges, receiving money from the clinic, the opportunity to self-regulate methadone dose on a single day, reduced urinalysis requirements, and recommendations for shortening length of probation. Baldridge et al. (1974) describe use of take home privileges as a reward for methadone maintenance clients who generally conform to programguidelines and show little or no illicit drug use, but the take-home privilege was not used to attempt to alter behavior' of poorly performing program participants. Stitzer et al. (1977), however, found that when weekend methadone take-home privileges were made contingent upon attendance at a weekly counseling session, the contingent arrangement resulted in markedly improved attendance in a group of originally poor attenders, while both Hall et al. (1977) and Bigelow et al. (1976) used take-hane medication and other program privileges in contingent arrangements to promote therapeutic changes in behavior of methadone maintenance clients. Thus several potential reinforcers are available at the methadone maintenance outpatient clinic, some with demonstrated efficacy in influencing specific target behaviors.

Since drug ingestion is ultimately the behavior of primary concern for drug abuse treatment, it would seen particularly important to assess in controlled studies the extent to which this behavior can be influenced by contingency management interventions. In addition to the controlled case study of Ball et al. (1977), only one other controlled study has evaluated the effects of offering clinic privileges contingent upon reductions in drug use. In that study (Stitzer and Bigelow 1978b) methadone maintenance clients with histories of chronic supplemental use of benzodiazepines were prescribed diazepam 20mg/day at the clinic dispensary. The prescription substituted for at least a portion of illicit benzodiazepine use and allowed experimental observation of and control over this portion of drug use. During certain portions of the experiment clients were offered a choice between continuing benzodiazepine use at the clinic or refusing available benzodiazepines in order to obtain clinic privileges. When a single methadone take-hone privilege was offered, clients refused available diazepam on 88.8% of occasions. On the other hand, when clients were offered the opportunity to regulate their own methadone dose for a single day by as much as +20mg, diazepam was refused on only 30.3% of occasions. Under noncontingent baseline conditions, diazepam was refused on only 4.4% of occasions. Thus, when offered in a contingent arrangement, methadone take-home privileges served as an effective reinforcer which influenced supplementary benzodiazepine use at the clinic, while opportunities for single day dose self-regulation were less effective in this regard.

In the diazepam study discussed above, controlled drug self-administration at the clinic served as a model or prototype of drug ingestion and allowed a controlled experimental evaluation of the influence of treatment interventions. It would be critical, of course, to assess the generality and applicability of these findings to a more natural treatment situation. The research which will be described in the remainder of this paper represents an attempt to establish such generality by evaluating the impact on supplemental drug use of contingent incentives offered to methadone maintenance clients for observable reductions in drug use as revealed in urinalysis test results.

METHODS AND RESULTS

Reinforcement of Drug-Free Urinalysis: Opiates

Participants in the first treatment intervention study were methadone maintenance clients who showed consistent morphine-positive urinalysis test results, indicating that they continued to supplement their methadone with street heroin on a regular basis. Six clients were chosen whose urines were morphine positive on at least 30% of twice weekly urinalysis tests during a five-week prestudy period. Other demographic characteristics of these clients are presented in table 1. During the study, urine samples were collected twice weekly and tested using an on-site EMT urinalysis system. Incentives were available for morphine-free urine tests during randomly selected weeks, while during other weeks no consequences were attached to urine test results. Random selection of incentive and no-incentive weeks was adjusted so that there were never more than 3 consecutive weeks of a given type and so that incentives were offered on about 50% of the weeks during an entire study. Morphine-free urine samples delivered during a week when incentives were available resulted in a choice among three incentive

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TABLE 1

DEMOGRAPHIC CHARACTERISTICS OF STUDY CLIENTS

Client	Age (Yrs)	Race	Education (Yrs)	Employment	Marital Status+	Years of Continuous Opiate Use	Previous Months of Methadone Maintenance (approx)
Opiate Incentive Study							
CB	32	B	12	unemp	M	8	20
WB	39	B	8	unemp	P*	13	11
JG	22	B	11	unemp	S	6	24
GL	32	B	10	unemp	P*	10	37
JM	28	B	12	ft	P	8	0
LW	33	B	10	unemp	M*	10	18
RW	27	B	10	unemp	S	9	0
Average	30.4		10.4			9.1	15.7
Benzodiazepine Incentive Study							
WB	39	B	8	unemp	P*	13	11
KC	30	W	10	unemp	S*	12	28
MC	29	W	9	unemp	S*	8	43
PT	24	W	9	unemp	S	10	30
CW	26	W	10	pt	S*	6	50
Average	29.6		9.2			9.8	32.4

+ M = Married, S = Single, P = Living with opposite sex partner

* Divorced or separated from a spouse

options: (1) a single methadone take-hone privilege, (2) $7.50 in cash, (3) single day dose self-regulation opportunity (up to ±20mg). Incentives earned were delivered immediately after the urine test and two incentive choices could be earned per week, on Monday and Friday.

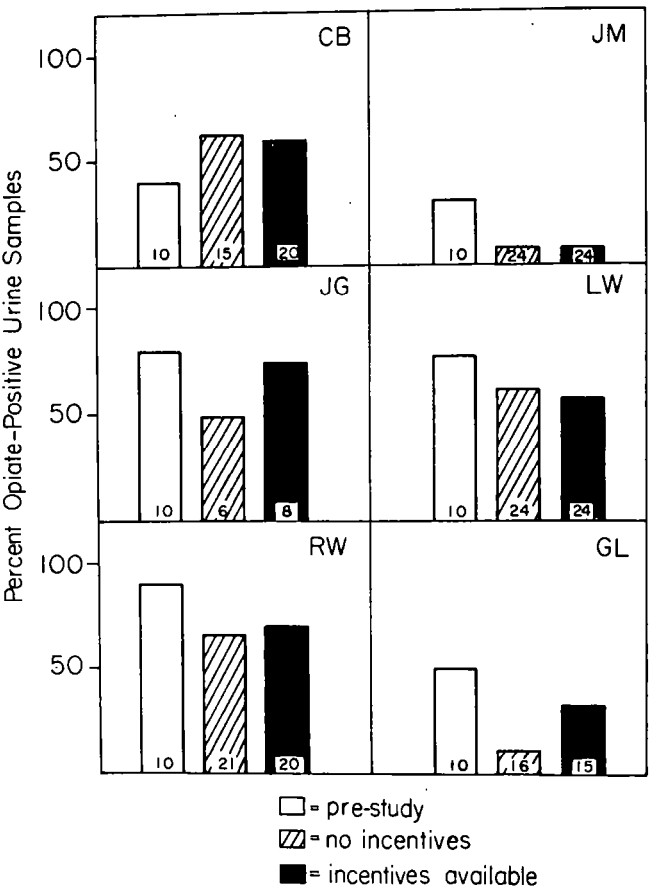
Figure 1 shows percent of morphine-positive urine samples prior to the study and during contingent and noncontingent study weeks for individual clients.. Although in two clients (JM & GL) overall opiate use declined during the study, there was no noticeable differential impact of incentives on opiate use during contingent and noncontingent Weeks. The inability of incentives to influence supplementary heroin use in this experiment attests to the stability and strength of habitual drug-taking behaviors. Nevertheless, it is possible that opiate use could be altered by offering reinforcers With a higher intrinsic value.

A second experiment was initiated in Which the value of incentives was increased. Four clients have participated to date, three of whom had been exposed to incentive offers during the previous study. All experimental procedures were identical to those described above except that morphine-free urine samples during contingent weeks resulted in a choice between (1) two methadone take-hone doses, (a) $15.00 in cash, (3) 2 single-day opportunities to self-regulate methadone dose by ±20 mg.

Figure 2 shows the percent of opiate-positive urine samples obtained during five Weeks preceding the study and during contingent and noncontingent weeks of the study. All four clients showed generally reduced levels of opiate use during the study as compared to prestudy levels. In addition, three out of four subjects delivered fewer opiate-positive samples during incentive weeks than during no incentive weeks. Thus, in three of four clients studied to date, abstinence incentives have been effective in reducing supplementary opiate use.

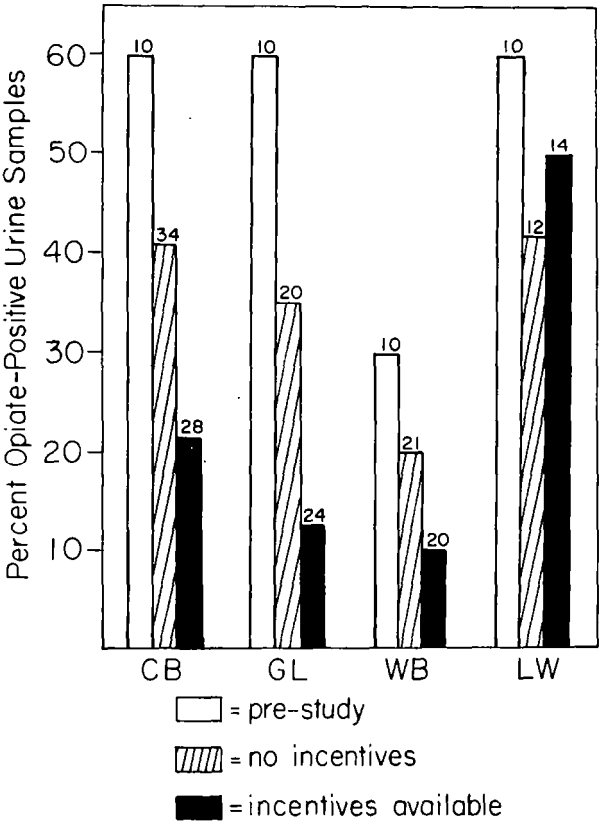
An even more intensive intervention procedure Was initiated subsequently for client LW when it became apparent that twice weekly incentive offers Were not influencing his opiate use. During a three-week period, LW was asked to give a urine sample every day. Each day that the EMIT urinalysis test showed negative opiates the-client received $30 in cash, Figure 3 shows the impact of this "super incentive" on LW's urinalysis test results. A single opiate-positive test was obtained on the first day of the super incentive offer. Subsequently, urinalysis tests were opiate free for the 18 Weeks shown and have remained opiate free for an additional four months since. This is in contrast to opiate positives observed on 50-80% of tests during the 44 Weeks prior to the super incentive intervention. The client reported that the money he earned gave him some temporary financial security Which allowed him to break off his involvements with drug dealing temporarily. This in turn reduced the availability to him of opiate drugs. Once he had made this temporary break, it became easier to completely terminate involvement With drugs in order to realize his own goal of remaining abstinent from heroin. The findings with this subject are consistent With the notion that abstinence incentives can be effective if sufficient incentive values are employed. Furthermore, the study had an unanticipated long term positive outcome in that the client became totally abstinent from supplemental opiate drugs. Although still in progress, these studies indicate that absti-

FIGURE 1



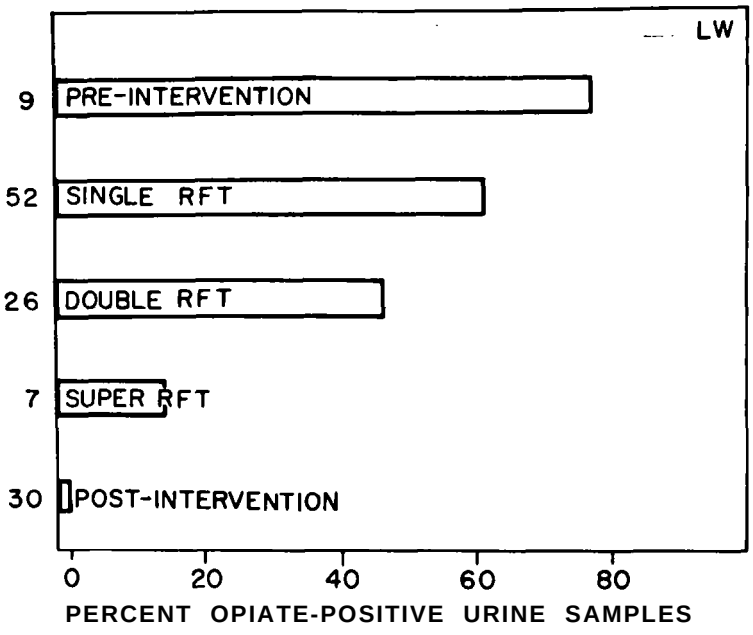
Results of twice-weekly urinalysis tests for opiates (morphine) in six individual methadone maintenance clients. Open bars show percent opiate (morphine) positive tests for ten consecutive prestudy urine samples. Solid and hatched bars show percent opiate (morphine) positive tests during study weeks when contingent incentives were (solid bars) or were not (hatched bars) available for morphine-free urine samples. Numbers inside each bar indicate the number of urinalysis tests used in determining percentages. A morphine-free urine sample resulted in delivery to the client of either a single methadone take-home dose or $7.50 cash.

FIGURE 2



Results of twice weekly urinalysis tests for opiates (morphine) in four individual methadone maintenance clients. Open bars show percent opiate (morphine) positive tests for ten consecutive prestudy urine samples. Solid and hatched bars show percent opiate (morphine) positive tests during study weeks when contingent incentives were (solid bars) or were not (hatched bars) available for morphine-free urine samples. Numbers above each bar indicate the number of urinalysis tests used in determining percentages. A morphine-free urine sample resulted in delivery to the client of either two methadone take home doses or $15.00 cash.

FIGURE 3



Results of twice-weekly urinalysis. tests for opiates (morphine) in a single client during 124 weeks of enrollment in methadone maintenance. All urine samples collected from this client are included regardless of study conditions in effect when samples were collected, but samples are grouped for periods of time during which the client participated in studies where contingent reinforcement was available for providing morphine free urine tests. During single reinforcement and double reinforcement studies, the client could earn incentives during randomly selected weeks; during super reinforcement, the client earned money daily for three consecutive weeks for providing morphine-free urine samples. See text for details of studies in which this client participated. Numbers to left of bars indicate the number of urinalysis tests included in determining percentages.

nence incentives are effective in reducing supplemental opiate use. Furthermore, results of these studies suggest that effectiveness of abstinence incentives may depend importantly upon the magnitude of incentives offered.

Reinforcement of Drug Free Urinalysis: Benzodiazepines

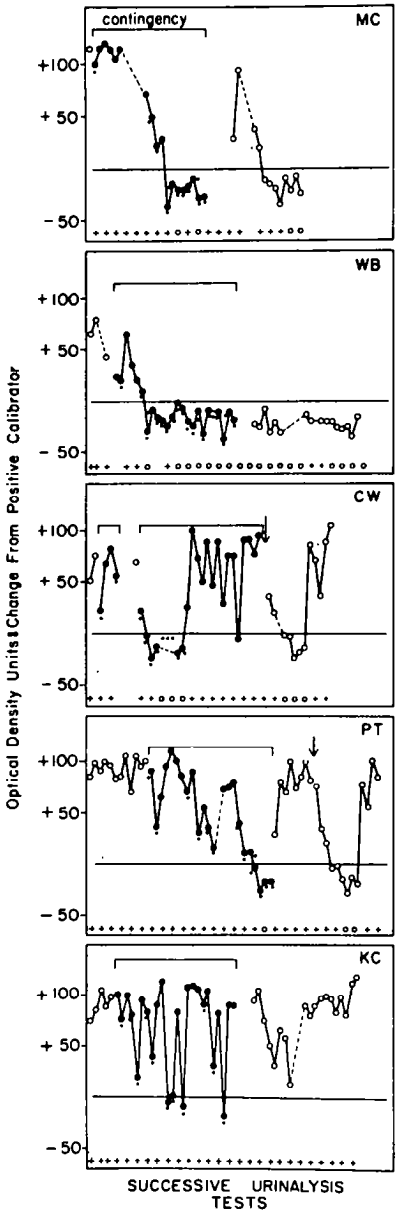
A concurrent experiment was undertaken to explore the use of contingent incentives in clients whose primary supplemental drugs are benzodiazepines. Because benzodiazepines take two weeks or longer to clear from the body following termination of their use, slightly different methodologies were adapted to study the impact of contingent abstinence incentives on benzodiazepine use. First, the study utilized long periods of incentive availability and unavailability to allow for a clear picture of long term benzodiazepine use to Emerge. Secondly, the EMIT urinalysis system was used to obtain semiquantitative measures of benzodiazepine levels, which allowed the investigators to track gradually reducing levels and to deliver reinforcers prior to obtaining urine samples which were totally benzodiazepine free.

Five clients have participated in studies where incentives were offered for declining benzodiazepine urinalysis levels. These clients had long histories of benzodiazepine use as revealed in clinical interviews, and consistent positive benzodiazepine levels in urine screening tests. Other demographic characteristics of study clients are shown in table 1.. Furthermore, all participants except KC had prescriptions for diazepam 20mg/day, available at the clinic dispensary, and had previously taken part in studies where clinic privileges could be earned by refusing prescribed diazepam at the clinic.

In the present study, incentives could be earned twice weekly by refusing diazepam at the clinic on 3 or 4 consecutive days, while in addition providing urines in which benzodiazepine levels were lower than those observed on the immediately preceding urinalysis test. It was explained to clients that they might earn some incentives by giving up benzodiazepine use intermittently but that if they wanted to obtain the maximum number of incentives they would have to give up benzodiazepine use entirely. Incentives were available on Monday and Friday imnediately following the on-site urine test. If eligible, clients could chose one incentive from the following reinforcer menu: (1) single methadone take-hone dose, (2) chance to self--regulate methadone dose for a single day by as much as +20mg ,(3) $7.50 in cash. The exception was CW, who chose from a reinforcer menu where each item was doubled in value.

Figure 4 shows benzodiazepine urinalysis test results during contingent and noncontingent portions of the study. All five clients achieved benzodiazepine-free urines at least temporarily during contingent portions of the study. Client WB was benzodiazepine free for 17 consecutive tests, MC and CW for 8 consecutive tests each, PT was benzcdiazepine free on 4 consecutive tests, while KC achieved 4 intermittent benzodiazepine-free urine tests. Thus, since all these clients had been consistently positive for benzodiazepines prior to the study, abstinence incentives had sane positive impact on benzodiazepine use in all clients when offered in contingent arrangements.

FIGURE 4



Results of once weekly benzodiazepine urinalysis tests in five individual methadone maintenance clients. Shown on the vertical axis are readings obtained on an EMIT urinalysis test system. Optical density readings obtained for the drug positive calibrator have been subtracted from readings obtained for the client sample. Positive scores fall above the horizontal line and represent drug-positive samples while negative scores fall below the line and represent benzodiazepine-free samples. Open data points represent samples collected during noncontingent portions of the study when no consequences were attached to urine results. Filled data points represent samples collected during contingent portions of the study when clients could obtain reinforcers for evidence of decelerating benzodiazepine use. Data collected during contingent portions of the study are also indicated by a bracket above. small dots adjacent to data points indicate delivery of a reinforcer. Along the bottom of each graph are shown benzodiazepine positive (+) and /negative (0) urine results obtained for duplicate urine samples by thin layer chromatography analysis at an independent laboratory. vertical arrows in graphs of CW and PT indicate cancellation of a prescription for diazepam, 20 mg/day, which had been available at the methadone clinic dispensary.

Figure 4 also illustrates that factors other than contingent incentives can influence benzodiazepine drug use. Client MC, for example, resumed use of benzodiazepines and other sedatives immediately after the contingent portion of the study. His drug use was so vigorous that he was hospitalized following an overdose. After this incident, MC stopped his use of all sedative drugs and has remained drug free for seven consecutive months. Clients CW and PT resumed their prescribed diazepam at the clinic dispensary either during (CW) or after (PT) incentive availability. Diazepam prescriptions were subsequently cancelled for these two clients at the points shown by an arrow in Figure 4. Cancellation of the diazepam prescription produced a temporary decline in benzodiazepine use which resulted in 5 or 6 benzodiazepine-free urine tests for each of these clients, after which benzodiazepine use resumed and urinalysis test results again became positive.

Clients who participated in the benzodiazepine and opiate incentive studies were similar in age, length of addiction, and general social stability as reflected in employment and educational status (table 1). Yet marked differences were apparent between the two groups in race, drug use, prior involvement in methadone maintenance programs, and the ability to sustain a relationship with a female partner. These differences between the two groups suggest that clients in the opiate and benzodiazepine studies represent very different subpopulations of methadone maintenance clients. Abstinence incentives offered at the treatment clinic nevertheless produced similar reductions in supplemental drug use among both these groups of clients. The one difference which was observed in results of the two studies had to do with the incentives which were selected from the reinforcer menu when these were earned. Clients who participated in opiate incentive studies chose money ($7.50) on 7% of occasions when incentives were earned and chose take-home medication on 25.6% of occasions, while clients in the benzodiazepine incentive study who were exposed to the same incentive choice took money on only 11% of occasions and take-home medication on 8% of occasions. This difference in client choices suggests that effectiveness of reinforcers will depend to sane extent on individual client characteristics and histories but that these differences may be predictable on the basis of client drug use and demographic characteristics.

DISCUSSION

The present studies are relevant to an important clinical problem among methadone maintenance patients. It has been repeatedly observed from urinalysis test results that a substantial portion of methadone maintenance patients continue to use supplementary drugs in addition to their methadone. Reported program-wide rates of opiate-positive urine tests (morphine or quinine) have ranged from 10% or less (Harford and Kleber, 1978; Senay et al. 1977) to higher rates of 27-38% of tests (Baldridge et al. 1974; Goldstein et al. 1977; Tyler and Hargreaves 1975). In another way of looking at incidence of drug use, 20-40% of patients are commonly reported as showing at least an occasional opiate-positive urine test over a period of several months (Goldstein 1972; Bigelow et al. 1976; Renault 1973) but even higher rates have been reported. Three investigators (Goldstein et al. 1977; Ling et al. 1978; Woody et al. 1975a) for example, report that 50-70% of methadone maintenance clients had at least one opiate-positive urine test, while 3% (Ling et al. 1978) and 5% (Goldstein et al. 1977)

had more than 10% of tests opiate positive. Similarly, persistent benzodiazepine use has been reported to occur in 30-40% of methadone maintenance clients (Bigelow et al. 1976; Woody et al. 1975a,b). supplemental drug use, then, is a Widespread problem among methadone maintenance clients, and one which deserves vigorous treatment intervention, since it represents a continuation of abusive drug ingestion patterns by addict patients even after their enrollment in treatment.

The present studies have shown that abstinence incentives can have at least. a temporary therapeutic impact in reducing supplemental drug use. Although the reliability and permanence of these effects needs to be assessed in future studies, these results suggest that it is appropriate and Worthwhile to pursue abstinence incentive strategies. Furthe more, the studies suggest that methods for reducing supplemental drug use can be implemented and evaluated as part of behavioral treatment programs at existing treatment clinics an adjunct to or substitute for current methods of dealing with this residual problem among methadone maintenance clients. Methadone clinics frequently attempt to influence supplemental drug use in one of two ways: The first method is to offer program privileges such as take-hare medication to clients Who are generally well-behaved and free of supplemental drug use and to revoke these privileges When drug use occurs (Baldridge et al. 1974). Unfortunately, this policy is often unsystematic in practice. Take-homes may be based more on "seniority" in the program than on actual behavior, and once privileges are granted, programs find it very difficult to take then away again. The second common policy for dealing With supplemental drug use is that clients Who are grievous offenders are frequently threatened With expulsion from the program if they do not reduce their drug use. While this policy may result in a lowered incidence of supplemental drug use among the remaining clinic enrollees, there is no information as to Whether threats or actual expulsion have any beneficial effect on individual drug-using clients exposed to the contingencies. The treatment approach suggested by the present studies involves offering incentives or reinforcement at the treatment clinic contingent upon improved therapeutic outcomes such as reduced supplemental drug use rather than delivering sanctions and punishments contingent upon continued drug use. To the extent that abstinence incentives are effective, this approach provides a rational treatment intervention Which Will permit patients to experience positive reinforcing interventions With the treatment program contingent upon successful behavior rather than negative, punishing interactions contingent upon misbehavior.

Methodological Issues

As described in the introduction, significant advances have been made in identifying treatment clinic privileges Which are available for use in contingency management therapy With addicts and in evaluating the efficacy of these privileges in controlled treatment research When used as reinforcers in contingent arrangements. The present studies represent another methodological advance in that the impact has been evaluated of contingent clinic privileges on drug use Which occurs outside the clinic in the natural environment. Thus, evaluation of contingent reinforcenent for drug abstinence is occurring in a realistic treatment setting, and findings have direct applicability to drug abuse treatment. When drug supplementation occurs outside the treatment

clinic, it is never directly observed by the clinic staff, and measures of drug use must necessarily be indirect. Urinalysis testing provides the most convenient and technically feasible method for assessment. However, urine testing has limitations as a measure of drug use. Data obtained on any urinalysis test system will be influenced by many factors, including the recency and quantity of drug ingested, as well as the method (Goldstein et al. 1977) and schedule (Harford and Kleber 1978) of urine testing, and my not always reflect drug ingestion accurately. Yet success of abstinence incentive programs depends importantly on the accuracy with which urinalysis tests reflect actual drug use as we11 as on the delay between urine testing and reinforcer delivery. The on-site EMIT testing system avoids the typical delays of one week or more in receipt of test results when urine testing is conducted by an outside laboratory, and is therefore essential for operation of a responsive contingency management program. Unfortunately, we cannot directly assess the validity of urinalysis test results obtained on EMIT when drug use occurs outside the experimental setting. Data collected during the present studies on the EMIT urinalysis system for both morphine and benzodiazepine tests were, however, compared with data obtained from thin layer chromatography analysis at an outside independent laboratory. This data comparison can be viewed as a check on the reliability and validity of urinalysis test results in the sense that agreement across tests verifies the presence or absence of opiates in the body. Gut of 178 morphine tests available for comparison, there agreement between the two urinalysis testing systems on 89.3% of tests. EMIT showed positives when chromatography testing was negative on 6.7% of tests, while EMIT was negative and chromatography positive on 3.9% of tests. These results contrast somewhat with those reported by Goldstein et al. (1977) who found EMIT to detect about twice as many opiate positives as did chromatography analysis. Similarly, as shown in Figure 4, urinalysis results obtained for benzodiazepines were compared for EMIT and chromatography testing methods. Out of 108 tests available for comparison, the two system agreed on 88.9% of cases. All disagreements were cases where chromatography was positive and EMIT negative. In general, then, the EMIT on-site urinalysis test system provided reliable, verifiable data on the presence of both opiates and benzodiazepines in the body following their use by addict clients as well as a responsive system which allowed for delivery of abstinence incentives without undue delay. These characteristics of the on-site urine testing system make evaluation of abstinence incentive programs feasible and their inplementation in treatment clinics practical.

A second methodological issue concerns the stability of drug use over time in individual addicts. Relatively stable baselines of drug use are desirable for demonstrating treatment effects within individual addict clients. It became apparent while conducting the present studies, however, that supplemental drug use may fluctuate widely over time within individuals and my be influenced by many factors other than abstinence incentives offered at the clinic. These other factors my include availability of drugs; current stability of the addict's life, and occasional traumatic events such as drug overdose. This fluctuating baseline of drug use can make demonstration of treatment effects equivocal. The influence of contingent reinforcement on drug use was nevertheless clearly apparent in the present studies, while ultimately, effects of abstinence incentives can be assessed by the

replicability of effects within subjects and consistency of effects across subjects.

Conceptual Issues

The use of abstinence incentive or reinforcement techniques has several important implications for our conceptualizations of the nature and dynamics of drug abuse and of the appropriate goals and methods of drug abuse treatment. As mentioned at the beginning of this paper there are two general orientations toward behavioral treatment of drug abuse. One involves a focus upon drug-seeking and drug self-administration behaviors and seeks to modify those behaviors directly. The second approach involves a focus upon collateral behavioral problems such as unemployment and poor social skills, and seeks to modify these behaviors on the assumption that alteration of these collateral behaviors will lead indirectly to alterations in drug--use behaviors. Successful application of abstinence incentives would suggest first that it may be profitable to focus treatment interventions directly on drug and other substance use rather than -treating addiction indirectly through psychotherapy and skills training. It is generally believed that there is an important interrelationship between drug use and the quality or variety of an individual's behavioral repertoire. This view can be stated as follows: If an individual receives adequate reinforcement from other areas of life, he/she will not engage in excessive substance use. This implies that if an addict is taught ways to gain alternative reinforcers, drug use will decline in the absence of specific contingencies for drug abstinence. Thus, for example, if addicts and substance abusers can be taught to solve their personal and emotional problems more effectively, improve their interpersonal relations, relieve their anxiety and boredom, or enhance their status in society by obtaining better jobs, this will in turn result in reduced drug and substance use. Indeed, it, is often suggested that collateral life adjustment problems must be alleviated before substance abuse can abate. This viewpoint presently lacks empirical support. Some, but not all, substance abusers have deficits in personal, social,or work skills which are concurrent with their substance abuse problem. Chronic alcoholism, for example, has long been associated with deteriorated work performance and family relations (Armor et al. 1976; Gerard and Saenger 1966; O'Leary et al. 1976) while deficits in social and personal adjustment, criminal lifestyles, and psychopathology are particularlv .notable among drug abusers (Gearing 1974; Martin et al. 1978). However, the fact that alcoholisn and especially cigarette smoking are common among otherwise ostensiblv normal individuals who display high levels of behavioral skills and high rates of alternative behavior argue against the notion that skills deficits or lack of alternative behaviors are significant determinants of substance abuse.

To the extent that abstinence incentive or reinforcement procedures, as illustrated in this paper, prove to be therapeutically effective for the long term, this will suggest that the determinants of drug abuse lie in the environmental contingencies on drug use itself and not in the patient's repertoire of collateral behavior. This would argue that the more efficient treatment intervention strategy will be to focus directly upon drug-seeking and drug self-administration behaviors.

Successful application of abstinence incentives suggests that drug use

can be influenced without teaching any special skills for achieving abstinence. It is generally believed that an important aspect of drug abuse treatment involves teaching addicts and substance abusers skills necessary for achieving abstinence. Therapy programs have been developed to teach methods and techniques for achieving abstinence from excessive substance use. Alcoholics, for example, have been given assertiveness training to teach then how to refuse drinks when these are offered (Foy et al. 1976) or have been taught new methods of ingesting drinks in order to control their total intake of alcohol (Sobell and Sobell 1973). It is not clear, however. whether people need to be taught any special skills in order to successfully give up excessive use of drugs, alcohol, or cigarettes; nor is there any reason to believe that, once learned, these skills would necessarily be applied by the addict to decline available drugs. It would seem plausible that declining available drugs involves behavior which is generally already within the abilities of most people. Indeed, most cigarette smokers who quit successfully do so on their own, with no professional help (U.S. Public Health Service 1977), while to the extent that abstinence incentives alone have been efficacious in reducing supplemental drug use in the present studies, these also suggest that even "hard core" drug addicts have the skills to give up their drug use successfully. Nevertheless, it is generally believed that skills training is a necessary, if perhaps not sufficient, step in attaining abstinence. Successful application of abstinence incentives suggests that this is not the case. Whether the teaching of abstinence skills could improve abstinence rates over those achieved with incentives alone is a different question, and one which will deserve future study.

If abstinence incentives can promote reduced drug and substance use in the absence of skills training, this suggests that the main problem in drug and substance abuse treatment may be one of motivating performance rather than teaching new skills, and suggests further that enviromental reinforcement contingencies may be the primary determinants of motivation. There are many benefits that addicts, for example, derive from involvement with supplemental drug use which militate against reduction in drug use patterns. These benefits may be financial, from the sale of drugs; socia1, from use which occurs in the company of friends; and pharmacological, from the subjective effects of the drug. The decision to change drug use must certainly involve consideration of the comse quences of drug use vs. drug abstinence. Thus, for example, the fact that exhortations from counselors and others are notoriously ineffective in producing behavioral change may reflect not only the relatively weak incentive value of avoiding these sorts of messages, and gaining praise from the counselor, but may also reflect the positively reinforcing aspects of receiving attention for continued drug use. The Present studies suggest that behavior change can be accommplished by altering meaningful consequences of drug use including financial consequences. This in turn suggests that it may be profitable to consider drug abuse less as a skills deficit and more as a motivational problem.

Practical Implementation

If abstinence incentives ultimately prove to be efficacious, their usefulness would then depend largely on whether they can be practically implemented in treatment clinics. Two caveats should be men-

tioned in this regard. First, the present studies suggest that efficacy of incentives may depend upon the value of incentives offered. Thus, efficacy Was generally enhanced When value of incentives was increased, especially in the opiate incentive studies. Practicality of abstinence incentive procedures would be quite limited if these Were only useful under conditions of excessive or continually escalating incentive values. Secondly, the practical implementation of reinforcement techniques to motivate behavior change and to promote drug abstinence may be limited by possible conflicts with community standards and mores. The idea that a treatment program might provide positive reinforcement (i.e., pay or special privileges) to individuals as a consequence of desirable behavior is often considered distasteful. There seem to be two bases for this feeling. On the one hand there is sometimes a feeling that contingent reinforcement procedures are unduly coercive - an apparent recognition of their efficacy. On the other hand there is sometimes a feeling that individuals being treated for problems of undesirable behavior do not deserve any special privileges or rewards; unfortunately; popular sentiment often favors punishment procedures in such cases. In the long run the resolution of these concerns will depend upon contingency management's establishing a solid history of appropriate and effective application in the treatment of substance abuse. Methadone maintenance clinics may provide an ideal context Within Which to establish such a history. A major, explicit, and consensual goal of these treatment programs is the reduction of illicit drug use. The use of contingent reinforcement procedures Within methadone maintenance clinics may provide a method of enhancing their effectiveness by utilizing privileges Which are already dispensed by the clinics in a more rational way, to promote improved therapeutic outcomes among drug addict patients.

REFERENCES

Armor, D.J .; Polich, J.M.; and Stambul, H.B. Alcoholism and Treatment. Santa Monica, Calif: The Rand Corporation, 1976. 216 pp.-

Baldridge, P.; McCormack, M.; Thompson, L.; Zarrow, A.; and Prinm, B.J. Providing incentives to successful methadone patients. Experimental program. N Y State J Med, 74(l): 111-114, 1974.

Bernstein, D.A., and McAlister, A. The modification of smoking behavior: Progress and problems. Addict Behav, 1: 89-102, 1976.

Bigelow, G.; Griffiths, R.R.: and Liebson, I. Experimental models for the modification of human drug self-administration: Methodological developments in the study of ethanol self-administration by alcoholics. Fed Proc, 34: 1785-1792, 1975.

Bigelow, G.; Lawrence, C.; Stitzer, M.; and Wells, D. Behavioral treatments during outpatient methadone maintenance: A controlled evaluation. Paper presented before the American Psychological Association, Washington, D.C., September, 1976.

Bigelow, G.; Stitzer, M.; Lawrence, L.; Krasnegor, N.; D'Lugoff, B.; and Hawthorne, J. Narcotics addiction treatment: Behavioral methods concurrent With methadone maintenance. Int J Addict, in press, 1978.

Birnbrauer, J.S. Mental retardation. In: Leitenberg, H., ed. Handbook of Behavior modification and Behavior Therapy. New Jersey: Prentice-Hall, 1976. pp. 361-404.

Boudin, H.M. Contingency contracting as a therapeutic tool in the deceleration of amphetamine use. Behav Ther, 3: 604-608, 1972.

Boudin, H.M.; Regan, E.J.; and Ruiz, M.R. Contingency contracting with drug abusers in the natural environment: Treatment evaluation. Paper presented before the American Psychological Association, San Francisco, August, 1977.

Brill, L., and Chambers, C.D. The rationale and design for a multi-modality approach to methadone therapy. In: Chambers, C.D.;and Brill, L., eds. Methadone: Experiences and Issues. New York: Behavioral Publications, 1973. pp. 289-315.

Burchard, J.D., and Harig, P.T. Behavior modification and juvenile delinquency. In: Leitenberg, H., ed. Handbook of Behavior Modification and Behavior Therapy. New Jersey: Prentice-Hall, 1976. pp. 405-452.

Cohen, M.; Liebson, I.; Faillace, L.A.; and Speers, W. Alcoholisn: Controlled drinking and incentives for abstinence. Psychol Rep, 28: 575-580, 1971a.

Cohen, M.; Liebson, I.A.; Faillace, L.A.: and Allen, R.P. Moderate drinking by chronic alcoholics. J Nerv Ment Dis, 153: 434-444, 1971b.

Dole, V.P., and Nyswander, M.E. Methadone maintenance treatment. A ten year Perspective. J Amer Med Assoc 235: 2117-2119, 1976.

Elliot, R., and Tighe, T. Breaking the cigarette habit: Effects of, a technique involving threatened loss of money. Psycho1 Rec, 18: 503-513, 1968.

Eriksson, J.H.; Gotestam, K.G.; Melin, L.; and Ost, L.G. A token economy treatment of drug addiction. Behav Res Ther, 13: 113-125, 1975.

Foxx, R.M., and Azrin, N.H. Toilet Training in Less Than a Day. New York: Simon and Schuster 1974

Foy, D.W.; Miller, P.M.; Eisler, R.M.; and O'Toole, D.H. Social skills training to teach alcoholics to refuse drinks effectively. J Stud Alc, 37: 1340-1345, 1976.

Gearing, F.R. Methadone maintenance treatment five years later - where are they now? Amer J Pub Health suppl, 64: 44-50, 1974.

Gerard, D.L., and Saenger, G. Cut-Patient Treatment of Alcoholism. A Study of Outcome and its Determinants Toronto: University of Toronto Press,.1966. 249 pp.

Glicksman, M.; Ottamanelli, G.; and Cutler, R. The earn-your-Way credit system: Use of a token economy in narcotic rehabilitation. Int J Addict 6: 525-531, 1971.

Goldstein, A. Blind comparison of once-daily and twice-daily dosage schedules in a methadone program. Clin Pharm Therap, 13: 59-63, 1972.

Goldstein, A. Heroin addiction. Sequential treatment employing pharmacologic supports. Arch Gen Psychiat, 33: 353-358, 1976.

Goldstein, A.; Horns, W.H.; and Hansteen, R.W. Is on-site urine testing of therapeutic value in a methadone maintenance treatment program? Int J Addict, 12: 717-728, 1977.

Gotestam, K.G.; Melin, L.; and Ost, L.C. Behavioral techniques in the treatment of drug abuse: An evaluative review. Addict Behav, 1: 205-225, 1975.

Griffiths, R.R.; Bigelow, G.E.; and Liebson, I. Relationship of social factors to ethanol self-adninistration in alcoholics. In: Nathan, P.E.; Marlatt, G.A.; and Loberg, T., eds. Alcoholisn: New Directions in Behavioral Research and Treatment. New York: Plenum Press, 1978. pp. 351-379.

Hall, S.M.; Cooper, J.L.; Burmaster, S.; and Polk, A. Contingency contracting as a therapeutic tool With methadone maintenance clients: Six single subject studies. Behav Res Ther 15: 438-441, 1977.

Harford, R.J., and Kleber, H.D. Comparative validity of random-interval and fixed-interval urinalysis schedules. Arch Gen Psychiat, 35: 356-362, 1978.

Hunt, G., and Azrin, N. A community reinforcement approach to alcoholisn. Behav Res Ther 11: 91-104, 1973.

Liebson, I.; Bigelow, G.; and Flamer, R. Alcoholism among methadone patients: A specific treatment method. Amer J Psychiat, 130: 483-485, 1973.

Liebson, I.A.; Tommasello, A.; and Bigelow, G.E. A behavioral treatment of alcoholic methadone patients. Ann Internal Med, 89: 342-344, 1978.

Ling, W.; Klett, J.; and Gillis, R.D. A cooperative clinical study of methadyl acetate. Arch Gen Psychiat, 35: 345-353, 1978.

Martin, W.R.; Haertzen, C.A.: and Hewett, B.B. Psychopathology and pathophysiology of narcotic addicts, alcoholics, and drug abusers. In: Lipton, M.A.; DiMascio, A.; and Killam, R.F., eds. Psychopharmacology: A Generation of Progress. New York: Raven Press, 1978. pp. 1591-1602.

Melin, L.; Andersson, B.E.; and Gotestam, K.G. Contingency management in a methadone maintenance treatment program. Addict Behav, 1: 151-158, 1975.

Miller, P.M. A behavioral intervention program for chronic public drunkenness offenders. Arch Gen Psychiat, 32: 915-918, 1975.

Miller, P.M. Behavioral Treatment of Alcoholism. New York: Pergamon Press, 1976. 188 pp.

Miller, P.M.; Hersen, M.; Eisler, R.M.; and Watts, J.G. Contingent reinforcement of lowered blood/alcohol levels in an outpatient chronic alcoholic. Behav Res Ther 12: 261-263, 1974.

Nathan, P.E. Alcoholism. In: Leitenberg, H., ed. Handbook of Behavior Modification and Behavior Therapy. New Jersey: Prentice Hall, 1976. pp. 3-44.

O'Brien, J.S.; Raynes, A.E.; and Patch, V.D. An operant reinforcement system to improve ward behavior in inpatient drug addicts. J Behav Ther Exp Psychiat, 2: 239-242, 1971.

O'Leary, D.E.: O'Leary, M.R.; and Donovan, D.M. Social skill acquisition and psychosocial development of alcoholics: A review. Addict Behav 1: 111-120, 1976.

O'Leary, S.G., and O'Leary, K.D. Behavior modification in the school. In: Leitenberg, H., ed. Handbook of Behavior Modification and Behavior Therapy. New Jersey: Prentice-Hall, 1976. pp. 475-515.

Patterson, G.R.; Weiss, R.L.; and Hops, H. Training of marital skills: Same problems and concepts. In: Leitenberg, H., ed. Handbook of Behavior Modification and Behavior Therapy. New Jersey: Prentice-Hall, 1976. pp. 242-254.

Paul, G.L., and Lentz, R.J. Psychosocial Treatment of Chronic Mental Patients. Milieu versus Social-Learning Programs. Cambridge, Massachusetts: Harvard University Press, 1977. 528 PP.

Pomerleau, O.F., and Pomarleau, C.S. Break the Smoking Habit A Behavioral Program for Giving up Cigarettes. Champaign, Illinois: Research Press, 1977. 108 pp.

Renault, P.F. Methadone maintenance: The effect of knowledge of dosage. Int J Addict 8: 41-47, 1973.

Senay, E.C.; Dorus, W.; Goldberg, F.: and Thornton, W. Withdrawal from methadone maintenance. Rate of withdrawal and expectation. Arch Gen Psychiat, 34: 361-367, 1977.

Sobell, M.B., and Sobell, L.C. Individualized behavior therapy for alcoholics Behav Ther, 4: 49-72, 1973.

Stahl, J.R., and Leitenberg, H. Behavioral treatment of the chronic mental hospital patient. In: Leitenberg, H., ed. Handbook of Behavior Modification and Behavior Therapy. New Jersey: Prentice-Hall, 1976. pp. 211-241.

Stitzer, M.; Bigelow, G.; Lawrence, C.; Cohen, J.; D'Lugoff, B.; and Hawthorne, J. Medication take-homes as a reinforcer in a methadone maintenance program. Addict Behav, 2: 9-14, 1977.

Stitzer, M., and Bigelow, G. Contingency management in a methadone maintenance program: Availability of reinforcers. Int J Addict, 13: 737-746, 1978a.

Stitzer, M., and Bigelow, G.E. Drug abuse research in outpatient clinics. In: Krasnegor, N., ed. Self-Administration of Abused Substances: Methods for Study. NIDA Research Monograph No. 20. DHEW Publication~(ADM) 78-727, 1978b pp. 59-67.

Stuart, R.B., and Davis, B. Slim Chance in a Fat World. Behavioral Control of Obesity. Champaign Illinois: Research Press, 1972. 240pp.

Stunkard, A.J., and Mahoney, M.J. Behavioral treatment of the eating disorders. In: Leitenberg, H., ed. Handbook of Behavior Modification and Behavior Therapy. New Jersey prentice-Hall, 1976. pp. 45-73.

Thompson, T., and Grabowski, J. Behavior Modification of the Mentally Retarded. New York: Oxford Press, 1977. 570 pp.

Tyler, J.C., and Hargreaves, W.H. Treatment sanctions and response to methadone treatment. Paper presented before American Psychological Association, September, 1975.

U.S. Public Health Service. The smoking Digest: Progress Report on a Nation Kicking the Habit. Bethesda, Maryland: National Institutes of Health, National Cancer Institute, Office of Cancer Cummunications, 1977. 127 pp.

Whaler, R.G. Deviant child behavior Within the family: Developmental speculations and behavior change strategies. In: Leitenberg, H., ed., Handbook of Behavior Modification and Behavior Therapy. New Jersey: Prentice-Hall, 1976. pp. 516-546.

Winett, R.A. Parameters of deposit contracts in the modification of smoking. Psycho1 Rec, 23: 49-60, 1973.

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Woody, G.E.; Mintz, J.; O'Hare, K.; O'Brien, C.P.; Greenstein, R.A.; and Hargrove, E. Diazepam use by patients in a methadone program - how serious a problem? J Psychedelic Drugs, 7: 373-379, 1975a.

Woody, G.E.; O'Brien, C.P.; and Greenstein, R. Misuse and abuse of diazepam: An increasingly common medical problem. Int J Addict, 10: 843-848, 1975b.

Yen, S. Availability of activity reinforcers in a drug abuse clinic: A preliminary report. Psycho1 Rep, 34: 1021-1022, 1974.

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Part II Tobacco Smoking

Chapter 7

An Overview of Smoking Behavior and its Modification

Terry F. Pechacek, Ph.D.

The use and abuse of tobaccopresents aparticularly challenging problem. The history of tobacco use documents the tenacity of the behavior once it is introduced into a culture. Moreover, this tenacity plus the widespread abuse of the substance through cigarette smoking make that behavior what Michael Russell called "probably the most addictive and dependence-producing form of object-specific self-administered gratification known to man" (Russell 1974).

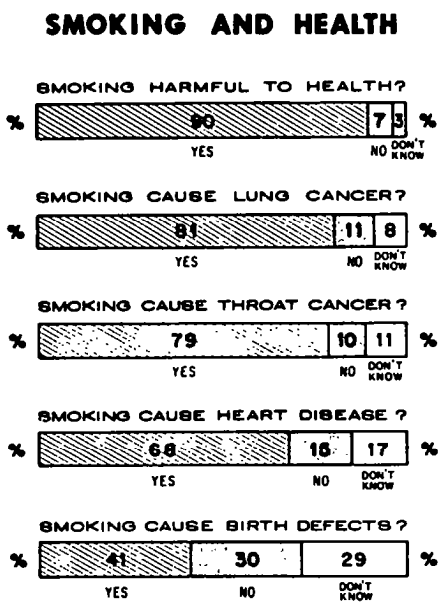
Unfortunately, research has yet to adequately define the controlling mechanisms of this common but complex behavior, For many smokers, the psychosocial and behavioral reinforcements outweigh the pharmacological; yet, for others, who are unable to successfully quit unaided, the complex interplay of social, behavioral, and pharmacological controlling factors may more closely resemble the traditionally defined dependencies of alcohol and illicit drugs (Hunt and Matarazzo 1973). Therefore, an overview of data relevant to the modification of cigarette smoking will be provided from the broader interpersonal or social level down to the finer intrapersonal factors.

TRENDS IN SMOKING BEHAVIOR

Since the health consequences of cigarette smoking have become more specifically defined (USDREW 1964), interest in the social, behavioral, and pharmacological aspects of the problem has been rapidly growing. Unfortunately the social relevancy of the problem has focused most of the effort to modify the behavior toward either general, nonspecific appeals or clinical presentations of what logically seemed to be the best treatment rather than toward the careful and systematic research needed to solve this Complex problem (Pechacek 1979). At the same time, massive changes have been occurring in this country's general social climate toward smoking (NCSH 1976; Gallup 1976). What formerly was accepted as an even appealing minor vice is now being defined as a

substance of abuse which appears to be this country's largest preventable cause of premature death, illness, and disability (USDHEW 1979). As figure 1 indicates, the US public has become very aware of the health consequences of cigarette smoking.

FIGURE 1



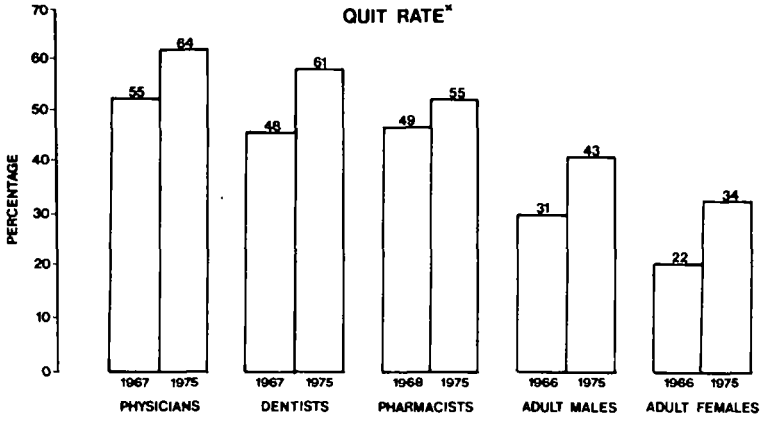
FROM: GALLUP OPINION INDEX, JUNE 1978

Most of the positive effects of this increased knowledge have occurred as a part of the vast public health campaign against smoking. The escalating smoking consumption pattern of the 1940's and 1950's has been blunted (Warner 1977), filtered cigarettes are now the norm (Harris 1979), and the average "tar" and nicotine content of cigarettes smoked has been substantially reduced (Harris 1979). Additionally, recent surveys of U.S. adults have documented a pattern of steady decline in the proportion of smokers at almost all age levels (NCSH 1969, 1973, 1976). Among males, for whom the health risks have been more publicized, and health professionals the decline has been most dramatic *(See* figure 2 and table 1). Finally, faced with the almost uniform awareness of the general health risks and rising concerns of families and friends, almost all current adult smokers report that

they have either tried or want to try to quit smoking completely (NCSHI 1976; Gallup 1978).

FIGURE 2

THE MAJORITY OF PHYSICIANS, DENTISTS AND PHARMACISTS WHO EVER SMOKED CIGARETTES HAVE QUIT



*PERCENT OF THOSE WHO HAVE EVER SMOKED CIGARETTES REGULARLY WHO NO LONGER SMOKE

TABLE 1

CUMULATIVE QUIT RATES BY AGE AND SEX (1964,1966, 1970, and 1975)[a]

	Males				Females			
Ages	1964	1966	1970	1975	1964	1966	1970	1975
21-25	12%[b]	10%	29%	28%	15%	14%	29%	23%
25-34	23%	2.5%	37%	34%	19%	21%	32%	32%
3544	28%	27%	39%	35%	19%	21%	29%	33%
45-54	32%	33%	44%	47%	16%	19%	30%	32%
55-64	33%	39%	53%	54%	25%	34%	40%	37%
65+	47%	51%	66%	60%	30%	41%	44%	51%
TOTAL	30%	31%	44%	43%	19%	22%	33%	33%

[a]Source : NCSH, 1969, 1973, 1976.

[b]Quit rates are computed by dividing the number of former smokers by the number of ever smokers in each cohort (see original references for definitions of categories).

Even though an estimated 30 million smokers have quit since 1964 (NC1 1977), the situation is not as positive it nay first appear. When this pattern of largely, unaided smoking cessation is considered in closer detail, the following points surface:

(1) most smokers are unsuccessful in their initial attempt to quit smoking (Pechacek and Danaher 1979);

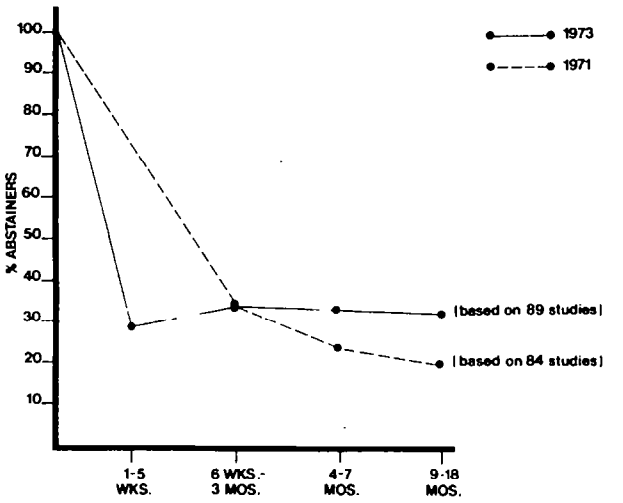
(2) while high proportions of smokers, especially middle-aged males, eventually do quit, many do not until the negative consequences, especially the physiological effects, become very immediate and inescapable (for example, symptoms of chronic heart or lung diseases or the more traumatic myocardial infarction) (Pechacek and Danaher 1979); and

(3) if a smoker is unable to quit unaided and seeks formal treatment, the probabilities of long term success in attaining abstinence remain very discouraging (Pechacek 1979).

In fact the rather discouraging picture presented by Hunt and Bespalec (1974) in their survey of 89 smoking treatment studies (see figure 3) continues to be a generally accurate representation of smoking treatment results.

FIGURE 3

RELAPSE RATE AFTER TREATMENT FOR SMOKING



From: Hunt, W.A., and Bespalec, D.A. An evaluation of current methods of modifying smoking behavior. Journal of Clinical Psychology, 30:430-438, 1974. © 1974, Clinical psychology Publishing Co. Reprinted with permission.

ANALYSIS OF THE PROBLEM

Attempts to define this tenacity of the behavior have highlighted the fact that smoking behavior is a classic example of a self-regulatory response seeking immediate rewards despite long term aversive consequences (Bandura 1969, 1977). When these contingencies are considered at a cognitive level by the smoker, a cost/benefit judgement seems to favor the immediate, but still poorly defined, gratifications of continued smoking rather than the future negative contingencies, such as severe illness, which have unknown probabilities for the individual (Horn 1976; Pechacek & Danaher 1979). Survey data (NCSH l966, 1973, 1976) reveal that broad social contingencies and models that encourage smoking initiation remain active into adulthood and produce differential smoking patterns for socioeconomic classes, genders, and working groups (Pechacek & Danaher 1979).

Additionally, the social acceptability of the behavior has allowed it to be learned in an almost total range of eliciting cues (Hunt & Matarazzo 1970, 1973; Logan 1970, 1973). Moreover, few human behaviors are performed as often as the habitual smoker inhales on the cigarette (Hunt & Matarazzo 1970, 1973; Iogan 1970, 1973). Thus, the contingencies and schedules under which almost all adult smoking has been learned would suggest a behavioral repertoire that would he highly resistive to extinction (Hunt & Matarazzo 1970, 1973). Given the additional but only partially understood neurological and physiological mechanisms by which nicotine and/or other chemicals in tobacco smoke may provide primary reinforcement (Jarvik 1977), the dependence-producing power of the behavior is understandable (Russell l974, 1976). However, for the individual smoker, other less clear patterns of secondary reinforcement and extended behavioral chains make the identification of the most important controlling factors very difficult (Pomerleau 1979a, 1979b).

The most integrative descriptions of these social, behavioral, and pharmacological controlling factors have been offered by behavioral and social learning theory formulations (Panerleau 1979a, 1979b; Pechacek & Danaher 1979; Lichtenstein & Danaher 1976). However, the theoretical analyses of smoking behavior have yet to produce the basic or applied research needed to test derived hypotheses, and these models have failed in general to lead to increasingly more effective or refined interventions (Lichtenstein & Danaher 1976; Lichtenstein 1977; Pechacek 1979). It would appear that the complexity of the behavior requires greater effort in analysis and definition of the problem before consistently successful interventions can be derived (Epstein & McCoy 1975; Lichtenstein 1977; Pechacek 1979; Panerleau 1979a).

STRATEGIES TO MODIFY SMOKING BEHAVIOR

This lack of theoretical direction has been compounded by the lack of sufficiently rigorous evaluation of most smoking control inter-

ventions (Bernstein 1969; Pechacek 1979; Schwartz 1969). A wide variety of general, nonspecific efforts have been made to help people quit smoking. These have included: public health educational campaigns, public service clinics, proprietary prograns, medical counseling, and large-scale coronary prevention studies (Pechacek 1979). While a remarkable amount of well meaning effort has teen devoted to these activities, little outcome data has been made available for critical appraisal.

General, Nonspecific Efforts

The effects of the public health educational campaigns are especially hard to evaluate. The landmark 1964 Surgeon General's Report on Smoking and Health (USDHEW 1964) and the subsequent outflow of information into all media channels have been estimated to have reduced consumption by 20 to 30 percent below the predicted 1975 level (Warner 1977), but the specific effects on individual reduction and cessation attempts remain almost completely unevaluated.

Likewise, the focus of public service clinics has inhibited evaluation. The group treatment programs of the American Cancer Society and the Five-Day Plan probably have helped more smokers than any other organized effort in this country but only limited outcome data are available for consideration (McAlister 1975; Schwartz & Rider 1977). Data a the efficacy of the Five-Day Plan are very mixed. Reports from uncontrolled evaluations have often been encouraging; however, controlled studies suggest the more commonly noted 20 to 30 percent long term abstinence at 9 to 12 month followups (Pechacek 1979).

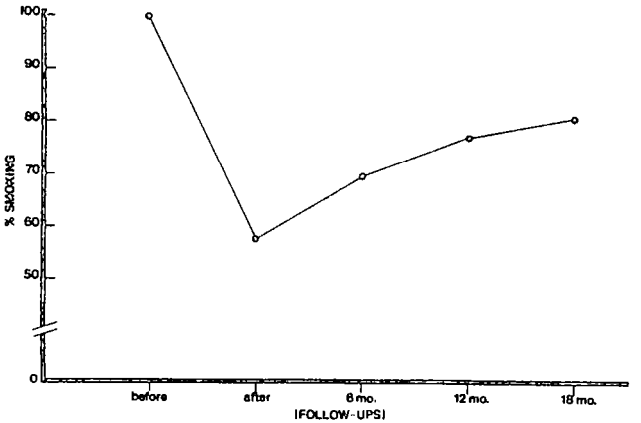
Similarly, when ACS group program was evaluated in the Los Angeles area in 1973, long term abstinence rates were not impressive (Pyszka, Ruggels, Janowicz 1973). As figure 4 highlights, only 41.7 percent of a random sample of participants reported having quit at posttreatment and only 18 percent were abstinent 18 months after treatment termination.

other smoking clinics, some being even more elaborate, have displayed similar results (Delarue 1973; Isacsson & Janzon 1976; Shewchuk et al. 1977: Schwartz & Dubitzkv 1968). Although this mechanism of service delivery may be important, effective treatment variables still need to be defined (Bernstein 1969). The lack of objective evaluation is especially unfortunate since millions of motivated smokers have passed through these programs with little or no history of the outcome.

In light of these data on public service and research withdrawal groups and clinics, the claim of more impressive results by proprietary programs must be viewed with caution (McAlister 1975; Schwartz & Rider 1977). The changing public attitudes regarding smoking have led to a rapid growth in such commercial efforts but again almost all have & en unevaluated. One evaluation of the SmokEnders program reported that 70 percent of the participants of a group of clinics quit by treatment termination and that 39

FIGURE 4

EFFECTIVENESS OF THE AMERICAN CANCER SOCIETY GROUP PROGRAM
based on 29 clinics held In the Los Angeles area



(Adapted from data of Pyszka, Ruggels, and Janowicz, 1973)

percent of a cohort (57 percent of the males and 30 percent of the females) followed up 3½-4 years later were still reporting abstinence (Kanzler, Jaffe & Zeidenberg 1976); however, when Schwartz and Rider (1977) considered treatment dropouts and subjects lost to followup, the abstinence rate dropped to 27 percent. In general, the proprietary programs have yet to demonstrate that their interventions provide more than a general placebo effect enhanced by significant financial outlays.

Medical counseling is an area of smoking intervention with great potential but little data (Lichtenstein & Danaher 1978; Rose 1977). Physicians are viewed as important in the smoking cessation decision by almost all smokers (NSCH 1976). Nevertheless, only 25 percent of the current smokers in 1975 reported being advised by their physician to quit smoking (NSCH 1976). Symptoms of health effects of cigarettes can produce behavior change. Numerous studies of ex-smokers have shown that finally linking the increase of symptoms such as coughing or breathlessness to smoking was a reportedly major precipitant for unaided quitting (Pechacek & Danaher 1979). However, it appears that most physicians are discouraged from taking the role of smoking counselor and are only effective when dramatic symptoms such as severe lung or heart disease are present (Rose 1977). In such cases, even minimal physician counseling can produce 30 to 40 percent cessation with almost no long term relapse (Croog & Richards 1977; Weinblatt, Shapiro, & Frank 1971). When more systematic counseling and followup is provided, over 50 percent long term abstinence has been found among post-myocardial infarction patients (Burt et al. 1974).

Since middle-aged male smokers judged at high risk for but not yet exhibiting coronary heart disease (CHD) offer great potential for prevention of premature death, several studies have focused on this population. Studies have . documented that substantial changes can be produced when coronary risk-factor screening is followed by sane systematic counseling which clearly links smoking to increased risks of a premature heart attack (Pechacek 1979). The Multiple Risk Factor Intervention Trial (MRFIT) is me of the largest and most ambitious of the multicomponent efforts to influence cigarette smoking, along with other CHD risk factors, among middle-aged men through face-to-face counseling (MRFIT Group 1976, 1977). Of 12,866 men, aged 35-57 at entry, who were selected as being above-average risk for CHD, 6,428 were randomly assigned to a six-year coronary prevention program which is attempting to reduce blood pressure and serum cholesterol levels as well as encourage smoking cessation. Primary intervention consisted of 8 to 10 multicomponent group or individual sessions focusing on dietary and smoking changes to reduce CHD risk and have been followed by monthly or bimonthly maintenance contacts. Results through the second year reveal that most of the successful cessation occurred during the initial months of the trial (Ockene 1979; Pechacek et al. 1979). Among the 3,727 Special Intervention smokers at entry, 1722 (46.2 percent) reported abstinence at the four-month visit and 1118 (64.9 percent.) were still reporting abstinence at the second annual exam (appromximately 20-22 months after the intensive intervention). However, among the 2005 smokers who had not quit by the four-month visit, only 263 (13.1 percent) were abstinent at the second annual visit. Overall, 44.1 percent of the smokers at intake were reporting to have quit by the second annual exam. Thus the data from MRFIT appears similar to the post-MI data noted above; namely, that once subjects are convinced concerning the smoking-heart disease link, dramtic changes are possible, while later changes are less frequent and' more subject to relapse.

Programs aimed at total communities also have produced encouraging data. The North Karelia Project within a region of eastern Finland has provided a comprehensive coronary prevention program since 1972 to reduce blood pressure and serum cholesterol levels and encourage smoking cessation (Tuamilehto et al. 1978; Puska et al. 1978). The promotion of male smokers 25 to 59 years old decreased from 54 percent to 44 percent during the initial year of intervention but changed only slightly in the reference counties in western Finland (Tuamilehto et al. 1978). Even more specific data are available from the Stanford Heart Disease Prevention program (McAlister et al. 1976; Farquhar et al. 1977). One community received an extensive, two year mass-media campaign focusing on general heart disease prevention while a second received the media campaign plus face-to-face behavioral counseling for two-thirds of the highest risk individuals. Three years after the start of the campaign. the proportion of smokers decreased by only 3 percent in a control community and 8 percent in the media-only community but by 24 percent in the media plus counseling community, and 50 percent of the counseled high-risk smokers reported quitting (McAlister et al. 1976):

When the risks of smoking are made more immediate and clear, and when both skills and support to change are provided, meaningful reductions in adult smoking can be obtained (Pechacek 8 Dinaher 1979). The multifactor coronary prevention trials seem to indicate that successful long term changes can be achieved with fairly minimal forms of direct smoking intervention; however, there is a lack of data regarding the types of individuals who respond best to these forms of intervention. In general, when smokers have been sufficiently educated regarding the immediate and clear relationship between their smoking and heart disease, they respond much like the post-M1 patient-they quit immediately and they tend to relapse less often than most other quitters.

Controlled Research on Modification Strategies

In addition to the diverse public service and medical counseling types of smoking interventions, there has been a wealth of research conducted on strategies for the modification of smoking behavior (Pechacek 1979). Early controlled research generally produced unimpressive and discouraging results (Bernstein 1969; Schwartz 1969). Schwartz and Dubitzky (1968) tested what appeared to be the best treatment strategies available in the late 1960's and found that not one of the seven experimental conditions was superior to the no-contact or minimal-contact controls by the end of a one-year followup. Moreover, the methodology of early _ research was generally quite inadequate (Bernstein 1969; Schwartz 1969). While the situation has been improving, major methodological inadequacies remain comnon (McFall 1978).

The most pervasive problem remains the validity of self-report data upon which almost all treatment evaluations are based (Pechacek 1979). Recent data suggest that after a treatment program, false reporting of abstinence may be as high as 20 to 30 percent (Delarue 1973; Ohlin, Lundh, and Westling 1977; Sillet et al. 1978). Therefore, uncorroborated self-reports may lead to an overestimation of success, especially in experimental conditions where subjects are under social pressure to report quitting. For this reason, physiological monitoring of smoking behavior should be used to both validate self-report and provide a low-cost and more objective dependent measure.

In addition to the problem of self-report data, the adequacy of designs and control groups remains a problem (Bernstein 1969). Attention placebo controls continue to be highly recommended since the no treatment. strategy reliably has been demonstrated as superior to general, nonspecific interventions (Pechacek 1979). Likewise, with the common problem of high relapse after treatment termination (see figure 3), complete and long term followups remain critical to the evaluation of any modification strategy (Schwartz 1969; Schwartz and Rider 1977). While the methodological quality of smoking research has been improving, many programs or studies have collected little or no objective followup data (Pechacek 1979). Nevertheless, more recent research has begun to highlight sane more encouraging trends in treatment strategies.

The literature on controlled research of strategies to modify smoking behavior has been extensively reviewed in the past (Bernstein 1969; Bernstein and McAlister 1976; Best and Bloch 1979; Hunt and Bespalec 1974; Lichtenstein and Eunaher 1976; McAlister 1975; Pechacek 1979; Schwartz 1969; Schwartz and Rider 1977); therefore, major trends rather than detailed studies will be discussed. This extensive research literature can be categorized into drug treatments, hypnosis, and social learning or behavior modification approaches.

As noted above, research has yet to defined the controlling mechanisms of smoking but, some research continues to suggest that there are pharmacological determinants of smoking. Nicotine is the most likely candidate; however, defining its role has been difficult (Jarvik 1977; Lader 1978). Moreover, identifying chemical agents either to substitute for smoking or to minimize withdrawal symptoms has been frustrating and difficult (Gritz and Jarvik 1977; Jarvik 1977). Early research on lobeline was equivocal but later, rigorous study found it clearly ineffective (Davidson and Rosen 1972). Nicotine chewing gum has shown some positive effects (Russell et al. 1976) but overall nicotine substitution studies have produced equivocal results (Lader 1978). Other chemical aids have been tested but current data suggest that the usefulness of pharmacological cessation aids has yet to be unequivocally demonstrated (Gritz and Jarvik 1977; Pechacek 1979).

Very optimistic claims have been made regarding the potential of hypnotherapy for smoking. Unfortunately these claim have not been substantiated in controlled research (Pechacek 1979). The early research was both chaotic and methodologically poor with almost all data appearing as clinical reports (Johnson and Donoghue 1971). Until the as yet unidentified unique component of hypnosis is identified as critical to cessation. the procedure can best be conceptualized as a combination of existing behavioral interventions, such as directed imagery, relaxation training, and contractual management (Danaher and Lichtenstein 1978; Pechacek and Danaher 1979). Similarly, Orne (1977) concluded that hypnosis can test be categorized as a placebo response which aids in nontraumatic cessation through both the mystique of the procedure and the hypnotic suggestion.

The most prolific research has been based upon experimental and social learning theories (Bernstein 1969; Bernstein and McAlister 1976; Best and Bloch 1979; Lichtenstein and Lanaher 1976; Pechacek 1979; Pechacek and McAlister 1979). While these studies continue to have many methodological flaws (McFall 1978; Pechacek 1979). the research based upon learning theories has generally been improving and encouraging (Bernstein and McAlister 1976; Best and Bloch 1979; Lichtenstein and Danaher 1976; Pechacek and McAlister 1979). Unfortunately many studies have adapted the generally successful techniques of behavior modification to smoking without sufficient analysis of the problem (Epstein and McCoy 1975; Lichtenstein 1977; Pechacek 1979). Moreover, many researchers have focused more on initial reductions rather than on long term

change (Pechacek 1979; pomerleau 1979c; Schwartz and Rider 1977). The literature is replete with studies demonstrating Temporary success but minimal long term results. Since the literature in this area is so large and has been comprehensively reviewed in the past (Bernstein 1969; Bernstein and McAlister 1976; Best and Bloch 1979; Danaher 1977; Danaher and Lichtenstein 1978; Hunt and Bespalec 1974; Lichtenstein and Danaher 1976; Pechacek, and McAlister 1979; Pechacek 1979; Schwartz 1969; Schwartz and Rider 1977), overview of major research trends will be presented.

The research in this area can be roughly dicotomized into two broad but not mutually exclusive classes: (a) behavioral self-control strategies utilizing high participant involvement and (b) aversion strategies designed to reduce the probability of the smoking response (Lichtenstein and Danaher 1976). However, many of the effective programs have tended to be multicomponent interventions which combined certain strategies from both categories (Pechacek 1979).

Self-Control Strategies. Stimulus control procedures, based on the assumption that smoking is prompted by environmental cues and that the variety and number of cues lead to difficulty in quitting, have attempted to produce a gradual elimination of smoking by narrowing the range of controlling cues. Interventions focusing on increasing stimulus intervals and hierarchical reductions and/or narrowing smoking situations have produced limited and inconsistent findings (Bernstein and McAlister 1976; Best and Bloch 1979; Lichtenstein and Danaher 1976; Pechacek 1979). Many programs have displayed initial suppression of smoking rates (although there seems to be a "floor effect" at about 10-12 cigarettes) followed by rapid relapse.

Therefore, the literature on self-control strategies generally has been discouraging. Some positive results have been demonstrated for contingency contracting, especially when it has been combined with other behavioral strategies (Danaher and Lichtenstein 1978; Pechacek 1979), but other specific techniques such as systematic desensitization or gradual stimulus fading have produced equivocal and unimpressive long term results (Pechacek 1979). Even when self-control strategies have been applied in more complex, multicomponent formats, the results have been only moderately encouraging and often replicate the common rates of 20 to 30 percent abstinence during followup (see figure 3) (Pechacek 1979; Pechacek and McAlister 1979).

Aversion Strategies. Treatment results for smoking modification programs based upon aversion techniques have also been inconsistent, with initially impressive results failing to be replicated. Nevertheless, aversion strategies have produced some of the most encouraging data of any behavioral approach (Danaher 1977; Danaher and Lichtenstein 1978; Lichtenstein and Danaher 1976). The most common aversive stimuli have been electric shock, covert images, and cigarette smoke itself. More recently, these aversion strategies have been included into multicomponent packages that include self-control techniques as well.

The data from controlled research on electric shock as a sole treatment have provided only minimal evidence for permanent effectiveness (Bernstein and McAlister 1976; Lichtenstein and Danaher 1976; Pechacek 1979). However, some recent data suggest that shock augmented by other procedures my produce an effective treatment package (Dericco, Brigham, and Garlington 1977). Cognitive processes have been commonly employed to produce aversion by pairing smoking with vivid images of extreme nausea or other unpleasant stimulation. Covert sensitization is the most. common of these and has often been discussed as a mechanism for generalizing aversion effects outside the lab. but as a primary treatment for smoking the technique has failed to produce meaningful or encouraging levels of long term abstinence (Bernstein and McAlister 1976; Lichtenstein and Danaher 1976; Pechacek 1979).

The most effective aversion strategies have utilized some form of smoke aversion (Best and Bloch 1979; Lichtenstein and Danaher 1976; Pechacek 1979). It has been suggested that cigarette smoke is a particularly appropriate aversive stimulus since it affects many of the endogenous cues that characterize smoking (Lichtenstein and Danaher 1976). Three main versions of smoke aversion have been used: (a) satiation, that is doubling or tripling daily consumption prior to abstinence, (b) warm, stale smoke blown into the smoker's face. or (c) rapid smoking, that is inhaling every six seconds until unable to continue. While data on smoke aversion techniques has been inconsistent and often mixed, continued research has produced some promising results Danaher 1977; Danaher and Lichtenstein 1978; Lichtenstein and Danaher 1976).

Early research on smoke aversion strategies produced minimal effects (Lichtenstein and Danaher 1976) but Lichtenstein and associates (1973) continued to refine the techniques and produced impressive results of 60 percent abstinence at six-month followup for both the rapid smoking and warm, smoky air procedures. Since the rapid smoking procedure was simpler and more convenient, it became increasingly popular (Lichtenstein and Danaher 1976). The rapid smoking procedure has been extensively tested in over 30 studies (Danaher 1977). Although some studies demonstrated minimal long term effects, overall, the procedure has shown relatively superior results (Danaher 1977; Danaher and Lichtenstein 1978). Danaher (1977) clarified some of the inconsistencies in the data by highlighting the departures from the original treatment procedures which could have accounted for the minimal treatment effects. It appears that the rapid smoking procedure can be potentially very effective; but a warm, Personal client-therapist relationship, flexible or individualized treatment scheduling, and continuation of treatment until abstinence is attained all may be important to produce high abstinence rates (Danaher1977; Pechacek and McAlister 1979).

The final smoke aversion strategy is satiation. Early research on this technique was encouraging but the weight of evidence since then has been negative Danaher and Lichtenstein 1978;

Lichtenstein and Danaher 1976). however, recent studies combining the technique with behavioral self-control training have produced sane encouraging data (Best and Bloch 1979; Best, and, and Trentadue 1978; Delahunt and Curran 1976). Nevertheless, the fact that controlled studies had been unable to replicate the initial success of satiation only or even demonstrate superiority versus control conditions raises doubts about the efficacy of the procedure (Pechacek 1979).

As smoke aversion strategies were gaining in popularity, concerns were raised regarding their safety. Since the techniques induce aversion by means of physiological discomforts of excessive smoking, the cardiopulmonary stress must be considered before using the techniques (Hall, sachs, and Hall 1978; Lichtenstein and Glasgow 1977). While initial data quantifying the procedures suggest that they are safe for healthy subjects, until the relative risks of the procedures have been more completely defined, all smoke aversion procedures should be used with appropriate screening and monitoring (Hall, Sachs, and Hall 1978; Lichtenstein and Glasgow 1977).

While the research dam on behavioral treatment strategies have yet to produce a clearly superior alternative, multicomponent treatments appear to be the most. encouraging (Pechacek 1979). Packages utilizing some combination of behavioral self-control techniques and/or integrating various aversive control procedures can be effective; however, they appear most effective when refined by systematic developmental research and applied by treatment teams sensitive to the complexity of the smoking problem (Pechacek 1979). Therefore, the manner in which the procedures are individualized to the participant's needs appears to be a critical variable.

Treatment Innovations

It has been estimated that 95 percent of the over 29 million smokers who have quit in this country since 1964 have done so on their own (NC1 1977). Survey data suggest that most smokers want to quit on their own (Pechacek and Danaher 1979). Treatment innovations are starting to become available to meet this area of need (Best, Owen, and Trentadue 1978; Danaher and Lichtenstein 1978) but this line of research merits additional attention.

Also as many smokers find that they are unable to quit completely despite several attempts (Gallup 1978; NCSH 1976), they have becane increasingly more interested in the products they are smoking (Harris 1979). Despite this obvious interest among smokers in reducing their risks without quitting, little research has teen conducted to develop strategeies to aid smokers in this process. Since there is a strong possibility that some or many smokers may alter their inhalation style to maintain a desired level of nicotine uptake even on low "tar" and nicotine brands (Russell 1976). such brand shifts may not produce true reductions in risk. Cigarette smokers who shift to pipes and cigars also need

assistance. Frederiksen and associates (1976, 1977, 1979) have begun developing strategies to address this issue; however, more work is needed in the area of controlled smoking to aid both continuing smokers unable to quit and former smokers switching to pipes or cigars.

MAINTENANCE OF NONSMOKING

Data on all types of interventions clearly indicate that initial high rates of success often deteriorate rapidly over time (see figure 3). All major reviews of the smoking literature have continued to stress the need to deal more effectively with this problem. Continuing nonreplications and minimal treatment effects have, however, kept more researchers searching for the urn-e effective cessation strategy (Pechacek 1979). Existing attempts to add maintenance programming to various treatment packages have proven ineffective in almost all cases (Ponerleau 1979c). Detailed procedures to aid smokers to cope with personal and situational factors which induce them back to smoking need to be developed and tested. While initial data suggest that multicomponent programs are somewhat more effective in maintaining treatment effects, the details of these procedures and how such programs integrate maintenance programing into the overall package have not been clarified (Pechacek 1979).

Specifically, the role of stress-related cues needs to be clarified (Pechacek and McAlister 1979). It remains unclear how cigarettes act as coping device or strategy-is the mechanisn pharmacological or is it completely behavioral? Similarly the problem of weight gain subsequent to cessation must be addressed from both a behavioral and pharmacological perspective. Research interest in these important areas is beginning, but many issues remain to be defined and tested (Pamerleau 1979c).

SUMMARY

In light of the amount of research conducted in recent years, it is remarkable that we have so little outcome data on many forms of intervention. Equally astounding is how little we know about the millions of smokers who have quit on their own. Therefore:

(1) The need for stronger methodology in smoking research must continue to be stressed. Objective measures of smoking behavior are needed, adequate followups must become the norm, and more study and theoretical consideration should be given to the development of treatment programs.

(2) The pattern of nonreplications suggests the need to balance advances methodology within increased practical and clinical sensitivity to the complexity of the smoking problem. It should be recognized that a massive lifestyle modification is required for sane smokers to become nonsmokers.

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(3) Adequate evaluations need to be carried cut in the public service area as well as in research programs. Both informal and formal public service programs should be evaluated, especially those that are reaching the smokers who are unlikely to attend formal treatment programs. Data is critically needed on how smokers quit without formal assistance.

(4) More research is critically needed on the situational and personal factors which induce ex-smokers back to smoking. Recidivism remains the overwhelming problem in smoking modification. As specific problem areas are identified, research is needed to develop skill training or support systems to aid recent ex-smokers in coping with these problem areas.

COMMONALITY ISSUES

Many questions are raised when smoking is considered in conjunction with food, alcohol, and drugs as substances of abuse. One of the commonly cited points is that smoking, alcohol, and drug treatment programs share very similar relapse rates after formal treatment (Hunt, Barnett, and Branch 1971). However the controlling mechanism in smoking dependency has yet to be adequately defined (Jarvik 1977; Lader 1978; Russell 1976). If nicotine is the substance responsible for a large portion of the smoking problem, then commonality with alcohol and other drugs would be easier to understand (Jarvik 1977; Russell 1976). Yet many smokers appear more akin to most dieters since both are substance-involved but behavior change seems to depend more on psychological rather than pharmacological factors. However, the fact that smoking seems to bridge the gap between the commonly accepted substances of abuse (i.e., alcohol and drugs) and food at the other end of the continuum suggests that answers to all these problems nay be derived from smoking research.

One intriguing issue is raised by the emerging interest in controlled smoking (Frederiksen and Peterson 1976). Alcohol and food both clearly-suggest that controlled use should be possible if there is a commonality across substances; however, survey data suggest that naturally occurring controlled use (e.g., infrequent and sporadic use) of tobacco is very rare in comparison to excessive ingestion of either inappropriate foods or alcohol. At this point it can not be determined if these seeming differences in naturally occurring "controlled use" are due to pharmacological differences in the substances or due to other behavioral factors. Broad social contingencies of public acceptability of the behavior, legality, cultural constraints, or the like may account for these differences to some degree.

Finally, Russell (1974) has stated that cigarette smoking is the most addictive and dependence-producing form of self-administered gratification. Yet little study has been made of individuals who

use multiple substances. Russell (1974) cited some data suggesting that cigarette-smoking heroin addicts felt it would be easier to quit using heroin than to stop smoking. Does this imply that nicotine or some other compound in tobacco is more addicting, despite the fact that physiological dependence on tobacco has teen very difficult to demonstrate (Jarvik 1977)? Hence, much more needs to be learned about the interaction of various substances and the relative dependence upon them by multitiple users.

REFERENCES

Bandura, A. Principles of Behavior Modification. New York: Holt, Rinehart and Winston, 1969.

Bandura, A. Social Iearning Theory. Ebglewood Cliffs, New Jersey: Prentice-Hall, 1977.

Bernstein, D.A. Modification of smoking behavior: An evaluative review. Psych Bull 71:418-l40, 1969.

Bernstein, D.A., and McAlister, A. The modification of smoking behavior: Progress and problems. Addictive Behav 1:89-102, 1976.

Best, J.A., and Bloch, M. On improving compliance: Cigarette smoking. In: Haynes, R.B., and Sackett, D.L., eds. Compliance. Baltimore: John Hopkins University Press, 1979.

Best, J.A., Owen, L.E., and Trentadue, L. Comparison of satiation and rapid smoking in self-managed smoking cessation. Addictive Behav 3:71-78, 1978.

Burt, A., Thornley, P., Illingworth, D., White, P., Shaw, T.R.D., and Turner, R. Stopping smoking after myocardial infarction. Lancet i:304-306, 1974.

Croog, S.H., and Richards, N.P. Health beliefs and smoking patterns in heart patients and their wives: A longitudinal study. Amer J Pub1 Hlth 67:921-929, 1977.

Danaher, B.G. Research on rapid smoking: Interim summary and recomendations. Addictive Behav 2:151-166, 1977.

Danaher, B.G., and Lichtenstein, E. **Became an ex-smoker.** Englewad Cliffs, New Jersey: Prentice-Hall, 1978.

Davidson, G.C., and Rosen, R.C. lobeline and reduction of cigarette smoking. Psych Report 31:443-456, 1972.

Delahunt, J. and Curran, J.P. Effectiveness of negative practice and self-control techniques in the reduction of smoking behavior. J Consult Clin psych 44:1002-1007, 1976.

Delarue, N.C. A study of smoking withdrawal. Can J Pub1 Hlth 64:S5-S19, 1973.

Dericco, D.A., Brigham, T.A., and Garlington, W.K. Developnent and evaluation of. treatment paradigms for the suppression of smoking behavior. J Appl Behav Analy 10:173-181, 1977.

Epstein, L.H.. and McCoy, J.F. Issues in smoking control. Addictive Behav 1:65-72, 1975.

Farquhar, J.W., Maccoby, N., Wood, P.D.. Alexander, J-K., Breitrose, H., Brown, B.W., Jr., Haskell, W.L., McAlister, A.L., Meyer, A.J., Nash, J.D., and Stem, M.P. community education for cardiovascular health. Lancet i:1192-1195, 1977.

Frederiksen, L.W., and Martin, J.E. Carbon monoxide and smoking behavior. Addictive Behav 4:21-30, 1979.

Frederiksen, L.W., Miller, P.M., and Peterson, G.L. Topographical components of smoking behavior. Addictive Behav 2:55-61, 1977.

Frederiksen, L.W., and Peterson, G.L. Controlled smoking: Development and maintenance. Addictive Behav 1:193-196, 1976.

Gallup Opinion Index. Smoking in Anerica: Public attitudes and behavior. Gallup Opinion Index (Report No. 155):1-26, June 1978.

Gritz, E.R., and Jarvik, M.E. Pharmacological aids for the cessation of smoking. In: Steinfeld, J., Griffiths, W., Ball, K., Taylor, R.M., eds. Proceedings of the Third World Conference on Smoking and Health, New York, June 2-5, 1975. Volume II. Health Consequences, Education, Cessation Activities, and Governmental Action. U.S. Department of Health, Education, and Welfare, Public Health Service, DHEW Publication No. (NIH) 77-1413.

Hall, R.G., Sachs., D.P.L., and Hall, S.M. Medical risk and therapeutic effectiveness of rapid smoking. Behav Ther, in press, 1978.

Harris, J.E. Cigarette Smoking in the United States, 1950-1978. In: U.S. Department of Health, Education, and Welfare, Public Health Service. Smoking and Health: A Report of the Surgeon General. U.S. (Government Printing Office, DHEW Publication No. (PHS) 79-50066, 1979.

Horn, D. A model for the study of personal choice health behavior. Int J Hlth Ed 19:89-98, 1976.

Hunt, W.A.. Barnett, W., and Branch, L.G. Relapse rates in addiction programs. J Clin Psych 27:455-456. 1971.

Hunt, W.A., and Bespalec, D.A. An evaluation of current methods of modifying smoking behavior. J Clin Psych 30:431-438, 1974.

Hunt, W.A., and Matarazzo, J.D. Habit Mechanisms in smoking. In: Hunt, W.A., ed. Habit Mechanisms in Smoking. Chicago: Aldine, 1970.

Hunt, W.A., and Matarazzo, J.D. Three years later: Recent developnents in the experimental modification of smoking behavior. J Abnormal Psych 81:107-115, 1973.

Isacsson, S.O., and Janzon, L. Results of a quit-smoking research project in a randomly selected population. Scand J Soc Med 4:25-29, 1976.

Jarvik, M.E. Biological factors underlying the smoking habit. In: Jarvik, M.E., Cullen, J.W., Gritz, E.K., Vogt, T.M., and West, L.J. eds. Research on Smoking Behavior. NIDA Research Monograph 17. U.S. Department of Health, Education, and Welfare, Public Health Service, DHEW publication No. (ADM) 78-581, December 1977.

Johnson, E., and Donoghue, J.R. Hypnosis and smoking: A review of the literature. Amer J Clin Hypnosis 13:265-272, 1971.

Kanzler, M., Jaffe, J.H., Zeidenberg, P. Long- and short-term effectiveness of a large-scale proprietary smoking cessation program-A four year follow-up of Smokenders participants. J Clin Psych 32:661-69, 1976.

Lader, M. Nicotine and smoking behavior. Br J Clin pharmacol 5:289-292, 1978.

Lichtenstein, E. Social learning. In: Jarvik, M.E., Cullen, J.W., Gritz, E.R., Vogt, T.M.. and West, L.J. eds. Research on Smoking Behavior. NIDA Research Monograph 17. U.S. Department of Health, Education, and Welfare, Public Health Service, DHEW Publication No. (ADM) 78-581, December 1977.

Lichtenstein, E., and Danaher, B.G. Modification of smoking behavior: A critical analysis of theory, research, and practice. In: Hersen, M., Eisler, K.N., and Miller, P.M., eds. Progress in Behavior Modification. Volume 3. New York: Academic Press, 1976.

Lichtenstein, E., and Danaher, B.G. What can the physician do to assist the patient to stop smoking? In: Brashear, R.E., Rhodes, M.L., eds. Chronic Obstructive Lung Disease: Clinical treatment and managenent. St. Louis: Mosby, 1978.

Lichtenstein, E., and Glasgow, R.E. Rapid smoking: Side effects and safeguards. J Consult Clin Psych 45:815-821, 1977.

Lichtenstein, E., Harris, D.E., Birchle, G.R., Wahl, J.M., and Schmahl, D.P. Comparison of rapid smoking, warm,, smoky air, and attention placebo in the modification of smoking behavior. J Consult Clin Psych 40:92-98, 1973.

Logan, R.A. The smoking habit. In: Hunt, W.A., ed. Learning Mechanisms in Smoking. Chicago: Aldine, 1970.

Logan, R.A. Self-control as habit, drive, and incentive. J Abnormal Psych 81:127-136, 1973.

McAlister, A. Helping people quit smoking: Current progress. In: Enelow, A.J., and Henderson, J.B., eds. Applying Behavioral Science to Cardiovascular Risk. New York: American Heart Association, 1975.

McAlister, A., Meyer, A.J., and Maccoby, N. long-term results of education to reduce smoking: Stanford Three Community Study. Circulation 54(Supplement 11):226, 1976 (abstract).

McFall, R.M. Smoking cessation research. J Consult Clin Psych 46:703-712, 1978.

Multiple Risk Factor Intervention Trial Group. The Multiple Risk Factor Intervention Trial (MRFIT): A national study of primary prevention of coronary heart disease. JAMA 235:825-828, 1976.

Multiple Risk Factor Intervention Trial Group. Statistical design considerations in the NHLBI Multiple Risk Factor Intervention Trial (MRFIT). J Chronic Dis 30:261-275, 1977.

National Cancer Institute. The Smoking Digest. Progress Report on a Nation Kicking the Habit. U.S. Department of Health, Education and Welfare, Public Health Service, October 1977.

National Clearinghouse for Smoking and Health. Use of Tobacco: Practices, attitudes, knowledge, and beliefs United States, Fall 1964 and Spring 1966. U.S. Department of Health, Education, and Welfare, Public Health Service, Center for Disease Control, July 1969.

National Clearinghouse for Smoking and Health. Adult Use of Tobacco -- 1970. U.S. Department of Health, Education Welfare, Public Health Service, Center for Disease Control, June 1973. DHEW Publication No. (HSM) 73-8727.

National Clearinghouse for Smoking and Health. Adult Use of *Tobacco* -- 1975. U.S. Department of Health, Education Welfare, Public Health Service, Center for Disease Control, June 1976.

Ockene, J. Multiple Risk Factor Intervention Trial (MRFIT): Smoking cessation procedures and recidivism Patterns for a large cohort; In: Schwartz, J.L., ed. Progress in-Smoking Cessation: Proceedings of the International Conference on Smoking Cessation, New York, June 21-23, 1978. New York: American Cancer Society, 1979.

Ohlin, P., Lundh, B., and Westling, H. Carbon Monoxide blood levels and reported cessation of smoking. Psychopharmacol 49:263-265, 1976.

Orne, M.T. Hypnosis in the treatment of smoking. In: Steinfeld. J., Griffiths; W., Ball, K., Taylor, R.N., eds. Proceedings of the Third World Conference on Smoking and Health, New York, June 2-5, 1975. Volume II. Health Consequences Education, Cessation Activities, and Governmental Action. U.S. Department of Health, Education, and Welfare, Public Health Service, DHEW Publication No. (NIH) 77-1413.

Pechacek, T.F. Modification of smoking behavior. In: U.S. Department of Health, Education, and Welfare, Public Health Service. Smoking and Health: A Report of the Surgeon General. U.S. Government Printing Office, DHEW publication No. (PHS) 79-5O066, 1979.

Pechacek, T.F., and Danaher, B.G. How and why people quit smoking: Cognitive-behavioral implications. In: Kendall, P.C., and Hollon, S.D., eds. Cognitive-Behavioral Interventions: Theory Research, and Procedures. New York: Academic Press, 1979.

Pechacek, T.F., and McAlister, A. Strategies for the Modification of smoking behavior: Treatment and prevention. In: Ferguson, J.. and Taylor, C.B., eds. A Comprehensive Handbook of Behavioral Medicine. New York: Spectrum, 1979.

Pechacek, T.F., Ockene, J., Luepker, R.V., and Mittelmark, M.B. Smoking Cessation Results of the Multiple Risk Factor Intervention Trial (MRFIT) at two years. Paper presented at the 4th World Conference on Smoking and Health, Stockholm, Sweden. June 18-21, 1979.

Pomerleau, O.F. Why people smoke: Current psychobiological models. In: Davidson, P., ed. Behavioral Medicine: Changing health lifestyles. New York: Brunner/Mazel, 1979. (a)

Pomerleau, O.F. Behavioral factors in the establishment, maintenance, and cessation of smoking. In: U.S. Department of Health, Education, and Welfare, Public Health Service. Smoking and Health: A Report of the Surgeon General. U.S. Government Printing Office, DHEW Publication No. (PHS) 79-50066, 1979. (b)

Pomerleau, O.F. Strategies for maintenance: The problem of sustaining abstinence from cigarettes. In: Schwartz. J.L.. ed. Progress in Smoking Cessations Proceedings of the International Conference on Smoking Cessation, New York, June 21-23, 1978. New York: American Cancer Society, 1979. (c)

Puska, P., Virtamo, J., Tuomilehto, J., Maki, J., and Neittaanmaki, L. Cardiovascular risk factor changes in a three year followup of a cohort in connection with a community programme (the North Karelia Project). Acta Med Scand 204:381-388, 1978.

Pyszka, R.H., Ruggels, W.L., and Janowicz, L.M. Health Behavior Change: Smoking Cessation. Menlo Park, California: Stanford Research Institute, 1973.

Rose, G. Physician counseling and personal intervention. In: Steinfeld, J., Griffiths, W., Ball, K., Taylor, R.M., eds. Proceedings of the Third World Conference on Smoking and Health, New York, June 2-5 1975. Volume 11. Health Consequences,- Education, Cessation Activities, and Governmental Action. U.S. Department of Health, Education,and Welfare, Public Health Service, DHEW Publication No. (NIH) 77-1413.

Russell, N.A.H. Cigarette smoking: Natural history of a dependence disorder. Brit J Med Psych 44:1-44, 1971.

Russell, M.A.H. The smoking habit and its classification. Practitioner 212:791-800, 1974.

Russell, M.A.H. Tobacco smoking and nicotine dependence. In: Gibbins, R.J., Israel, Y., Kalant, H., Popham, R.I., Schmidt, W., and Smart, R.G., eds. Research Advances in Alcohol and Drug Problems, Volume 3. New York: John Wiley, 1976.

Russell, M.A.H., Wilson, C., Feyerabend. C., and Cole, P.V. Effect of nicotine chewing gum on smoking behavior and as an aid to cigarette withdrawal. Brit Med J 2:391-393, 1976.

Schwartz, J.L. A critical review and evaluation of smoking control methods. Pub Hlth Reports 84:483-506, 1969.

Schwartz, J.L., and Dubitzky, M. One-year follow-up results of a smoking cessation program. Can J Publ Hlth 59:161-165, 1968.

Schwartz, J.L., and Rider, G. smoking cessation methods in the United States and Canada: l969-1976. In: Steinfeld, J., Griffiths, W., Ball, K., Taylor , R.M., eds. Proceedings of the Third World Conference on Smoking and Health, New York, June 2-5, 1975. Volume II. Health Consequences, Education, Cessation Activities Governmental Action. U.S. Department of Health, Education, and Welfare, Public Health Service, DHEW Publication No. (NIH) 77-1413.

Shewchuk, L.A., Dubren, R., Burton, D., Forman, M., Clark, R.R., and Jaffin, A.R. Preliminary observations on an intervention program for heavy smokers. Int J Addictions 12:323-336, 1977.

Sillet, R.W., Wilson, M.B., Malcolm, R.E., and Ball, K.P. Deception among smokers. Brit Med J 2:1185-1186, 1978.

Tuomilehto, J., Koskela, K., Puska, P., Bjorkqvist, S., and Salonen, J. A community anti-smoking programme: Interim evaluation of the North Karelia Project. Int J Hlth Ed 21:Sl-S15, 1978.

U.S. Department of Health, Education, and Welfare, Public Health Service. Smoking and Health: Report of the Advisory Committee to the Surgeon General of the Public Health Service. U.S.Government Printing Office P.H.S. Publication Number 1103, 1964.

U.S. Department of Health, Education, and Welfare, Public Health Service. Smoking and Health: A Report of the Surgeon General. U.S. Government Printing Office, DHEW Publications No. (PHS) 79-50066, 1979.

Warner, K.E. The effects of the anti-smokng campaign on cigarette consumption. Amer J Publ Hlth 67:645-650, 1977.

Weinblatt, E., Shapiro, S., and Frank, C.W. Changes in personal characteristics of men, over five years, following first diagnosis of coronary heart disease. Amer J Publ Hlth 61:831-842, 1971.

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Chapter 8

Social Learning, Smoking, and Substance Abuse

Edward Lichtenstein, Ph.D.

Social learning theory can be viewed as a broadening of behavior modification to include Modeling and other mediational (cognitive) processes (Bandura 1977). In the realm of cranking behavior, social learning has functioned not as a formal explanatory model, but rather as a methodological approach with special emphasis on smoking cessation technology (Pamerleau 1978). Smoking behavior lends itself nicely to the behavioral outcome research paradigm 'in that it is a discrete behavior, frequently occurring and relatively easy to measure, that many persons wish to eliminate or reduce. Because of these factors and because smoking lends itself to the application of numerous behavior strategies, there have been literally hundreds of behaviorally-based intervention studies conducted during the last 15 years.

The intervention research has been largely atheoretical in nature in the sense that the strategies and tactics employed have not derived from a comprehensive theory of smoking behavior nor have they been based on extensive clinical experience with dependent smokers. Interventions have either been suggested by armchair assumptions about the phenomena or borrowed from other areas, often from other substance abuse problems such as obesity, to "see if they work" with smoking. The dominant research strategy has been what McFall (1978) terms the "horserace." Several treatments are lined up at the starting gate (hopefully without weight handicaps)and the data and investigator jointly determine which one gets to the finish line first. Such studies usually tell us little about the processes involved in producing a change in smoking even when outcomes are reasonably successful;

The results of behavioral intervention efforts have been well summarized by several scorekeepers,with surprisingly close agreement (Lichtenstein & Dahaner 1976; Bernstein & McAlister 1976; Bernstein & Glasgow, in press; Pechacek, inpress). The reviewers all seem to agree that things are getting better, albeit slowly, that some treatment strategies now appear to have modest specific effects, that methodology is imroving, and that a long-needed shift toward focusing on maintenance is occurring. But there is further

agreement that, in an absolute sense, the current state of affairs does not constitute grounds for self-reinforcement and there is room for considerable improvent. Replicable, effective treatment programs elude social learning proponents as well as other workers in smoking cessation.

What accounts for this humbling state of affairs and what can be done to improve matters? While a number of factors and issues have been noted in the literature, this discussion reflects the writer's biases. Following a brief critique, sane recent work, mostly from the Oregon Smoking Control Program, will be describedas it relates to the issues noted.

Three sets of problems have impeded progress: methodological, conceptual, and sociopolitical.

Methodological Problems

Methodological problems in smoking research have been thoroughly discussed (Bernstein 1969; Lichtenstein & Danaher 1976; Straights 1977; Mcfall 1978; Pechacek 1979). In the area of research design and control groups, much progress has been made. In fact, methodological rigor far outpaces useful theory or effective interventions (Lichtenstein 1971, 1977).

Several writers voice strong concern about the lack of objective measurement of the dependent variable in smoking intervention studies (e.g., Bernstein 1969; Pechacek 1979). It is recommended that self-reported smoking rates be corroborated by objective, physiological indices. The use of informants is also encouraged but is viewed as a much weaker alternative. Measures of blood carbon monoxide or carboxyhemoglobin have been used to check on self-reported smoking rates (Lando 1975). More recently, shortcomings of the carbon Monoxide measure have been noted, especially CO's short half-life and susceptibility to environmental factors. Thiocyanate measurements have teen suggested as a stronger alternative (Brockway 1978): The use of physiological indices is desired able, but is feared that investigators will become overconcerned with this methodological issue at the expense of dealing with more important problems such as developing better theories and interventions. Further, it is suggested that sources of error in physiological measurements have been minimized, and their limitations in reflecting differences in smoking <u>rates</u> have not been sufficiently appreciated. Both informants and physiological indicators can reliably corroborate abstinence,but neither is a truly dependable check on rate (Lichtenstein & Danaher 1976). Our own research experience has shown that verbal reports of abstinence have very consistently been substantiated by informants (Schmahl, Lichtenstein & Harris 1972; Lichtenstein et al. 1973). However, the demand characteristics of the smoking control program are an important consideration in evaluating self-report. If contingency deposits are refundable as a function of increasing periods of abstinence, for example, there is a stronger incentive for subjects to lie.

Conceptual Problems

There is no canprehensive yet reasonably specific social learning model of smoking behavior (Pomerleau 1978). This is not to say that such a model cannot be constructed. Pomerleau (1978) has made a systematic and comprehensive effort by attempting to integrate social learning, the nicotine titration hypothesis (Schachter et al-l977)and opponent process theory (Solomon & Corbit 1973). His formulation suggests several interesting lines of laboratory research. Pumerleau, in effect, argues persuasively for one major strategy for developing an adequate knowledge base: theory-guided laboratory research. This has been a neglected approach with respect to the role of behavioral and cognitive variables in smoking behavior. In contrast, there has been a vast amount of work on the physiology and biochemistry of smoking. Three specific conceptual issues may be noted.

Elicitors of smoking. Many social learning programs emphasize stimulus control and/or anxiety management procedures, but there is little evidence on the stimulus control of snaking. A recent study by Best and Hakstian (1978) documents individual differences in patterns of smoking situations and has implications for treatment planning. The assumption that smokers (at least some smokers) smoke when anxious and feel less anxious after smoking is similar to clinical lore about drinking (Nathan 1976), and both assumptions appear weak in empirical support.

Nicotine effects. Social learning smoking interventions have largely ignored the role of nicotine in maintaining the smoking habit. Most self-control strategies have focused on external or environmental stimuli as elicitors of smoking. While recognizing that the crucial role of nicotine is yet to be conclusively demonstrated (Kumar et all 1977), them is surely enough convergent evidence that it is an important primary reinforcer incorporate this point in any comprehensive treatment program. Acceptance of the crucial role of nicotine, if it were to be conclusively demonstrated, would not put behavioral interventionists out of business. The inherent physiological or biochemical reinforcers in eating, alcohol consumption, and drug use are well demonstrated, but behavioral interventions still compete well with pharmacological ones in these domains. At the least, many smokers think that nicotine is important for then. Joining rather than disputing this belief may be more productive clinically.

Emphasis on cessation rather than maintenance. The great bulk of all smoking intervention program, including behaviorally based ones, focus on cessation or helping people stop smoking. Many programs end just about the time that the participants reach cessation, and there is often little emphasis on helping participants learn skills, attitudes, or cognitions that would help them maintain abstinence. Fortunately, them is now a discernible trend toward emphasizing maintenance, especially in the behavioral literature. Bernstein's (1969; Bernstein & McAlister 1976) persistent pleading has been helpful in this regard.

With respect to maintenance, however, investigators are beset with the same conceptual and knowledge base deficits noted above. There is good information about the shape of the relapse curve. Most relapse occurs within three months after treatment has ended. But relatively little is known about the factors that produce relapse. This particular knowledge deficit is in large part due, it is suggested, to still another misplaced emphasis: a focus on individual difference predictors of relapse such as age, sex, smoking history and the like. Situational processes in relapse have been neglected. Since relapse is a common phenomenon across all substance abuse areas, and since the relapse curves for different substance abuses appear to be remarkably similar (Bunt & Bespalec 1974) a systematic attack on situational factors in relapse would certainly seem called for. The work of Marlatt (in press) on alcoholic relapses provides a useful model.

At the conceptual level, there is need for a useful account of the distinction between cessation and maintenance that could guide the development of maintenance strategies. Cessation and maintenance are thought be be affected by different processes, but these different processes are not well understood.

Social-Political Problems

Social-political contingencies surround the conduct of smoking cessation research. The point has been made elsewhere (Lichtenstein 1977) but is briefly repeated here because the policies and priorities of funding agencies can influence this issue. The basic problem is simple. The social contingencies surrounding most smoking intervention research, especially in academic settings, lead to premature, controlled evaluations of treatment strategies. Largely derived from armchair analyses without adequate pilot work, they culminate in overly short followup, in order that thesis, dissertation, or publication deadlines can be met. Needed are settings in which social learning workers can acquire clinical experience with dependent smokers and use aclinical-developmental approach to construct effective strategies and tactics. Such an approach would begin with single subjects, proceed through clinical trials evaluation, and eventuate in rigorous, controlled evaluations only for those treatment strategies that show sufficient promise to warrant such an effort.

The remainder of this paper describes some recent work from the Oregon Smoking Control Program, and occasionally that of others, as it relates to several of the issues noted.

Modeling Effects in Smoking

There is remarkably little research looking at social or situational variables as they affect smoking,in spite of the assumed importance of these phenomena in most bebavioral smoking control pograms. This is in sharp contrast to the great amount of research that has focused on changes in smoking as a function of pharmacologic manipulations and the considerable work situational cues eliciting

alcohol consumption and eating. The study to be described was influenced by some recent mark on modeling effects in drinking, show ing that drink consumption and sip rates can powerfully affected by the behavior of a mode1 (e.g., Caudill & Marlatt 1975). Since modeling effects with smoking had not yet been shown, the study sought to optimize conditions to demonstrate such an effect (Antonuccio & Lichtenstein, in preparation).

Subjects were told that the purpose of the study was to test the accuracy of a new saliva test as an indicator of smoking rate. They were asked to refrain from smoking for an hour before each session, and during the two sessions they were instructed to smoke at least two of their own cigarettes in their usual way. Subjects were also told that they could smoke additional cigarettes if they wished. Sessions lasted 45 minutes.

Subjects were then informed that they would be tested in pairs, both for the sake of efficiency, and also because another experimenter wished to obtain some pilot data on naturally occurring social interaction. Because of the needs of the latter study, their interaction with the other subject would be observed and coded. This manipulaticm provided the cover for coders taking data on the number of cigarettes smoked, interval between cigarettes, puff rate, puff duration, and other measures of smoking topography (Frederiksen, Miller, & Peterson 1977).

Each subject was observed under both high- and low-rate mode1 conditions, with the order randomized. Depending on the experimental condition, the models smoked two or three cigarettes, waited 30 or 120 seconds between puffs, inhaled for one or three seconds, burned 50 percent or 80 percent of their cigarettes, and started their second cigarette before or after the subject. The models were friendly, supportive and followed the subjects; conversational leads. Smoking rate and topography measures provided to be highly reliable; agreement on the dependent variables was 95 percent or better.

The results can be summarized succinctly. Subjects smoked significantly more cigarettes in the high-rate model condition than in the low-node1 condition. The interval between cigarettes was also significantly shorter for the high-rate model condition. None of the topography variables, such as puff rate, puff duration, or amoumt of tobacco smoked, yielded any significant effects.

Subjects were a priori classified (and selected)as low rate,<pack a day ($x = 14.5$) or high rate, >pack a day ($X = 27$) smokers. Contrary to expectation, there were no significant differences between heavy and light smokers. It was expected that high-rate smokers would be less susceptible to modeling effects than low-rate smokers, whose smoking behavior is presumably less determined by nicotine effects.

Though the range of smoking rates was considerably constrained by the experimental setup, a modeling effect on rate was clearly demonstrated. On the other hand, topography remained virtually the same

under both experimental conditions. Topography may consist of relatively stereotypical performances that are executed in similar ways irrespective of the situation. Social circumstances affect whether and when one lights up a cigarette but not how ones smokes that cigarette.

Nicotine Dependency and Nicotine Fading

As was noted, behavioral treatment programs have tended to ignore the possible role of nicotine dependency. This omission may undermine behavioral treatment programs in two ways. First, to the extent that there are genuine nicotine dependency effects, at least in heavy smokers, difficulties can be anticipated if programs fail to deal with them. Second, and more speculatively, since many smokers believe that nicotine dependency is a part of their problem, behavioral programs may not seem credible or may appear inconsistent with the smokers' own cognitions concerning their behavior.

Nicotine fading is a recently developed, nonaversive and convenient procedure that is congruent with the nicotine hypothesis and "joins" smokers Cognitions about the role of nicotine in their habit After a baseline week, the smoker progressively switches to designated lower tar and nicotine brands, a new brand each week for three weeks, usually finishing with a .lO mg. brand. The subject also self-monitors smoking rate and estimates and graphs daily tar and nicotine consumption. Because the smokers' task during this phase of treatment is simply to smoke the designated brand of cigarette rather than try to quit, initial success--reduced tar and nicotine consumption-is virtually assured, enhancing the smokers' expectations of success. At the beginning of the program, a target quitting date is set, usually after one week of smoking the lowest tar and nicotine brand.

Initial work with this procedure appears promising (Brown 1977; Foxx & Brown in press; Beaver, Brwn & Lichtenstein, in preparation). The studies, admittedly with small numbers of smokers, have yielded an abstinence rate of appromximately 50 percent three and six months posttreatment. Table 1 displays followup data from Brown's (1977) thesis. Also of interest is the observation that the majority of persons who continue or resume smoking stayed with the low tar and nicotine brands they smoked during the last phase of the program. Smoking rate did not appear to increase, but it is not knom whether dosage levels were affected by compensatory changes in the topography of smoking.

Relapse and Resumption

Accounts of smoking behavior have focused on three stages in the evolution of the behavior: initiation, maintenance, and cessation. But many smokers go through still a fourth stage when they resume smoking after having stopped for a period of time, often a long period of time. Considering the potential importance of the relapse phenomenon, it is surprising how little systematic work there is on the processes involved. Therefore, an exploratory study was

TABLE 1

Treatment Condition	Abstinent	Reduced T/N Brand	Baseline (or Higher) T/N Brand
Nicotine Fading	1/10	5/10	4/10
self-monitoring	0/8	4/8	4/8
Nicotine Fading & Self-monitoring	5/10	5/10	0/10
American Cancer Society program	1/10	3/10	6/10

Proportion of subjects in each treatment condition reporting abstinence, consumption of reduced tar/nicotine brand, and consumption of baseline (or higher) tar/nicotine brand of cigarettes at b-month followup. Data reprinted with permission of Society for the Experimental Analysis of Behavior, Inc., @1979, from Journal of Applied Behavior Analysis, Vol. 12, No. 1, spring 1979.

undertaken in which persons-who had-been abstinent for at least two weeks and then had relapsed were intensively interviewed (Lichtenstein, Antonuccio, & Rainwater, in preparation). Most subjects were unaided quitters. Two weeks of abstinence was required in order to minimize physiological withdrawal effects and maximize the role of situational and cognitive factors.

The interview was focused around a tentative model of the relapse process that identified three phases. The first and least observable phase was the period before the first cigarette was consumed. The presence and intensity of urges to smoke and cognitions about smoking were the major concern. The second phase was the actual relapse episode, the smoking of the first cigarette or series of cigarettes. The interview focused on the situation and circumstances involved, including feelings and cognitions immediately preceding and following the taking of the first cigarettes. The third phase was the period from the taking of the first cigarette until the return to baseline levels of smoking. Smoking urges and cognitions again were of principal interest.

A methodological weakness in the study is the retrospective nature of the relapse accounts. The median interval between the relapse episode and the interview was 22 weeks. The data are not fully analyzed but some interesting trends have emerged. Nearly all subjects reported a deduction in both the frequency and intensity of smoking urges between the time they quit smoking and relapse. Re lapse was less consistently triggered by stress or negative emotional states than was anticipated. The modal relapse situation involved a social contact with one or more friends, at least one of whom smoked, in which alcohol was often involved, and was about equally divided between pleasant and unpleasant affect.

Maintenance

The final sections sketches three alternative but not mutually exclusive maintenance strategies and briefly indicates sane of the work done at Oregon guided by these notions.

The three maintenance strategies are tentatively labeled: social support, coping skills, and cognitive restructuring. Central to the social support approach is the notion that the support and/or influence of a group can help the individual sustain the necessary motivation in other to maintain some standard of behavior such as not smoking,not drinking,or not using certai drugs. In the area of substance abuse, the social support strategy has along history, exemplified by such programs as Alcoholics Anonymus, Synanon, and Weight Watchers. Systematic inplementation and evaluation of social support strategies, however, are few. With respect to smoking, they are almost nonexistent. This is surprising, given the frequent use of "buddy systems" in such programs as the Five-Day Plan.

The coping skills approach, the social learning favorite, assumes that the individual lacks the needed knowledge and skills to become a permanent nonsmoker. What is required is training in dealing with

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the discomfort involved in depriving oneself of cigarettes, in developing substitute responses that would replace smoking, in learning to recognize and modify the cues (discriminative stimuli) antecedent to the smoking act, and in altering the consequences of smoking. Many of these strategies and tactics have been encompassed under the rubric of "self-control" (Thoresen & Mahoney 1974) and have been applied to smoking reduction in a number of studies (cf. Lichtenstein & Danaher 1976; Pechacek 1979). Coping skills may also be recognized as the social learning approach to drinking and obesity.

The cognitive restructuring approach to maintenance is the most difficult to define and the least well developed with respect to smoking. This approach assumes that some change must occur "within the head" in order for behavior change to endure. Such changes may involve attitudes, self-perceptions, or covert verbalization. The application of attribution theory (kopel & Arkowitz 1975) is one variation within the cognitive framework that has been applied to smoking (Kopel 1974; Colletti & Kopel in press).

Coping skills. As good behaviorists, we in the Oregon program have emphasized the coping skills approach. Prior work with rapid smoking was quite promising (e.g., Lichtenstein et al. 1973), but even these relatively successful programs had relapse rates of about 50 percent. A guiding assumption was that aversion was useful in producing in-Mediate Cessation but coping skills would be necessary to maintain abstinence. Dissertation studies by Brian Danaher (l977) and Russ Glasgow (in press) were of similar design format. Rapid smoking only was compared to rapid smoking plus coping skills training. Appropriate control groups were also employed. The results for improving maintenance were discouraging with respect to coping skill training. Neither Danaher nor Glasgow was able to demonstrate any incremental effect from adding fairly extensive self-management training programs to the basic rapid smoking procedure. Both studies employed what seemed to be reasonable and basic behavioral coping skills training: stimulus control analysis, substitute behaviors, relaxation,and urge managanent, Danaher's program was more extensive; G1asgow opted to focus on more intensive training of fewer procedures. But the results were relatively similar.

A recent study, and one still being evaluated at followup, followed Pechacek's (1977) lead in introducing anxiety management training for smokers with high anxiety levels (Beaver, Brown, '& Lichtenstein, unpublished). Pechacek's data had suggested that this might improve the maintenance performance of subjects with high but not low levels of anxiety. This time, however, coping skills training was combined with the nicotine fading procedure noted above. The results again were that anxiety management did not increase the effectiveness of the basic Program and, in fact, subjects who received anxiety management tended to do worse than those not receiving it.

It is puzzling why the coping skills training programs were not more effective. Perhaps, as in architecture, "less is more." Subjects may have been given more concepts and techniques than they could

assimilate and use. Many multicomponent programs have yielded similar results, but a few have been more successful (e.g., Chapman, Smith & Layden 1971; Lando 1977).

It is possible that the particular coping skills chosen and/or the methods of teaching them were not optimal. There is often uncertainty as to whether subjects really practice and use what they are being taught. Glasgow's (in press) follow-through data indicated that, at least by their self-report, subjects were quite faithful, but inadequate practice and application may yet be an issue. A practical problem is getting subjects to maintain their motivation to continue working on a maintenance program after they have reached cessation. Conducting sessions in natural settings such as restaurants and taverns may promote effective application of coping skills.

Social support. Two small pilot studies exploring the social support approach have been conducted. The first was an attempt to replicate and extend an interesting study by Janis and Hoffman (1970),who found that subjects paired with a "buddy" smoked significantly less at followup than controls. 'Ibis wc& even though subjects did not maintain contact with their buddies after the treatment program was over. A similar buddy system was combined with rapid smoking in a design format similar to that used by Danaher and Glasgow, and unfortunately, with similar results(Rodrigues & Lichtenstein,unpublished). The introduction of buddy system again did not improve on rapid smoking only. Given the pervasiveness of buddy-like systems in many programs for substance abuse problems, the strategy deserves further investigation.

The second study also evolved from a combination of real world practice and social psychological theory (Rodrigues & Lichtenstein, unpublished). In many substance,abuse programs, former sufferers come to save as helpers with persons who are trying to kick the habit. The interaction is presumably helpful to both parties. Social psychological notions of role playing and self-perception suggest such helping activity would strengthen the helpers' own maintenance efforts (Kopel & Arkowitz 1975). Using a similar incremental design, rapid smoking only was compared to rapid smoking plus serving as a therapeutic assistant with another subject. The therapeutic assistants both administered rapid smoking and also provided information, advice and encouragement based on their own experience. while therapeutic assistants tended to maintain treatment gains better than nonhelpers, the results did not reach significance.

A similar but independent study has recently been conducted by colletti and Kope1 (in press)who also incorporated an evaluation of the cognitive restructuring approach. In their design, members of one group served as participants in the treatment of another smoker and were required to perform a good deal of therapeutic activitv; ,a second group served as observers of treatment who could participate at their own option. Originally it was predicted that participants would show greater maintenance than observers because they would be more involved and have more opportunity for self-perception and role playing effects to occur. The data instead

Showed that observers maintained better. In reformulating their hypothesis; Colletti and Kopel suggested that the participants were externally were coerced to participate, whereas the observers were in a better position to make self-attributions about their participation and the resulting changes. An Important finding was that posttreatment ratings of self-attribution of smoking reduction were significantly correlated With smoking reduction at six month followup. Attribution of changes is an important aspect of the cognitive restructuring approach.

The development of effective treatments for substance abuse will be facilitated both by an expanded knowledge base and by more consistent use of theory to guide intervention efforts. Social learning approaches to substance abuse likely would profit from more serious consideration of social support and cognitive restructuring strategies, probably in combination with coping skills and contingency management methods. Recent developments in methodology and measurement procedures, together with a growing realization of what the important issues are, should yield better theory and more effective technology.

REFERENCES

Antonuccio, D.O. & Lichtenstein, E. Modeling effects on smoking rate and topography. University of Oregon, in preparation.

Bandura, A. Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2):191-215, 1977.

Bandura, A. Social learning theory. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1977.

Beaver, C. W., Brown, R. A., and Lichtenstein, E. Use of anxiety management training to increase the long-term effectiveness of a nicotine fading procedure for high anxious smokers. Psychology Department, University of Oregon, Eugene, Oregon, 1978. Unpublished report.

Bernstein, D.A. Modification of snaking behavior: An evaluative review. Psychological Bulletin, 71(6):418-440, 1969.

Bernstein, D. & Glasgow, R. The modification of smoking behavior. In: Pomerleau, 0. F., Brady, J.P. Behavioral Medicine: Theory and practice. Baltimore: Williams and Wilkins, 1979.

Bernstein, D.A. and McAlister, A. The modification of smoking behavior: Progress and problems. Addictive Behavior, 1(2):89-102, 1976.

Best, J.A. & Hakstian, A.R. A situation-specific model for smoking behavior. Addictive Behaviors, 3:79-92, 1978.

Brockway, B.S. Chemical validation of self-reported smoking rates. Behavior Therapy, 9:685-686, 1978.

Brown, R.A. The use of nicotine fading and self-monitoring to reduce cigarette smoking. Unpublished master's thesis, University of Maryland, Baltimore County, 1977.

Caudill, B.D. & Marlatt, G.A. Modeling influences in social drinking: An experimental analogue. Journal of Consulting and Clinical Psychology, 43:405-415, 1975.

Chapman, R.F., Smith, J.W., & Layden, T.A. Elimination of cigarette smoking by punishment and self-management training. Behavior Research and Therapy, 9:255-264, 1971.

Colletti, G. & Kopel, S.A. Maintaining behavior change: An investigation of three maintenance strategies and attributional processes in the long-term reduction of cigarette smoking. Journal of Consulting and clinical Psychology, in press.

Danaher, B.G. Rapid smoking and self-control in the modification of smoking behavior. Journal of Consulting and Clinical Psychology, 45:1068-1075, 1977.

Delahunt, J. & Curran, J.P. Effectiveness of negative practice and self-control techniques in the reduction of smoking behavior. Journal of Consulting and Clinical Psychology, 44:1002-1007, 1976.

Foxx, R.M. & Brown, R.A. A nicotine fading and self-monitoring program to produce cigarette abstinence or controlled smoking. Journal of Applied Behavior Analysis, 12(l), 1979.

Frederiksen, L.W., Miller, P.M., &Peterson, G.L. Topographical components of smoking behavior. Addictive Behaviors, 2:55-61, 1977.

Glasgow, R.E. The effects of a self-control manual and amount of therapist contact in the modification of smoking behavior. Journal of Consulting and Clinical Psychology, in press.

Hunt, W.A. & Bespalec, D.A. An evaluation of current methods of modifying smoking behavior. Journal of Clinical Psychology, 30(4): 431-438, 1974.

Janis, I.L. & Hoffmann, D. Facilitating effects of daily contact between partners Who make a decision to cut down on smoking. Journal of Personality and Social Psychology, 17:25-35, 1970.

Kopel, S.A. The effects of self-control, booster sessions, and cognitive factors on the maintenance of smoking reduction. (Doctoral dissertation, University of Oregon, 1974). Dissertation Abstracts International, 35:4182B-4183B. (University Microfilms No. 75-3895)

Kopel, S.A. & Arkowitz, H. The role of attribution and self-percep tion in behavior change: Implications for behavior therapy. Genetic Psychology Monographs, 92:175-212, 1975.

Kumar, R., Cooke, E., Lader, M., & Russell, M. Is nicotine important in tobacco smoking? Clinical Pharmacology and Therapeutics, 21:520-529, 1977.

Lando, H.A. A comparison of excessive and rapid smoking in the modification of chronic smoking behavior. Journal of Consulting and Clinical Psychology 43(3):350-355, 1975.

Lando, H.A. Successful treatment of smokers with a broad-spectrum behavioral approach. Journal of Consulting and Clinical Psychology, 45:361-366, 1977.

Lichtenstein, E. modification of smoking behavior: Good designs-ineffective treatments. Journal of Consulting and Clinical Psychology, 36(2):163-166, 197l.

Lichtenstein, E. Social Learning, In: Jarvik, M.E., Cullen, J.W., Gritz, E.R., Vogt, T.M., West, L.J. Research on smoking Behavior. NIDA Research Monograph 17, December, 1977. DHEW publication Number (ADM) 78-581.

Lichtenstein, E., Antonuccio, D.O., & Rainwater, G. Situational and cognitive factors in the resumption of cigarette smoking. University of Oregon, in preparation.

Lichtenstein, E. & Danaher, B.G. Modification of smoking behavior: A critical analysis of theory, research. and practice. In: Hersen, M., Eisler, R.M., Miller, P.M. Progress in Behavior Modification, Vol. 3. New York: Academic press, Inc., 1976, pp. 79-132.

Lichtenstein, E., Harris, D.E., Birchler, G.R., Wahl, J.M., & Schmahl, D.P. Comparison of rapid smoking, warm, smoky air, and attention placebo in the modification of smoking behavior. Journal of Consulting and Clinical Psychology, 40:92-98, 1973.

Lichtenstein, E. & Rodrigues, M. Long-term effects of rapid smoking treatment for dependent cigarette smokers. Addictive Behaviors, 2:109-112, 1977.

Marlatt, G.A. Craving for alcohol, loss of control and relapse: A cognitive-behavioral analysis. In: Nathan, P.E. & Marlatt, G.A., eds., Experimental and behavioral approaches to alcoholism. New York: Plenum publishing Corporation, in press.

McFall, R.M. Smoking-cessation research. Journal of Consulting and Clinical Psychology, 46:707-7l2, 1978.

Nathan, P.E. Alcoholism. In: H. Leitenberg, ed., Handbook of Behavior modification and Behavior Therapy. Englewood Cliffs, N.J.: Prentice-Hall, 1976.

Pechacek, T.F. An evaluation of cessation and maintenance strategies in the modification of smoking behavior. Unpublished doctoral dissertation, University of Texas at Austin, 1977.

Pechacek, T.F. Modification of smoking behavior. In: U.S. Department of Health, Education, and Welfare, Public Health Service. Smoking and Health, A Report of the Surgeon General, P.H.S. Publication No. 79-50066, U.S. Government Printing Office, 1979. Chapter 19.

Pomerleau, O.F. Why people make: Current psychological models. Davidson, P., ed., Behavioral Medicine: Changing Health Lifestyles. New York: Bruner/Mazel, in press.

Rodrigues, M.P. & Lichtenstein, E. "Lending a hand" as treatment. Unpublished manuscript, University of Oregon, 1977.

Rodrigues, M.P. & Lichtenstein, E. The buddy system and smoking control. Unpublished manuscript, University of Oregon, 1978.

Schachter, S., Silverstein, B., Kozlowzki, L.T., Perlick, D., Herman, C.P., & Liebling, B. Studies of the interaction of psychological and pharmacological determinants of smoking. Journal of Experimental Psychology, General, 106:3-40,1977.

Schmahl, D.P., Lichtenstein, E., & Harris, D.E. Successful treatment of habitual smokers with warm, smoky air and rapid smoking. Journal of Consulting and Clinical Psychology, 38(1):105-1ll, 1972.

Solomon, R.L. & Corbit, J.D. An opponent-process theory of motivation: II. Cigarette addiction. Journal of Abnormal Psychology, 81:158-171, 1973.

Straits, B.C. Research and design methodology in laboratory settings. In: Steinfeld, J., Griffiths, W., Ball, K., Taylor, R.M. Health consequences, education, cessation activities, and governmental action, Vol. II. Proceeding of the Third World Conference on Smoking and Health, New York, June 1975. DHEW publication No. (NIB) 77-1413, 1977, pp. 635-641.

Thoresen, C.E. & Mahoney, M.J. Behavioral self-control. New York: Bolt, Rinehart and Winston, 1974.

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Chapter 9

Controlled Smoking

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This paper will focus on four main topics: The nature of smoking risk; our working model of smoking behavior; a behaviorally-based approach to risk reduction, called controlled smoking; and a brief discussion of some possible commonalities among behavioral approaches to substance abuse.

ON THE NATURE OF SMOKING RISK

A logical starting point is reviewing why we wish to control smoking behavior. It seems safe to say that the main problem with smoking is health-related. The weight of the evidence clearly indicates that smoking can be a dangerous behavior. This danger can arise from a variety of sources, e.g., fire, accidents, cancer, emphysema, bronchitis, coronary heart disease. If we exclude risks such as fire and accidents, fact of central importance to the controlled smoking approach emerges. For the smoking-related diseases mentioned above, the health risk is dose-related. That is, the greater the dose of the harmful constituents of tobacco smoke (e.g., CO, tar, nicotine), the greater the risk (USPHS 1971, 1975; Van Lancker 1977).

Pose is determined by the interaction of three factors. (1) Substance -- pipe vs. cigarette, high vs. low tar, nicotine and CO yield, tobacco moisture, etc. (2) Smoking rate — episodes of smoking per unit time. (3) Smoking topography — number of puffs, puff intensity, depth of inhalation, amount of tobacco smoked, etc.

It is important to emphasize that risk involves the interaction of these' three components: For example, switching to a pipe or cigar is safer than cigarettes if, and only if, the smoker doesn't inhale (Goldman 1977). Similarly, reducing smoking rate may be of little benefit if the person compensates by changing brands or taking more frequent, deeper puffs. This is an important consideration, since compensation has been observed (Goldfarb, Gritz, Jarvik, and Stolerman 1976; Russell 1974; Schachter 1978).

A WORKING MODEL OF SMOKING BEHAVIOR

A comprehensive approach to smoking risk reduction requires both an understanding of the nature of smoking risk and a model of smoking behavior. Such a working model, while subject to revision, should be both consistent with our current knowledge and heuristic. The model we employ has two essential features (see Frederiksen and Simon, in press, for a more detailed presentation).

1. Smoking is controlled by multiple factors. These factors may be classified in temporal relationship to an episode of smoking (i.e., antecedents, concomitants, and consequences) as well as by the level of each factor involved (i.e., physiological, cognitive, behavioral, and situational). The resulting matrix allows for the inclusion of diverse factors such as the nicotine regulation (Jarvik 1977; Schachter 1978), temporal control (Epstein and McCoy 1978; Frederiksen and Frazier 1978), "affective" factors (Ikard and Tomkins 1973), and situational influences (Best and Hakstian, in press; Collins and Epstein, in press). Interventions could be and in fact have been) aimed at almost any single factor or group of resulting factors (cf. Fredericksen and Simon, in press).

2. Control is individualized. This second feature of the model simply states that it is not assumed that the configuration and relative importance of controlling variables are the same across smokers. For example, the stimulant properties of nicotine may be critically important for one smoker and almost irrelevant for another. Likewise, one smoker may be strongly influenced by the presence of other smokers (modeling effect), while another smoker is not influenced at all. The point is that intersmoker commonalities or differences must be empirically demonstrated, not assumed.

THE CONTROLLED SMOKING APPROACH

Historically, behavioral approaches to smoking risk reduction have overwhelmingly focused on smoking rate reduction, with total abstinence being the goal (Frederiksen and Simon, in press). This pattern has been associated with several unfortunate practices. (1) Measurement has focused on smoking rate to the exclusion of substance and topography. An analysis of these critically important components of smoking risk is omitted. (2) There is little research effort devoted to those subjects that are unable to quit. What happens to their smoking risk? If smokers "relapse" they could be back at the preintervention starting point or possibly worse off than if they had never participated in a program at all. The point is, we simply don't know. (3) These approaches typically offer little to the smoker who is unwilling to quit entirely. In most cases they are either not seen at all or given nonspecific advice to "cut down," usually referring to a reduction in smoking rats.

One alternative approach is called controlled smoking. It was developed to be applicable to a wider range of smokers, taking into account our model of smoking behavior and the nature of smoking risk. The essential characteristics of the controlled smoking approach, to be taken up in turn, are: (1) comprehensive measurement; (2) individualized goals; (3) emphasis on regulation; (4) skill development approach to treatment.

1. Comprehensive Measurement. Given that smoking risk arises from multiple characteristics of the consumption pattern and that this pattern is influenced by multiple variables, the need for comprehensive measurement becomes apparent. Further, as is common among behavioral approaches, measurement should be ongoing or continuous. Such comprehensive and continuous measurement can play a key role in the experimental analysis and modification of smoking behavior.

The variables measured can be roughly divided into two categories. The first includes those variables that are thought to be potentially important in the regulation or control of smoking behavior (table 1). These regulation-related variables are derived from the model of smoking behavior presented earlier.

TABLE 1

VARIABLES MEASURED WITHIN A CONTROLLED SMOKING APPROACH

Category of Variable	Examples
Regulation-Related	
Antecedents	"Urges," time of day, location, activity
Concomitants	Enjoyment, presence of others, activity
Consequences	Subjective feelings, physiological changes, activity, location
Risk-Related	
Rate	Cigarettes per day, cigars per day
Substance	Pipe vs. cigar vs. cigarette; tar, nicotine and CO yield
Topography	Number of puffs, puff duration, cigarette duration, amount of tobacco burned, CO boost

The second major category of variables assessed is risk-related (table 1). These variables are related to the analysis of smoking risk presented above. It should, of course, be noted that the distinction between regulation-and risk-related variables is somewhat artificial. For example, certain physiological changes (e.g., nicotine uptake) can be both risk-and regulation-related.

While most of these variables are rather straightforward and have been previously measured, one set is relatively more novel and deserves comment. This set is smoking topography. Our assessment of smoking topography is laboratory-based (see Frederiksen, Miller, and Peterson 1977; Frederiksen and Simon, 1978a, 1978b, for procedural details). The person is simply instructed to “smoke a cigarette.” This smoking episode is videotaped and scored for a range of behavioral variables (see Table 1). In addition, the smoker is asked to give a numerical enjoyment rating (0-10 scale),

and measures of CO boost are obtained. CO boost is defined as the change in alveolar carbon monoxide (CO,) levels associated with smoking Under normal circumstances, CO level tends gradually to decay (a natural physiological process). However, when a cigarette is consumed, CO level shows a marked increase. This increase is called the CO boost. One important characteristic of CO boost is that it is variable. That is, it depends on what is smoked and how it is smoked (Frederiksen and Martin, in press). This intersubject variability is illustrated in figure 1, which shows the distribution of CO boost across 53 cigarette smokers. These data were collected by sampling CO_a immediately before and two minutes after the smoker consumed a cigarette.

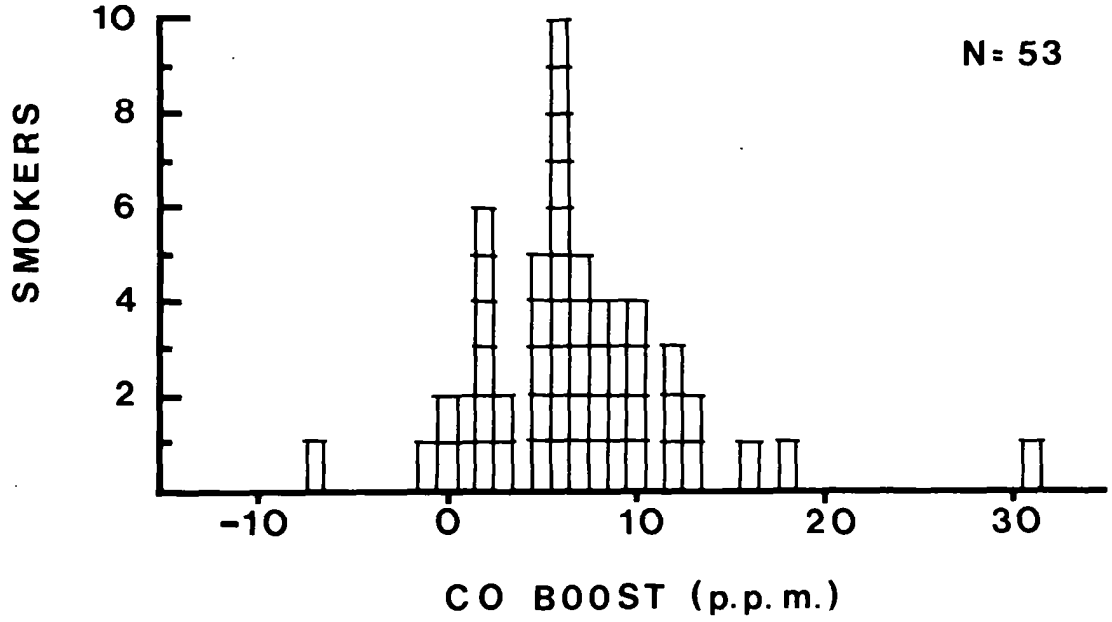
Besides being related to smoking behavior, CO boost also serves as an index of the severity of smoking risk. This arises from the finding that CO is in and of itself a smoking risk. Further, CO may serve as a convenient marker for other risk factors. Since CO is a component of the tobacco smoke one might logically assume that (holding substance constant) greater CO uptake would indicate greater "tar" and nicotine uptake. If this is in fact the case, the utility of CO_a assessment is great. In sum CO boost analysis can provide a sensitive, physiological indicator of both smoking topography and smoking risk (Frederiksen and Martin 1979).

2. Individualized Goals. A second important characteristic of the controlled smoking approach is that it emphasizes individualized goals. It equally accomodates smokers who wish to minimize risk by "cutting down" and those who wish to quit entirely. The specific goal to be pursued depends both upon the smoker's preference and his/her current smoking pattern. For example, an individual smoker may present with the goal of "cutting down." After an initial assessment it may become clear that this goal will require both a brand switch and a reduction in rate. Smoking topography would be monitored but modified only as necessary. A second smoker may also wish to cut down. He may smoke only a few cigars each day but inhale each deeply. In this case, topography change would be the main target.

Total abstinence is probably the most frequently selected goal. If abstinence is the goal, we will usually also teach the individual principles of risk reduction. The rationale for this approach is that such knowledge will be potentially useful in the event that the person "relapses." It may also be beneficial for abstinence-oriented smokers to pursue a nonzero goal, i.e., less than one cigarette per day. The purpose of such a goal is to counter feelings of deprivation associated with self-statements such as "I can never have another cigarette" (cf.Frederiksen, Peterson and Murphy 1976).

3. Emphasis on Regulation. The emphasis in the controlled smoking approach is on regulation and control rather than suppression of behavior. This places a premium on functionally analyzing variables that exert control over smoking risk rather than simply on suppressing cigarette consumption. The smokers are taught what they should do rather than focusing on what they should not do. This difference in

FIGURE 1



Distribution of CO boost.

emphasis may be more heuristic than between-group comparisons of different suppression techniques (McFall 1978).

4. Skill Development Approach to Treatment. In keeping with the above emphasis, treatment involves the development and maintenance of skills that may be useful in the regulation of risk. These skills tend to fall into three main categories.

The first set of skills are those useful in the measurement and functional analysis of smoking. The smoker learns to self-monitor smoking rate, antecedents to smoking, concomitants, and consequences. These may be behavioral, subjective, or situational.
Another possibility we are pursuing (Martin and Frederiksen, unpublished) is teaching individuals to predict physiological variables (CO level) as a step in control. When individuals have learned to monitor this range of variables, they learn to functionally analyze smoking. Put another way, they learn to detect commonalities in the antecedents and consequences that control smoking.

The second set of skills might be labeled general coping skills. These are skills that may be useful in coping with stress, resisting social pressure, managing one's own behavior, etc. Examples of these skills include refusal training, relaxation training, exercise, education regarding health, self-management, how to gather social support for efforts at quitting, etc. The important point is that these skills are not risk-specific nor do they deal with the abused substance directly. Let's take the example of exercise. The rationale for encouraging exercise is that it is healthful and may prove to be a substitute for smoking. It is an indirect technique for reducing smoking. Further, one would teach essentially the same exercise skills if the client were a smoker, a problem drinker, a problem eater, or drug abuser.

The third and final set of skills is risk-specific to the abused substance (cigarettes, cigars, pipes) as well as the smoker's individual use pattern. Here we would teach the person to change substance (e.g., switch from a high- to low-tar cigarette), reduce smoking rate, or alter smoking topography. Since these are conceptualized as skills, we train them as you would any other skill. We tell the person what to do. show him/her (model the response), have him practice the new behavior, and provide reinforcement for changes. The structuring of the reinforcement is often done within the framework of a behavioral contract (Frederiksen et al. 1976).

To illustrate this process I will present topography change data from a 26-year-old female smoker (Frederiksen and Simon 1978a). 'Ibis individual had a nine-year history of smoking and was consuming an average of 23 low tar/nicotine cigarettes, (8 mg tar, .6 mg nicotine) per day. The smoker attended laboratory sessions twice daily. Topography change instructions were introduced in a multiple baseline fashion (Frederiksen 1976) during morning sessions, while afternoon sessions served as a measure of generalization. During baseline the smoker was taking 8 to 9 puffs per cigarette. With the introduction of

instructions to reduce puff frequency, the number of puffs taken decreased to about 5 or 6 (figure 2). When instructions to reduce puff duration were subsequently introduced, this variable decreased from about 2.5 seconds per puff to just over 1 second per puff. Finally, following the introduction of instructions to reduce cigarette duration, this variable decreased from approximately 7 minutes per cigarette to about 4 minutes per cigarette. These changes were accompanied by a gradual reduction in the amount of tobacco burned. In addition, all of the positive changes were maintained at each of six monthly followups (figure 2).

Of particular importance is the effect of these topography changes on CO boost. During baseline. this individual had a mean CO boost of 8 ppm. During followup this boost was reduced to a mean of 2.1 ppm. The potential cumulative impact of this change is apparent if one assumes that this laboratory assessment is somewhat representative of smoking outside the laboratory. By multiplying the mean baseline boost (8 ppm) by the baseline smoking' rate (23 cigarettes per day) one obtains a cumulative daily boost of 184 ppm. Following topography change, the same basic calculation (2.1 ppm boost, 23 cigarettes her day) would yield a cumulative daily boost of 48.3 ppm. In this particular case the topography change phase was followed by a rate reduction phase (using contingency contracting). During rate reduction, smoking was reduced slightly from 23 cigarettes per day to 18 cigarettes per day. Consequently this subject's cumulative daily boost following treatment (2.1 ppm, 18 cigarettes per day) was reduced to 38 ppm from a preintervention baseline of 184 ppm. Viewed from this perspective, the clinical potential of this approach is readily apparent.

COMMONALITIES

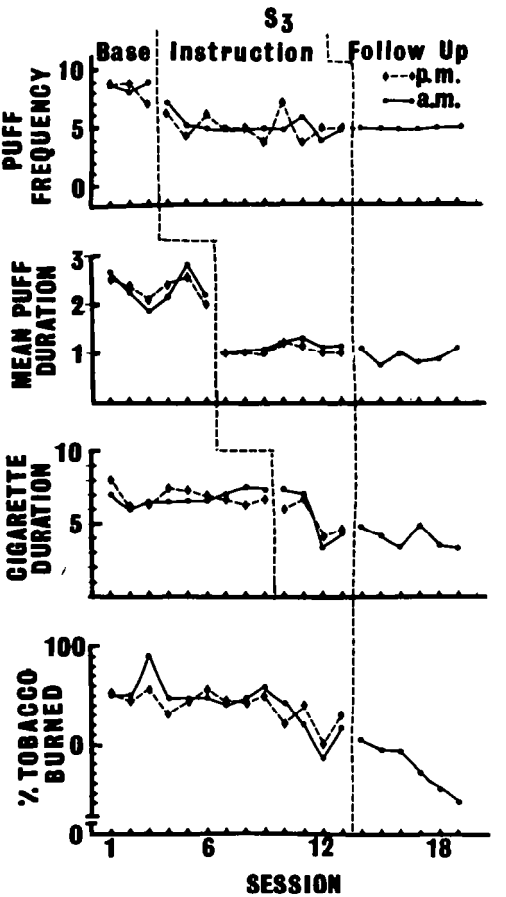
It is with a good bit of caution that I approach this section on commonalities in behavioral approaches. First, there is probably no clear definition of a behavioral approach. As researchers in the various areas become more sophisticated, there is a greater appreciation of the roles of physiology and cognitive activity, making the distinction between behavioral and nonbehavioral difficult indeed. Second, there is little empirical data either to confirm or deny the validity of the whole notion of substance abuse. Consequently, the following commonalities should be viewed more as hypotheses or suggestions' than as statements of fact.

1. The first commonality is primarily historical. In the past we have focused our efforts on suppressing "deviant" or abusive behavior. Emphasis was on the eradication of certain behaviors. This has resulted in rather homogeneous treatment goals -- usually abstinence. At times it seems that we have lost sight of our real treatment goals. Russell (1977) makes this point nicely with regard to smoking; however, the same argument is more widely applicable. He argues that "At times it has seemed that the ultimate goal is to prevent and stop people from smoking. Yet this is merely secondary. The primary goal is surely to reduce and prevent smoking-related disease" (p.14).

Not only have our goals been homogeneous, but there has been great

FIGURE 2

Topography change for a female cigarette smoker



similarity in our treatment formats. Smoking and obesity interventions are typically delivered in "clinic" formats with weekly group sessions. Certainly there is nothing about these problems that would indicate that a weekly meeting should foster maximal behavior change. For example, why not brief daily meetings? The same argument applies to alcohol and drug abuse interventions. Is inpatient treatment optimal?

Finally, there has been an excessive homogeneity of dependent variables. The clearest example of this has been in smoking research, where smoking rate is used almost to the exclusion of other measures (cf. Frederiksen and Simon, in press). While standardization clearly has some advantages, any single measure may be inadequate (see the section on the Nature of Smoking Risk above). Dr. Wooley's innovative work on obesity (in this volume) also makes this point nicely when she shifts some of the emphasis from absolute body weight to how the individual "adjusts" to a given weight.

2. Behavioral approaches seem to be placing an increasing emphasis on regulation and the controlled use of substances. To some extent this has always been the case with diet regulation, but a greater willingness to investigate methadone maintenance. controlled drinking. and co&rolled smoking-seems to be extending this trend. There also seems to be an emerging emphasis on health and "adjustment" as being issues of overriding importance.

3. There has been a trend toward the assessment and experimental evaluation of consumption behavior per se. For example, rather than labeling an individual an alcoholic, we are starting to focus on the behaviors of interest. What is the specific consumption pattern? What variables control consumatory behavior? This methodological shift is an important one since the direct, objective observation and functional analysis of specific behaviors are critical elements of the 'behavioral approach" (Baer, Wolf and Risley 1968).

4. There seems to be a greater awareness of the interaction among "substances with abuse potential." For example, the facilitative effects of ethanol on smoking behaviors have been experimentally analyzed (Griffiths, Bigelow and Liebson 1976) . This increasing emphasis will likely form the empirical base for the concept of substance abuse.

5. The therapeutic approaches to abuse of various substances also seem to share considerable common ground. Many approaches emphasize monitoring skills and general coping skills, as well as a number of substance-specific skills. Further, the use of systematic consequation (via contingency management, token economies or behavioral contracts) is quite common. This commonality suggests that there may be a possibility of developing a "core approach" to substance abuse. Further, therapeutic advances in one area may also be readily transferable to others.

6. Maintenance of behavior change has emerged as a concern separate from the induction of change. Procedures useful in inducing initial change may be ineffective in fostering maintenance. Related problems

include the issues of treatment adherence and dropouts. The emergence of dropouts, adherence, and "relapses" as important, shared concerns may foster the development of improved therapeutic procedures that can benefit all areas of substance abuse.

SUMMARY

The health risks of smoking are related to the interaction of what is smoked, smoking rate, and the topography of consumption. Assessment and treatment efforts should take all three of these factors into account. A working model of smoking behavior is proposed which involves the consideration of antecedents, concomitants, and consequences of smoking on cognitive, behavioral, situational and physiological levels. Further, the relative importance of these factors is not assumed to be the same across individuals.

An approach to smoking risk reduction, called controlled smoking, is proposed which includes the elements of: (1) comprehensive assessment, (2) individualized goals, (3) emphasis on regulation, and (4) a skill development approach to treatment. Finally, some possible commonalities among behavioral approaches to substance abuse are presented.

REFERENCES

Baer, D.M.; Wolf, M.M.; and Risley, T.R. Some current dimensions of applied behavior analysis. Journal of Applied Behavior Analysis, 1: 91-97, 1968.

Best, J.A., and Hakstian, A.R. A situation-specific model for smoking behavior. Addictive Behaviors, in press.

Collins, F., and Epstein, L.H. Temporal analysis of cigarette smoking. Addictive Behaviors, in press.

Epstein, L.H., and Collins, F. The measurement of situational influences on smoking. Addictive Behaviors, 2: 47-53, 1977.

Frederiksen, L.W. Single-case designs in the modification of smoking. Addictive Behaviors, 1: 311-319, 1976.

Frederiksen, L.W., and Frazier, M. Temporal distribution of smoking. Addictive Behaviors, 2: 187-192, 1977.

Frederiksen, L.W., and Martin, J.E. Carbon monoxide and smoking behavior. Addictive Behaviors, 4:21-30, 1979.

Frederiksen, L.W.; Miller, P.M.; and Peterson, G.L. Topographical components of smoking behavior. Addictive Behaviors, 2: 55-61, 1977.

Frederiksen, L.W., Peterson, G.L., and Murphy, W.D. Controlled smoking: Development and maintenance. Addictive Behaviors, 1: 193-196, 1976.

300-345 0 - 79 - 10

Frederiksen, L.W., and Simon, S.J. Abstract of: Modifying how people smoke: Instructional control and generalization. Journal of Applied Behavior Analysis, 11: 431-432, 1978a.

Frederiksen, L.W., and Simon, S.J. Modification of smoking behavior. In R.S. Davidson, ed., Modification of Pathological Behavior. New York: Gardner Press, in press.

Frederiksen, L.W., and Simon, S.J. Modification of smoking topography: A preliminary analysis. Behavior Therapy, 9:946-949, 1978b.

Goldfarb, T.; Gritz, E.R.; Jarvik, M.E.; and Stolerman, I.P. Reactions to cigarettes as a function of nicotine and "tar." Clinical Pharmacology and Therapeutics, 19: 767-772, 1976.

Goldman, A.L. Carboxyhemoglobin levels in primary and secondary cigar and pipe smokers. Chest, 72: 33-35, 1977,.

Griffiths, R.R., Bigelow, G.E., and Liebson, I. Facilitation of human tobacco self-administration by ethanol: A behavioral analysis. Journal of the Experimental Analysis of Behavior, 25: 279-292, 1976.

Ikard, F.F., and Tomkins, S. The experience of affect as a determinant of smoking behavior: A series of validity studies. Journal of Abnormal Psychology, 81: 172-181, 1973.

Jarvik, M.E. Biological factors underlying the smoking habit. In: Research on Smoking Behavior, National Institute on Drug Abuse Research Monograph 17. Jarvik, M.E. et al., eds. DHEW Pub. No. (ADM)78-581. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1977.

Martin, J.E., and Frederiksen, L.W. The discrimination of carbon monoxide levels by smokers, unpublished manuscript.

McFall, R.M. Smoking-cessation research. Journal of Consulting and Clinical Psychology, 47: 703-712, 1978.

Russell, M.A.H. Realistic goals for-smoking and health: A case for safer smoking. Lancet, 1: 254-258, 1974.

Russell, M.A.H. Smoking problems: an overview. In: Research on Smoking Behavior, National Institute on Drug Abuse Research Monograph 17. Jarvik, ME et al., eds. DHEW Pub. No. (ADM) 78-581. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1977.

Schachter, S. Pharmacological and psychological determinants of smoking. Annals of Internal Medicine, 1: 104-114, 1978.

United States Public Health Service. The health consequences of smoking. Washington, D.C.: United States Department of Health, Education and Welfare, 1971.

United States Public Health Service. The health consequences of smoking. Washington, D.C.: United States Department of Health,

Van Lancker, J. Smoking and disease. In: Research on Smoking Behavior, National Institute on Drug Abuse Research Monograph 17. Jarvik, M.E. et al., eds. DHEW Pub. No. (ADM)78-581. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1977.

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Chapter 10

Commonalities in the Treatment and Understanding of Smoking and Other Self-Management Disorders

Ovide F. Pomerleau, Ph.D.

INTRODUCTION

Cigarette smoking, excessive-consumption of ethanol, excessive eating, and the use of heroin constitute clinical entities in their own right—with separate basic and applied research traditions and clinical lore. These disorders, however, can also be conceptualized more generally as self-management problems. This paper will examine treatment and research related to the above disorders in an attempt to identify common features. Smoking will be emphasized, and the problem of recidivism — a major challenge for current treatment in each clinical area-will be used as a point of departure for suggesting research which could lead to the development of more rational, improved therapies.

A SOCIAL, LEARNING ANALYSIS OF SELF-MANAGEMENT DISORDERS

Social learning theory has functioned less as a formal explanatory model for specific clinical problems than as a general methodological approach with an associated intervention technology (Pomerleau 1979). Since the social learning approach to the understanding and treatment of the several disorders under review is similar, smoking will be examined here in some detail for purposes of illustration.

The basic premise of social learning theory is that smoking is a learned behavior and that it can be modified using learning and conditioning strategies. According to the model, inhalation of smoke is aversive initially. Then, typically as a result of peer pressure, with practice smoking begins to produce sufficient positive reinforcement in its own right to be sustained independently of extrinsic social reinforcement. Various events (internal and external) now begin to control smoking. By virtue of being associated with smoking, some situations, such as an empty cigarette pack or an annoying telephone call, may serve as conditional stimuli (CS's) which elicit covert responses. These reactions (physiological or cognitive responses perceived as craving) increase the likelihood of smoking by serving as discriminative stimuli (S^D's), setting the occasion for the reinforcement provided by smoking. Various environmental cues, such as the sight of a cigarette, can also function as secondary reinforcers for behaviors preceding them (e.g., purchasing

a pack of cigarettes) and as discriminative stimuli for behaviors which follow (e.g., lighting the cigarette), thus forming a complex chain of behaviors or a smoking ritual. Smoking is conceptualized as a behavior which receives direct positive reinforcement through consmption as well as negative reinforcement through termination or avoidance of aversive withdrawal states.

From the social learning perspective, smoking is resistant to modification because it is overlearned: at ten puffs per cigarette, the smoking behavior of a pack-a-day smoker is reinforced more than 70,000 times per year--a frequency unmatched by any other form of drug taking (Russell 1977). Smoking cam also be seen as a maladaptive behavior more under the influence of immediate reinforcers of relatively small magnitude than of delayed aversive consequences of considerably greater magnitude (i.e., serious illness or death). The behavioral self-management strategy of interfering with the reinforcers which maintain smoking while making delayed aversive consequences more potent is derived from this conceptualization (Rachlin and Green 1972).

Consistent with the above analysis, two main lines of behavioral treatment have evolved, emphasizing either the use of positive reinforcement techniques and employing stimulus control and contingency management procedures (Levinson, Shapiro, Schwartz et al. 1971; Elliott and Tighe 1968) or emphasizing the use of negative reinforcement and aversive conditioning techniques and employing escape/avoidance or punishment procedures (e.g., Best and Steffy 1975; Cautela 1967; Powell and Azrin 1968; Resnick 1968; Steffy, Meichenbaum, and Best 1970). The emergence of clinic programs based on these behavioral approaches has been associated with an improvement in treatment results (Bernstein and McAlister 1976; Bernstein and Glasgow 1979). In most nonbehavioral clinics, fewer than half the smokers quit (e.g., Guilford 1972) and, of those who quit, only 25 percent to 30 percent are abstinent 9 to 18 months later (Hunt and Bespalec 1974); the estimated long term abstinence rate in nonbehavioral treatment is about 13 percent (McFall and Hamnen 1971). In contrast, current reviews of behavioral treatment indicate long term sustained abstinence rates in excess of 33 percent for both positive reinforcement and aversive conditioning approaches, in the context of comprehensive treatment programs (e.g., Lichtenstein and Penner 1977; Pomerleau, Adkins, and Pertschuk 1978).

AN EXAMPLE OF MULTICOMPONENT BEHAVIROL TREATMENT

The earliest practical multicomponent program using a stimulus control/ contingency management approach was developed for weight reduction by Stuart (1967). Similar procedures have been used for other self-management disorders such as alcoholism (e.g., Pomerleau, Adkins, and Pertschuk 1978) and smoking (e.g., Pomerleau and Ciccone 1974). These concepts have also been used as components in drug treatment but, to date, very few comprehensive programs have been attempted. Since the program developed for smoking cessation at the Center for Behavioral

Medicine is fairly representative, it will be used here to illustrate the approach.

The treatment procedure, typically conducted by two therapists, was provided for groups of 8 to 10 smokers, meeting in 90-minute sessions once a week for two months during treatment and at increasing intervals over ten months during followup. There were four overlapping phases: (1) baseline--including the initial interview and first therapy session; (2) reduction--the second through the fourth session; (3) abstinence+- the fifth through the eighth session; and (4) followup — five additional sessions. Treatment consisted of an integrated sequence of instructions for dealing with various aspects of quitting smoking, as described in the self-help book, Break the smoking Habit (Pomerleau and Pomerleau 1977; pp. 95-96):

> In the baseline phase, smokers are interviewed and fill out forms for smoking history and demographic information. A prepaid treatment fee of $50 is required. A "commitment fee" (Chapman, Smith, and Layden 1971) of $50 is also requested; this fee is not returned if the participant drops out of treatment, but it can be earned back in its entirety by keeping daily records of smoking ($10 award based on completeness, not content, and $40 for attending followup sessions). In the first week of treatment, participants smoke at their usual rate and keep a daily record of each cigarette consumed, indicating time, place, with whom, mood, and degree of craving. Active treatment begins in the reduction phase. Participants set daily cigarette quotas and use various stimulus control and contingency management techniques to cut down smoking rate in preparation for abstinence three weeks later (gradual reduction with target date combines the two most effective of the procedures evaluated by Flaxman 1978). Using a stimulus hierarchy, cigarettes are deleted situation by situation (Gutman and Marston 1967); alternatively, quotas can be met by smoking to cues provided by a timer that is set at increasing intervals (Shapiro, Tursky, Schwartz et al. 1971). Other techniques include increasing delays before the first cigarette of the day and dispersing cigarettes, ash trays, and matches. Quotas are publicly stated, and social reinforcement for success is provided by the therapist as well as participants. The designated quit date marks the start of the abstinence phase. Participants prepare for quitting by cutting down to below ten cigarettes per day, providing in many cases the first success in controlling an important aspect of smoking (Bernard and Efran 1972).. .. After the participants quit, the "ultimate aversive consequences of smoking" (Ferster, Nurnberger, and Levitt 1962) are stressed for the first time (Best 1975) using educational articles (e.g., Terry and Horn 1969); and, in covert conditioning, participants pair cravings for cigarettes with the imagined health consequences of sustained smoking (Cautela 1970). Participants practice non-smoking

behavior (e.g., refusing a cigarette convincingly); they receive instruction in deep muscle relaxation (Jacobson 1938) and are encouraged to exercise as alternatives to smoking. Followup continues the treatment process over an extended period of time. Group support and encouragement for nonsmoking are provided, and the therapists are available to give assistance if problems arise or if smoking is resumed (Chapman, Smith, and Layden 1971).

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Smokers were recruited through announcements of treatment availablity in the local news media and through physician referrals. Criteria for admission to the treatment program were: (1) expressed willingness to attend treatment and followup sessions, (2) capacity to follow instructions, and (3) absence of marked psychpathology evidenced by a brief interview. The first 100 smokers who received treatment constituted the subjects of a long term outcome study. (An additional 20 smokers were screened and accepted for treatment but did not attend the first treatment session or pay a fee for service; also, eight smokers whose previous attempts to quit had been highly disruptive were not accepted for the program and were referred for psychological treatment.) As shown in Table 1, subjects in the study were similar to a random national sample (United States Department of Health, Education, and Welfare 1975) except in sex distribution, educational level, and number of previous attempts to quit smoking.

TABLE 1

DEMOGRAPHIC COMPARISON OF TREATMENT AND NATIONAL SAMPLES

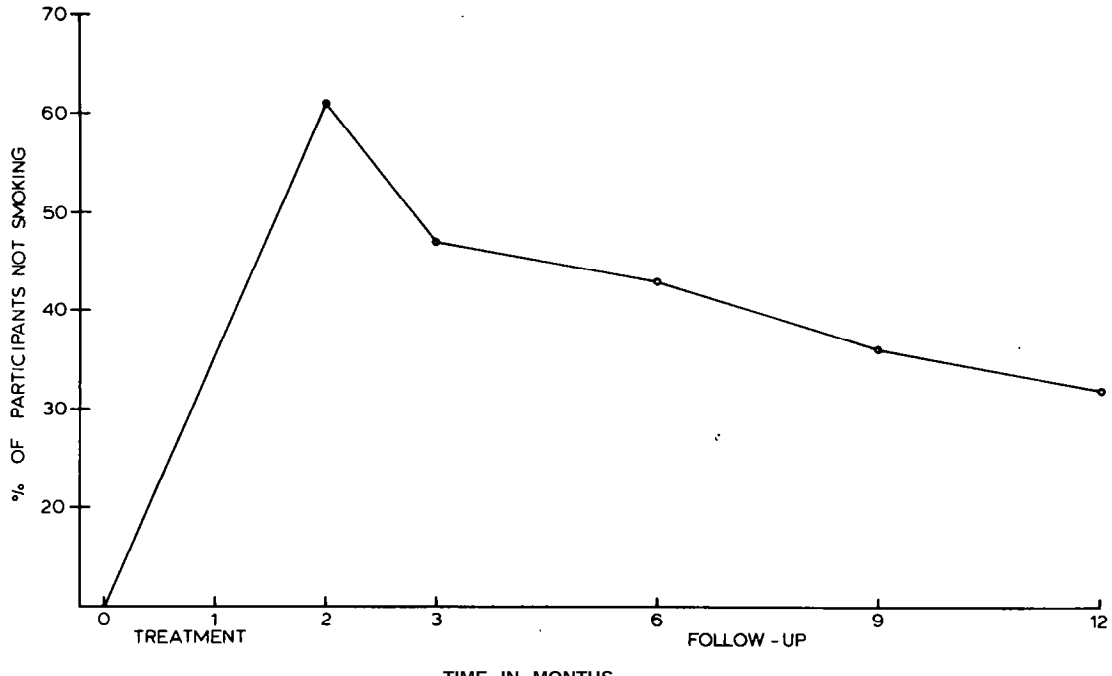
	Treatment Sample (medians)	National Sample (medians)
Age	37.5 years	39.5 years
Sex	36% male	55% male
Years of education	16 years	12 years
Age started smoking	17 years	18 years
Years smoking	20.5 years	21.5 years
Rate	30 cig./day	19.5 cig./day
Prior attempts to quit	3 times	1 time

The underrepresentation of males probably relates to the fact that treatment was conducted during working hours, and the higher education level probably reflects the university setting of 'the treatment facilities (students and university staff comprised 34 percent of the sample). The findings that the present population smoked more and had made more attempts to quit than the national average probably represent a difference between smokers entering treatment and untreated smokers in the national sample.

As can be seen in Figure 1, by the last week of treatment 61 percent of participants were not smoking, but in followup a month later the number had decreased to 47 percent and by the year anniversary followup, 32 percent. Preliminary data for 56 participants at the second anniversary followup showed only a slight additional decrement, with 29 percent not stoking. Figure 2 shows treatment results according to outcome category. As can be seen, at the end of treatment 28 percent of smokers were smoking at a reduced rate (median of 9 percent of original level) while at the first anniversary followup 49 percent were smoking at a reduced rate (median of 60 percent of original level). At the end of treatment no participants were unimproved; at the one-year followup only 4 percent were smoking at their original level. At the two year followup (for 56 participants), 34 percent were smoking at a reduced rate (median of 50 percent of original level) and the percentage of participants smoking at their original level increased to 21 percent. The previous analysis accounts for all smokers who entered treatment. The calculations used as an indicator of program effectiveness at the one-year followup (showing 32 percent abstaining and 49 percent reducing) were based on the assumption that those participants for whom information was not available (15 percent of the total) were smoking. If these subjects are deleted from the analysis, the outcome statistics become 38 percent abstaining and 58 percent reducing.

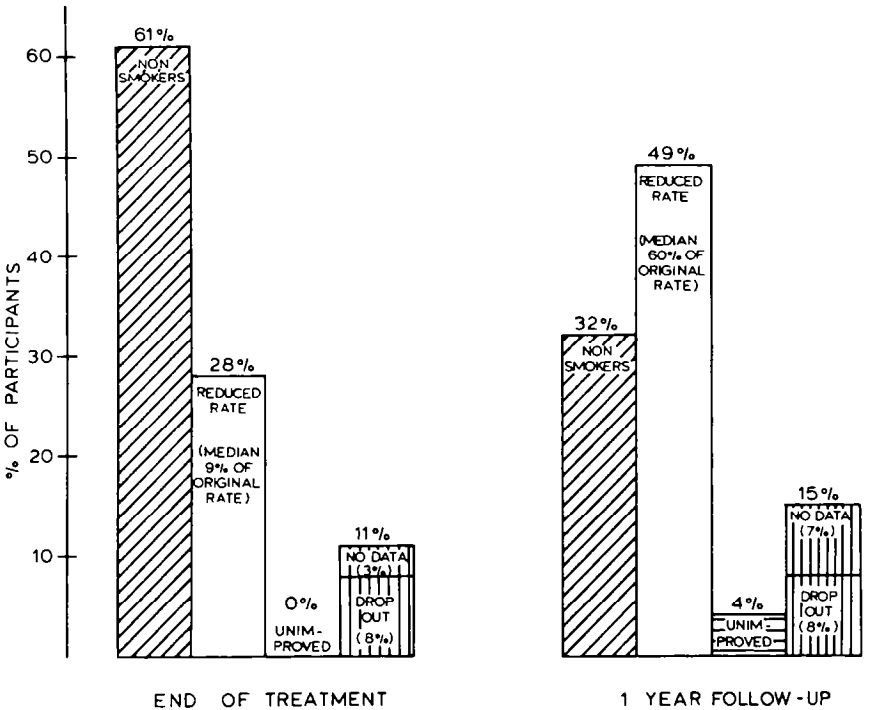
As a check on the accuracy of self-reported smoking status, data on pulse rate and nicotine levels in the body (Krumholz, Chevalier, and Ross 1965; Russell and Feyerabend 1975) were obtained from a random sample of 12 treated smokers and compared with results for a control sample of five known smokers and five known nonsmokers (employees of the Department of Psychiatry at the University of Pennsylvania). Control subjects showed 88 percent concordance between known smoking status and quantitative saliva analysis (using gas chromatography with a nitrogen detector); results for treated subjects were identical. The combined sample concordance was significantly different from chance (Sign Test; $p < .002$, one tailed). Since control subjects were presumed to have no reason to give biased self-reports and since concordance was identical for control and treated subjects, it was concluded that the 12 percent nonconcordance rate was the result of data collection problems (in particular, insufficient sample size leading to laboratory analysis errors) rather than inaccurate reporting of smoking status by treated subjects. Quantitative and qualitative urinanalysis also gave similar results. Pulse rate measurements, taken before and after therapy for treated subjects and two months apart for control subjects, were entirely consistent with self-reported smoking status: Treated subjects exhibited

FIGURE 1



Percent of participants not smoking as a function of time for 100 treated smokers (based on status during prior week). Participants not reporting were assumed to be smoking (11 participants assumed to be smoking at end of treatment and 15 assumed smoking at anniversary followup).

FIGURE 2



percent of smokers abstinent, reduced, unimproved, dropped out, or not reporting at the end of eight weeks of therapy and at the fist anniversary followup, 100 participants.

a significant reduction in heart rate (Wilcoxin Test; $p < .025$, one tailed), while control subjects showed no significant change in heart rate (in keeping with the lack of change in smoking rate). Median heart rate for treated smokers went from 80 beats per minute before to 72 beats per minute after treatment, the subjects who reported abstinence at the end of treatment had significantly lower heart rates than the subjects reporting reduction (Mann Whitney U Test, $p < .002$, one tailed).

In preliminary clinical trials, the behavioral treatment has been shown to be more effective than nonbehavioral smokers randomly assigned to a local Five-Day Plan ($N = 7$) had an immediate quit rate of 43 percent with a sustained abstinence rate of 14 Percent at the six month followup (results consistent with the findings of Thompson and Wilson 1966). Furthermore, the abstinence rate seems to be the result of treatment of smokers assigned to a waiting list control ($N=14$; median wait, 3 months), only 7 percent quit during the waiting interval while 57 percent reduced (to a median of 72 percent of original rate) and 36 percent were unchanged.

THE PROBLEM OF RECIDIVISM

Relapse following treatment is a major problem for all self-management disorders. A review of recidivism for heroin, smoking and alcohol (Hunt,Barnett, and Branch 1971; Hunt and Bespalec 1974) shows remarkably similar relapse rates for each disorder, with 70 to 75 percent of treatment successes relapsing within 12 months. Attempts to minimize relapse in the smoking area using behavior modification are illustrative of the social learning approach to the problem.

While a 50 percent recidivism rate reported for behavioral procedures for smoking (Lichtenstein and Penner 1977, Pomerleau, Adkins, and Pertschuk 1978) represents an improvement, much work remains to be done. Relatively few formal studies have been conducted on the problem to date, even though it clearly represents a major deficiency in current treatment practice (Pomerleau 1978). One obvious approach is to provide continued therapist contact following "official" treatment termination. The benefits of added therapist contact, however, have been difficult to demonstrate in controlled studies Studies evaluating the contribution of booster sessions (Kopel 1974, Relinger et al. 1977), telephone contacts with therapists (Bernstein 1970; Schmal, Lichtenstein, and Harris 1972), and contingency contracts in followup meetings (Lando 1976) have all reported negligible effects on recidivism. According to Bernstein and Glasgow (1979), the only positive findings reported to date have been a description of success in a case study (Lewittes and Israel 1975), an indication of mixed results (St. Pierre and Lawrence 1975), and a note on a recorded phone message service which indicated improved outcome over one month (Dubren 1977).

Another line of attack on the problem has been to try to make therapy more efficient and effective by individualizing treatment according to patient characteristics. In preparatory research, Pomerleau, Adkins, and Pertschuk (1978) examined pretreatment and treatment variables for 100 smokers in an attempt to determine predictors of treatment outcome and recidivism. "Negative affect" smoking, defined as reporting smoking a greater proportion of cigarettes in dysphoric states, was the only variable which significantly predicted relapse at the one year followup, a finding generally consistent with Tomkins' model (1966). While the idea of matching therapy to the smoker has been explored with respect to variables which predict outcome in therapy (e.g., Best 1975; Best and Steffy 1975), there have been no studies specifically directed toward preventing relapse using a predictor of recidivism. The closest is a report by Pechacek (1976) on the effects of providing special relaxation training: high "state anxiety" (negative affect) smokers were found to be more successful in therapy when they were provided with a manual teaching deep muscle relaxation and stress management; unfortunately, the apparent benefits of the procedure dissipated somewhat during a six-month followup. Tailoring treatment to the smoker to reduce recidivism is a plausible and attractive concept, but it has yet to receive a definitive test.

DISCUSSION

While treatment procedures for smoking and other self-management problems have improved under the influence of concepts from social learning theory, and further refinements can be expected, a major breakthrough based on behavior modification alone seems unlikely. As Lichtenstein (1977) has observed, to a large extent, behavioral researchers have assumed relationships between environmental events and smoking. Treatment practices have been based on a general theory rather than on a model which also takes into account the special characteristics of smoking as a self-management disorder. Part of the promise of social learning theory has been fulfilled, and several behavioral concepts have generated new standards of effectiveness in the treatment of smoking, but there has not been a corresponding improvement in the understanding of smoking as such. Moreover, behavioral treatment efforts have been devoted primarily toward the modification of the act of smoking, an operant behavior. Considerably less formal attention has been given to cognitive and physiological responses which constitute precursors for smoking (e.g., craving and withdrawal) and which are under the control of both exteroceptive and interoceptive stimuli. If treatment extinguishes mainly the overt act of smoking but not its conditioned cognitive or physiological concomittants, then the exsmoker will continue to be tormented by various situations and feelings which have come to be associated with smoking, and the probability of relapse will remain high. A similar argument can be made for the other self-management disorders.

The study of the recidivism process offers many opportunities for behavioral research on self-management. First, the variables which cause

relapse may provide important clues to the understanding of the development and maintenance of self-management problem. Recidivism is an all too common phenomenon and is easily specified, making it far easier and more convenient to study than initiation. Second, as exemplified by the statistics on the behavioral treatment of smoking, the principal limitation in current therapy is not the lack of effective procedures for changing behavior on a short term basis but rather the lack of effective procedures for sustaining treatment benefits.

The reminder of the present discussion will focus on the role of conditioning factors in relapse, reviewing relevant studies on several self-management disorders in an attempt to generate a common conceptual analysis. In keeping with the focus of the present paper, evidence from the several clinical areas will be used to provide a framework for directing research on smoking.

The conditionability of opiate drug states has been well established in animals and humans. Stimuli associated with the pleasurable drug state have been shown to function as secondary positive reinforcers (Davis and Smith 1976) as well as to restore ongoing instrumental responding in a manner analogous to administration of the primary reinforcing drug (Thompson and Schuster 1964). Conditioned withdrawal has been demonstrated in numerous studies on physically dependent animals and humans. For example, a previously neutral stimulus, paired with an opiate antagonist (which precipitates the withdrawal syndrome), can become an aversive CS—supressing instrumental responding, functioning as a secondary negative reinforcer, or eliciting both physiological and subjective manifestations of the abstinence syndrome (Goldberg 1976; O'Brien, Testa, O'Brien et al. 1976; Wikler 1976). The demonstration of conditionability has important implications for understanding opiate addiction relapse in humans, for it may begin to explain how environmental stimuli can precipitate conditioned craving--even after an extended abstinence period has ended physical dependence (O'Brien et al. 1976). Wikler (1965) has proposed that relapse in the detoxified addict should be expected if conditioned craving is not extinguished as part of therapy.

Though research has not been carried out as extensively or systematically in the alcoholism area, several studies do suggest the importance of conditioning factors in relapse. For example, Kennedy (1971) demonstrated that patients who exhibited pupillary dilation in response to the smell of a favorite beverage, just prior to discharge from a treatment program, were much more likely to relapse within six months than patients who did not show this response. In addition, several investigators (e.g., Ludwig, Wikler, and Stark 1974) have reported that stimuli associated with alcoholic drinking (such as a label designating a beverage alcoholic when it is not) produced physiological responses which resemble withdrawal (conditioned withdrawal) in alcoholics with a history of physical dependence. Moreover, evidence for a "protracted abstinence syndrome," in which measurable subclinical symptoms persist for months to years after physical dependence is over, has been accumulated by Kissin et al. (1959), Ludwig et al. (1977), and Wagman and Allen (1975).

A further example of how stimulus response variables can affect self-management behavior under different conditions is provided in the area of obesity. A series of studies by the Wooleys indicated that the salivary response to an external food stimulus varies as a function of the palatability of the food and beliefs regarding its caloric value and availability (Wooley and Wooley 1973). In addition, lean subjects were shown to display sensitive differentiation of salivary responses to food as a function of the caloric value of ingested preloads (Wooley, Wooley, and Williams 1977), whereas obese subjects gave uniformly large salivary responses regardless of preload (Wooley, Wooley, and Woods 1975). Rodin (1978) hypothesized that insulin release might provide the intervening physiological mechanism for the demonstrated increased responsivity to external stimuli in the obese, as insulin is involved in promoting increased ingestion and increased storage of nutrients as fat. In a series of preliminary experiments, Rodin (1978) demonstrated that the insulin response to highly palatable food was significantly greater in overweight subjects (who were especially responsive to external cues for food), compared with normal weight subjects. She concluded that, if the obese oversecrete insulin (the combined effects of reflexive and conditioned hyperinsulinemia) in the presence of compelling food cues and eat more calories in order to balance this hormonal and metabolic output, then weight reduction program might be well advised to provide more explicit extinction procedures to disrupt the associative links between salient food stimuli and eating.

The demonstration of conditioned withdrawal and conditioned craving in several self-management areas has important implications for smoking research (Pomerleau 1979). No formal investigations have been conducted to date, but the plan of action and its potential contribution to the understanding and treatment of smoking seem clear. As the first order of business, basic research on the withdrawal process should be undertaken: Smokers can be paid to abstain from cigarettes for varying periods of time, and physiological responses (e.g., blood nicotine levels, muscle tension, heart rate, etc.) and cognitive responses (e.g., subjective reports of craving, irritability, etc.) could be monitored during the withdrawal period. Using the information on unconditioned withdrawal as a baseline, the conditioned physiological and subjective effects of various stimuli naturally associated with smoking (e.g., the sight of an empty cigarette pack or the smell of cigarette smoke) could be determined under different levels of deprivation; moreover, new conditioned craving responses could be created by pairing previously neutral stimuli with smoking or nonsmoking in a laboratory situation. Several lines of applied research also seen feasible using smokers undergoing treatment as subjects. The physiological and cognitive responses to stimuli associated with smoking could be determined prior to the termination of therapy and related to outcome in followup. In addition, the idea that certain stimuli associated with smoking elicit conditioned craving responses which in turn predispose the exsmoker to relapse (Solomon-and Corbit 1973) could be tested directly in clinical trials: For example. long term abstinence rates for a standard behavioral treatment could be compared with augmented therapy in which autonomic (and cognitive)

responses were extinguished in a simulated smoking environment or modified directly using biofeedback. The result might be a demonstrably lower rate of recidivism for smokers exposed to augmented therapy.

CONCLUSION

Behavioral approaches to self-management disorders have been illustrated by reviewing the treatment of smoking. Conditioning factors in relapse were emphasized, not only because of the importance of trying to identify variables which contribute to recidivism, but also because the search for underlying mechanism my lead to the development of a more comprehensive theory of self-management; in this way, hypotheses and findings in one clinical area may stimulate research in other areas. Conditioned craving and withdrawal are not the only phenomena that can be examined profitably across disorders. For example, research on the role of positive and negative reinforcement (Jarvik 1977; Russell 1978; Schachter, Silverstein, Kozlowski et al. 1977), on conditioned tolerance (LeMagnen 1975; Siegel 1978), and on the relative contribution of interoceptive versus exteroceptive stimuli (Herman 1974; Ludwig and Wikler 1974; Schachter and Rodin 1974), may also contribute to a better understanding of self-management disorders and, ultimately, to improved therapies.

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REFERENCES

Bernard, H.S., and Efran, J.S. Eliminating versus reducing smoking using pocket timers. Behaviour Research and Therapy, 10: 399-401, 1972.

Bernstein, D.A. The modification of smoking behavior: A search for effective variables. Behaviour Research and Therapy, 8: 133-146, 1970.

Bernstein, D., and Glasgow, R. The modification of smoking behavior. In: Pomerleau, O.F., and Brady, J.P., eds. Behavioral Medicine: Theory and Practice. Baltimore: Williams and Wilkins Company, 1979.

Bernstein, D., and McAlister, A. The modification of smoking behavior: Progress and problems. Addictive Behaviors, 1: 89-102, 1976.

Best, J.A. Tailoring smoking withdrawal procedures to personality and motivational differences. Journal of Consulting and Clinical Psychology, 43: 1-8, 1975.

Best, J.A., and Steffey, R.A. Smoking modification procedures for internal and external locus of control clients. Canadian Journal of Behavioral Science, 7: 155-165, 1975.

Cautela, J.R. Covert sensitization. Psychological Reports, 20: 459-468, 1967.

Cautela, J.R. Covert reinforcement. Behavior Therapy, 1: 33-50, 1970.

Chapman, R.F., Smith, J.W., and Layden, T.A. Elimination of cigarette smoking by punishment and self management training. Behaviour Research and Therapy, 9: 255-264, 1971.

Davis, W., and Smith, S. Role of conditioned reinforcers in the initiation, maintenance and extinction of drug behavior. The Pavlovian Journal of Biological Science, 11: 222-236, 1976.

Dubren, R. Self reinforcement by recorded telephone messages to maintain non-king behavior. Journal of Consulting and Clinical Psychology, 45: 358-360, 1977.

Elliott, R., and Tighe, T. Effects of a technique involving threatened loss of money. Psychological Record, 18: 503-513, 1968.

Ferster, C.B., Nurnberger, J.I., and Levitt, E.B. The control of eating. Journal of Mathetics, 1: 87-109, 1962.

Flaxman, J. Quitting smoking now or later: Gradual, abrupt, immediate, and delayed quitting. Behavior Therapy, 9: 260-270, 1978.

Goldberg, S. Conditioned behavioral and physiological changes associated with injections of a narcotic antagonist in morphine dependent monkeys. The Pavlovian Journal of Biological Science, 11: 203-221, 1976.

Guilford, J. Group treatment versus individual initiative in the cessation of smoking. Journal of Applied Psychology, 56: 162-167, 1972.

Gutman, M., and Marston, A. Problems of subject's motivation in a behavioral program for the reduction of cigarette smoking. Psychological Reports, 20: 1107-1114, 1967.

Herman, C.P. External and internal cues as determinants of the smoking behavior of light and heavy smokers. Journal of Personality and Social Psychology, 30: 664-672, 1974.

Hunt, W.A., Barnett; L.W., and Branch, L.G. Relapse rates in addiction programs. Journal of Clinical Psychology, 27: 455-456, 1971.

Hunt, W., and Bespalec, D. An evaluation of current methods of modifying smoking behavior. Journal of Clinical Psychology, 30: 431-438, 1974.

Jacobson, E. Progressive Relaxation. Chicago: University of Chicago Press, 1938.

Jarvik, M. Biological factors underlying the smoking habit. In: Jarvik, M., et al:, eds. Research on Smoking Behavior: National Institute on Drug Abuse Research Monograph 17. DREW Pub. No. (ADM) 78-581. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1978. pages 122-148.

Kennedy, D.A. Pupilometrics as an aid in the assessment of motivation, impact of treatment and prognosis of chronic alcoholics. Unpublished dissertation, University of Utah, 1971.

Kissin, B., Schenker, V., and Schenker, A. The acute effects of ethyl alcohol and chlorpromazine on certain physiological functions in alcoholics. Quarterly Journal of Studies on Alcohol, 20: 480-492, 1959.

Kopel, J.A. The effects of self control, booster sessions, and cognitive factors on the maintenance of smoking reduction. Unpublished doctoral dissertation, University of Oregon, 1974.

Krumholz, R.A., Chevalier, R.B., and Ross, J.C. Changes in cardiopulmonary functions related to abstinence from smoking. Annals of Internal Medicine, 62: 197-207, 1965.

Lando, H. Aversive conditioning and contingency management in the treatment of smoking. Journal of Consulting and Clinical Psychology, 44: 312, 1976.

LeMagnen, J. Olfactory endocrine interaction and regulatory behaviors. In: Denton, D.A., and Coghlan, J.P., eds. Olfaction and Taste V. New York: Academic Press, 1975.

Levinson, B.L., Shapiro, D., Schwartz, G.E., and Tursky, B. Smoking elimination by gradual reduction. Behavior Therapy, 2: 477-487, 1971.

Lewittes, D., and Israel, A.C. Responsibility contracting for the maintenance of reduced smoking: A technique innovation. Behavior Therapy, 6: 696-698, 1975.

Lichtenstein, E. Current approaches: Social learning.' In: Jarvik, M., et al., eds. Research on Smoking Behavior, National Institute on Drug Abuse Research Monograph 17. DHEW Pub No. (ADM) 78-581. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1978. pages 348-354.

Lichtenstein, E., and Penner, M. Long term effects of rapid smoking treatment. Addictive Behaviors, 2: 109-112, 1977.

Ludwig, A., Cain, R., Wikler, A., Taylor, R., and Benfeldt, F. Physiologic and situational determinants of drinking behavior. In: Gross, M.M., ed. Alcohol Intoxication and Withdrawal: Experimental Studies III, Advances in Experimental Medicine and Biology. Vol. 85. New York: Plenum Press, 1977.

300 - 345 0 - 79 -11

Ludwig, A., and Wikler, A. "Craving" and relapse to drink. Quarterly Journal of Studies on Alcohol, 35: 108-130, 1974.

Ludwig, A., Wikler, A., and Stark, L. The first drink. Archives of General Psychiatry, 30: 539-547, 1974.

McFall, R., and Hammen, C. Motivation, structure, and self monitoring: Role of specific factors in smoking reduction. Journal of Consulting and Clinical Psychology, 37: 80-86, 1971.

O'Brien, C., Testa, T., O'Brien, T., and Greenstein, R. Conditioning in human opiate addicts. The Pavlovian Journal of Biological Science, 11: 195-202, 1976.

Pechacek, T. Specialized treatment for high anxious smokers. Paper presented at the annual meeting of the Association for the Advancement of Behavior Therapy, New York, December, 1976.

Pomerleau, O.F. Strategies for maintenance: The problem of sustaining abstinence from cigarettes. Paper presented at the International Conference on smoking Cessation, New York, June, 1978.

Pomerleau, O.F. Why people smoke: Current psychobiological models. In: Davidson, P., ed. Behavioral Medicine: Changing Health Lifestyles. New York: Brunner/Mazel, 1979.

Pomerleau, O., Adkins, D., and Pertschuk, M. Predictors of outcome and recidivism in smoking cessation treatment. Addictive Behaviors, 3: 65-70, 1978.

Pomerleau, O.F., and Ciccone, P. Preliminary results of a treatment program for smoking cessation using multiple behavior modification techniques. Paper presented at the annual meting of the Association for the Advancement of Behavior Therapy, Chicago, November, 1974.

Pomerleau, O.F., Pertschuk, M., Adkins., and Brady, J.P. A comparison of behavioral and traditional treatment for middle income problem drinkers. Journal of Behavioral Medicine, 1: 187-200, 1978.

Pomerleau, O., and Pomerleau, C. Break the Smoking Habit: A Behavioral Program for Giving Up Cigarettes. Champaign, Illinois: Research Press, 1977.

Powell, J., and Azrin, N. The effects of shock as a punisher for cigarette smoking. Journal of Applied Behavioral Analysis, 1: 63-71, 1968.

Rachlin, H., and Green, L. Commitment, choice and self control. Journal of Experimental Analysis of Behavior, 17: 15-22, 1972.

Relinger, H., Bernstein, P.H., Bugge, I., Carmody, T.P., and Zohn, C.J. Utilization of adverse rapid smoking in groups: Efficacy of treatment and maintenance procedures. Journal of Consulting and Clinical Psychology, 45: 245-249, 1977.

Resnick, J.H. The control of smoking behavior by stimulus satiation. Behaviour Research and Therapy, 6: 113-114, 1968.

Rodin, J. Has the internal versus external distinction outlived its usefulness? In: Bray, G., ed. Advances in Obesity Research. Vol. 2. London: Newman Press (in press), 1978.

Russell, M.A.H. Smoking problems: An overview. In: Jarvik, M., et al., eds. Research on smoking Behavior, National Institute on Drug Abuse Research Monograph 17. DHEW Pub No. (ADM) 78-581. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1978. pages 13-34.

Russell, M.A.H. Smoking addiction: Sane implications for cessation. Paper presented at the International Conference on Smoking Cessation, New York, June, 1978.

Russell, M.A.H., and Feyerabend, C. Blood and urinary nicotine in nonsmokers. The Lancet, 179-181, January 25, 1975.

Schachter, S., and Rodin, J., eds. Obese Humans and Rats. Washington, D.C.: Earlbalum/Wiley, 1974.

Schachter, S., Silver-stein, B., Kozlowski, L., Perlick, D., Herman, P., and Liebling, B. Studies of the interaction of psychological and pharmacological determinants of smoking. Journal of Experimental Psychology, 106: 3-40, 1977.

Schmahl, D.P., Lichtenstein, E., and Harris, D.E. Successful treatment of habitual smokers with warm smoky air and rapid smoking. Journal of Consulting and Clinical Psychology, 38: 105-111, 1972.

Shapiro, D., Tursky, B., Schwartz, G., and Shnidman, S. Smoking on cue: A behavioral approach to smoking reduction. Journal of Health and Social Behavior, 12: 108-113, 1971.

Siegel, S. A Pavlovian conditioning analysis of morphine tolerance. In: Krasnegor, N.A., ed. Behavioral Tolerance: Research and Treatment Implications. National Institute on Drug Abuse Research Monograph 18. DHEW Pub. No. (ADM) 78-551. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1978. pages 27-53.

Solomon, R., and Corbit, J. An opponent process theory of motivation: II Cigarette addiction. Journal of Abnormal Psychology, 81: 158-171, 1973.

Steffy, R.A., Meichenbaum, D., and Best, J.A. Aversive and cognitive factors in the modification of smoking behavior. Behaviour Research and Therapy, 8: 115-125, 1970.

St. Pierre, R., and Lawrence, P.S. Reducing smoking using positive self management. Journal of School Health, 45: 7-9. 1975.

Stuart, R. Behavioral control of overeating. Behaviour Research and Therapy, 5: 357-365, 1967.

Terry, L., and Horn, D. To Smoke or Not to Smoke. New York: Lothrup, Lee, and Sheport, 1969.

Thompson, T., and Schuster, C. Morphine self administration, food reinforced and avoidance behavior in rhesus monkeys. Psychopharmacologia, 6: 267-279, 1964.

Thompson, D., and Wilson, T. Discontinuance of cigarette smoking: "Natural" and with "Therapy". Journal of the American Medical Association, 196: 1048-1052, 1966.

Tomkins, S. Psychological model for smoking behavior. American Journal of Public Health, 56: 17-20, 1966.

United States Department of Health, Education, and Welfare. Adult Use of Tobacco - 1975. Atlanta, Georgia: Public Health Service, Center for Disease Control, 1975.

Wagman, A., and Allen, R. Effects of alcohol ingestion and abstinence on slow wave sleep of alcoholics. In: Gross, M.M., ed. Alcohol Intoxication and Withdrawal: Experimental Studies II, Advances in Experimental Medicine and Biology. Vol. 59. New York: Plenum Press,. 1975, pp. 453-366.

Wikler, A. Conditioning factors in opiate addictions and relapse. In: Wilner, D., and Kassebam, G., eds. Narcotics. New York: McGraw Hill Book Company, 1965.

Wikler, A. Symposium on conditioning and addiction. The Pavlovian Journal of Biological Science, 11: 191-194, 1976.

Wooley, S., and Wooley, 0. Salivation to the sight and thought of food: A new measure of appetite. Psychosomatic Medicine, 35: 136, 1973.

Wooley, O., Wooley, S., and Williams, B. Effect of the prior protein intake on appetite for palatable food. Paper presented at the annual meeting of the American Psychological Association, September, 1977.

Wooley, O., Wooley, S., and Woods, W. Effect of calories on appetite for palatable food in obese and nonobese humans. Journal of Comparative and Physiological Psychology, 89: 619, 1975.

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Chapter 11

Problem Drinking and Substance Abuse: Behavioral Perspectives

William R. Miller, Ph.D.

ALCOHOLISM AND PROBLEM DRINKING

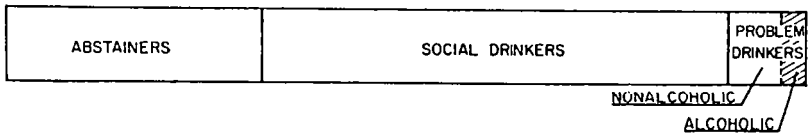
Although alcoholism is widely acknowledged to be a serious public health problem there is relatively little agreement regarding the necessary and sufficient conditions for diagnosing it (Miller 1976). Some definitions regard as "alcoholic" any person displaying one or more of a wide range of alcohol-related problems (e.g., National Council on Alcoholism 1972; World Health Organization 1952). Others have favored reserving the term alcoholism" for the more severe end of the continuum of problem drinking or for individuals displaying signs of physiological addiction (Miller & Caddy, 1977). The widely quoted incidence figure of nine million (more recently ten million) alcoholics in the United States was apparently based upon a double misinterpretation of data provided by Cahalan's (1970) excellent survey of American drinking practices and problems, and is an estimate without substantive basis, particularly, in light of current disagreement regarding diagnostic criteria.

We do know from Cahalan's research that approximately one of every eleven American adults reports significant life problems related to alcohol use and on this basis may descriptively be termed a "problem drinker" (Cahalan 1970). This would project an incidence figure for problem drinking in the United States in excess of fifteen million individuals. This is graphically portrayed in figure 1, which is based on Cahalan's findings. About one-third of American adults drink less often than once a year and can functionally be considered abstainers. (These would include, of course, those who have successfully maintained abstinence following a former period of problem drinking.) Of the two-thirds who do drink, most do not experience significant life problems as a result. Nevertheless a surprising number (nine percent of the total population or about thirteen percent of the drinkers) do report sufficient interference in functioning to warrant the title "problem drinker." Only the broadest of definitions would label all of these individuals as "alcoholic." By most diagnostic standards only a subset of these problem drinkers - the more advanced or severe cases - would be so labeled. Miller and Caddy (1977) have proposed, albeit somewhat circularly, that the term

"alcoholic" be reserved for cases in which abstinence is a necessary goal of treatment. The shaded portion of the figure is an arbitrarily chosen proportion to illustrate the distinction between problem drinkers ingeneral and the more limited subset of alcoholism, whatever the criteria for differentiation.

FIGURE 1

GRAPHIC REPRESENTATION OF THE CONTINUUM MODEL



This is not a trivial distinction. The treatment of alcoholism has traditionally been devoted to the attainment of total abstinence. Persons seeking treatment for drinking problems have typically been enjoined to accept the label "alcoholic" and to discontinue use of alcohol completely. Yet it is now quite clear that controlled drinking, long regarded as impossible for alcoholics to maintain, is an attainable outcome for some if not many problem drinkers (Lloyd & Salzberg 1975; Miller & Caddy 1977; Miller & Munoz 1976; Pattison, Sobell & Sobell 1977). Failure to distinguish alcoholics from problem drinkers in general may imply either that abstinence is necessary or that controlled drinking is possible for all problem drinkers, and neither statement is accurate. It was, in part, a failure to recognize this distinction that lay at the heart of the heated controversy regarding the Rand Report (Armor, Polich, & Stambul 1976).

An important diagnostic task for us then is to distinguish those for whom abstinence is necessary from those for whom controlled drinking is attainable, whether or not we choose to label these two categories as "alcoholic" and "problem drinker" respectively. Seeking predictors of successful treatment outcomes, Miller and Joyce (1978) found that individuals who attained controlled drinking generally (1) had lower alcohol consumption at intake; (2) had less family history of alcoholism; (3) showed less severity ofproblem drinking; (4) were more likely to be female; and (5) were lesslikely to identify themselves as alcoholic. Successful abstainers, on the other hand, (1) showed more severe drinking problems; (2) were more likely to have labeled themselves as alcoholic; (3) had more family history of alcoholism; and (4) were more likely to be males. These findings are largely consistent with those of other studies seeking predictors of success in controlled drinking (e.g., Orford 1973; Popham & Schmidt 1976; Smart 1978; Vogler, Compton & Weissbach 1975; Vogler, Weissbach & Compton 1977). With the accumulation of such prognostic data it may eventually be possible to establish empirical criteria for differential treatment assignment.

But why consider controlled drinking at all? There are several compelling reasons. The requirements of a lifelong abstinence commitment and acceptance of the label "alcoholic" are met with substantial resistance by many problem drinkers. Clients may be more willing to

seek and accept treatment with a goal of controlled drinking and to do so earlier in the development of drinking problems, thereby improving prognosis as well as preventing the development of more serious deterioration characteristic of alcoholism. Those who truly require abstinence may more readily accept this fact when confronted by failure in a systematic control oriented program, thereby circumventing denial and again speeding recovery. Also to be considered is the fact that only a minority of clients maintain successful abstinence following treatment (Emrick. 1974, 1975). We can hardly afford to ignore treatment approaches that may improve overall success rate and/or reach a different portion of the population.

On the other hand the importance of abstinence-oriented approaches must not be underestimated. There are individuals for whom the process of recovery unquestionably must include total abstinence from alcohol. Miller and Caddy (1977) have suggested contraindications to a goal of moderation, among them pharmacological addiction to ethanol, advanced liver disease, and pathological intoxication. There are also many individuals who will prefer abstinence or find it easier than the continual decisions and self-control measures necessary for controlled drinking (Reinert & Bowen 1968). Under certain circumstances (e.g., pregnancy, cardiovascular disease) even relatively moderate amounts of alcohol may be hazardous, and no safe level of drinking has been established. Under conditions like these, individuals should be counseled toward and offered our most effective approaches to abstinence. Hopefully the years ahead will bring more valid criteria for differentiating those for whom abstinence is necessary from the more general population of problem drinkers.

ASSESSMENT OF PROBLEM DRINKING

Before turning to a discussion of treatment outcome research it will be useful to consider methods and problems of assessment in alcohol abuse. Special difficulties are raised when moderate drinking outcomes are of interest, and these will receive particular attention.

Perhaps the simplest approach to assessment is the attempt to establish and differentiate a dichotomy - in this case, alcoholic versus nonalcoholic. Despite the large number of instruments and procedures purported to accomplish this, none provides satisfactory reliability and cross-situational validity, nor do such dichotomous classifications prove prognostically predictive. Miller (1976) has suggested focusing diagnostic assessment instead on two continuous dimensions: the extent and pattern of alcohol use, and the extent and nature of problems related to alcohol consumption. A continuum of severity may be more helpful in selecting treatment goal and modality and in predicting and assessing outcomes.

Measuring Alcohol Consumption

A Standardized Unit. One problem to be addressed in assessing alcohol consumption is how to combine and compare consumption volumes across a wide variety of alcohol beverages. Fortunately all beverage alcohol contains the same basic substance, ethanol, varying only in concentration and in the nature of congeners accompanying the alcohol. This allows all beverages to be converted into a standard unit with which

total alcohol consumption can be calculated and compared. One possibility which has been used in several studies is simply to calculate the total amount of absolute ethanol consumed by multiplying the volume of beverage by the proportion of alcohol it contains. Thus three ounces of 80 proof (40% alcohol) vodka contain 1.2 ounces of ethanol. Our clinics have chosen to employ a Standard Ethanol Content (SEC - plural: SECs) unit equivalent to one half ounce of absolute ethyl alcohol. This unit has the advantage of being equal to the approximate content of many typical drinks (10 oz of 5% beer; 4 oz of 12% wine; 2.5 oz of 20% wine; 1 oz of 100 proof spirits) and is more comprehensible to clients, for whom we describe a SEC as "one drink" (Miller & Muñoz 1976).

Self-Report. Short of continuous direct observationof drinking, perhaps the best source of data regarding alcohol consumption is the client's self-report. Certainly this is the most frequently used measure in outcome studies. If outcome is regarded as dichotomous (i.e., abstinent or not), the question is a simple one: "Are you now or have you ever been (during the past X months) drinking?" When the goal is moderation or when degree of improvement is to be considered, a more specific quantification of drinking becomes important. Marlatt (1976) has described a detailed Drinking Profile that assists both client and interviewer in quantifying alcohol intake. Daily, weekly, and periodic consumption are estimated on a beverage by-beverage basis.

The combining and reporting of such self-report data present some formidable problems. If weekly SECs are used, the client who consumes 14 drinks during one day per week and the client who has two drinks daily appear to be identical (14 SECs per week). Even if daily data are reported, there is no distinction between four drinks in one hour and one drink every four hours. Periodic drinkers pose particular problems in this regard. Cahalan's (1970) quantity/frequency index can be employed to summarize total consumption over a longer period of time such as a month or even a year, but a change from severe binges to steady and moderate drinking is not adequately reflected by the product of quantity and frequency.

If the interviewer obtains data regarding drinking pattern, including typical time intervals between drinks, it becomes possible to estimate peak blood alcohol concentration (BAC) for a client of given weight and sex (Matthews & Miller 1979). Variability in pattern and the difficulty of accurately recalling time intervals raise some question about the validity of such reports, but this method may nevertheless provide some correction for the shortcomings of reporting consumption volume only.

The vicissitudes of memory may be at least partially avoided by the most detailed method of self-report, client self-monitoring. Typically the person is instructed to record each drink just prior to taking the first sip, noting the date, time, type, and amount of beverage (Miller & Muñoz 1976). Data from daily record cards can then be combined manually or by computer (Matthews & Miller, 1979) to provide more detailed estimates of daily consumption, peak and mean BAC, etc.

Corroborative Data. The accuracy of self-report of problem drinkers has often been questioned due to presumed denial and memory problems

in this population. Research. comparing self-reports with corroborating data, however, have often supported the veraciousness of first hand drinking reports, particularly when a detailed interviewing or self-monitoring procedure has been used (Miller, Crawford, & Taylor 1979). Nevertheless it may be desirable to obtain corroborative data, if for no other reason than to encourage greater accuracy in self-reports of clients.

The most common method for corroborative client data is to interview collateral sources, usually family members, friends, drinking partners, coworkers or employers. As with self-report, it is easiest to ask whether or not the client has been drinking, and quantitative estimates are more difficult. We have found that very few collaterals volunteer such estimates or provide them when asked merely, "Do you know how much X drinks?" Through more structured interviewing, however, we have been able to obtain quantitative data from approximately 70% of collaterals. Most valuable are reports of drinking that is actually observed by the collateral, although estimates based on other data (e.g., number of. empty bottles seen) may be helpful. After interviewing a number of collaterals we construct a composite collateral report by combining data for each time block (morning, afternoon, evening) of each day in a typical week, giving preference to data from collaterals who observe drinking and resolving discrepancies conservatively by favoring the higher estimate when two observations conflict. Correlation between the composite collateral profiles and clients' self-reported data have been of the order of .70 in our research.

Miller, Hersen, Eisler, and Watts (1974) introduced another method for corroborating client data. A staff member visited the client at home or elsewhere in the natural environment at random intervals to obtain a breath sample that was later analyzed for BAC. We are presently exploring the feasibility of this somewhat intrusive procedure in larger scale outcome research.

Alcohol consumption may be corroborated indirectly via a number of medical procedures. Reyes, Miller, Taylor and Spalding (1978) have found marked improvement on liver function tests (SGOT and GGTP) among problem drinkers following a treatment program oriented to reduction in alcohol consumption. The latter test (GGTP) appears to be particularly sensitive to binge drinking, although further research regarding consumption/enzyme relationships is needed. Shaw, Lue and Lieber (1978) have advocated measurement of the ratio between plasma alpha-amino-N-butyric acid and leucine for detecting recent chronic alcohol intake. Like more gross examination procedures such as liver palpation, these tests assess the results of alcohol consumption and are therefore useful in screening and as corroborating data. It should be recognized, however, that such tests merely reflect alcohol use and provide neither definitive diagnosis for alcoholism nor unique solutions to the diagnostic conundrums of this area.

Alcohol-Belated Problems

The extent of life problems related to drinking is a critical focus for assessment both at intake and at followup. A structured interview or questionnaire may provide quantitative indices of problem severity useful in prognosis and in outcome evaluation. Selzer's (1971) Michigan

Alcoholism Screening Test is a problem checklist of this kind. Although Selzer proposed it for the purpose of making a dichotomous classification of alcoholic/nonalcoholic, it has proved helpful as a continuous index of severity of problem drinking. Miller and Joyce (1978) found this scale to be prognostic of treatment outcome, with highest scorers at intake (most severe problems) becoming abstainers, moderate scorers becoming controlled drinkers, and lowest scorers experiencing less successful outcomes.

Qualitative if not quantitative data regarding life problems can also be obtained by interviewing collaterals as well as clients themselves. We have found Kiresuk's (1972) method of Goal Attainment Scaling to be helpful in quantifying problem areas at intake, thereby facilitating rating of improvement at follow-up periods. A composite collateral profile can be constructed from interviews, as described above for alcohol consumption.

Several investigators (e.g., Miller 1978a; Sobell, Sobell & Samuels, 1974) have consulted public records to obtain corroborative data regarding client problem areas. Instances of alcohol-related arrests, driving offenses, and hospitalizations may be documented, assisting in the confirmation or disconfirmation of abstinence. Information about employment and social functioning may also be obtained. Sobell et al. (1974) reported good agreement between client self-report and corroborative data from public records.

Improvement Ratings

Measures of central tendency can be misleading. A steady decline in mean drinking of a group may represent, at the extremes! an analogous decline in all members or a successive adoption of abstinence by an increasing number of individuals. Consequently it is important to provide data regarding the outcomes of individuals as well as the usual nomothetic analyses.

This process is greatly simplified if one is interested only in abstinence as a successful outcome. The box score in this case consists of the number of abstinent and nonabstinent individuals in each treatment condition at each assessment point. Even abstinence-oriented programs, however, have tended to report some nonabstinent cases as "improved," often without explaining the basis for this classification. When the outcome dichotomy is abandoned, the picture becomes considerably more complicated.

Consider first the rating of individuals on the basis of alcohol consumption alone. What is a success? must the individual drop below some absolute ceiling of alcohol consumption arbitrarily defined as "moderate" or "controlled" drinking? Such a criterion poses many problems. Suppose we choose 20 drinks (SECs) per week, the approximate mean drinking level for American drinkers (Miller & Muñoz 1976), as a maximum for "controlled drinking." A client who drops from 21 to 20 drinks is then a success, whereas a client who plunges from 180 to 21 drinks is a failure. If on the other hand we require a 50 percent reduction in consumption in order to be "successful," then a client dropping from 180 to 90 drinks per week is a success, whereas the client going from 18 to 12 drinks per week is a failure. Increasing the number of classification

categories improves flexibility of the system but does not obviate this problem. In addition, as noted earlier, consumption data fail to reflect pattern of drinking. The client drinking 3-4 drinks per day and spacing them 3 hours apart is regarded an equal success with the client who drinks once per week but downs a fifth of Scotch in an hour. A comprehensive improvement rating system based on alcohol use must consider at least (1) absolute level of drinking, (2) amount of reduction in consumption, and (3) patterning of drinking. One attempt to establish such a system is described by Miller (1978 a). If in addition to alcohol consumption overall life functioning or improvement in alcohol related problems is to incorporated, the possibilities and perplexities multiply. Multidimensional outcome rating systems have been employed by Sobell and Sobell (1973, 1976) and by Vogler et al. (1975, 1977).

CONTROLLED DRINKING THERAPIES

Prior to 1970 the problem drinker who did not regard herself or himself as an alcoholic and who did not wish to become abstinent had almost nowhere to turn. It was in that year that Lovibond and Caddy (1970) published the first report of controlled research with a treatment technique designed to moderate alcohol use. Their success rate of more than 75 percent was encouraging. There followed a series of reports with similar success rates from a variety of intervention methods Caddy E Lovibond 1976; Gottheil et al. 1972; Hedberg & Campbell 1974; Miller 1977; 1978b; Pomerleau et al. 1978; Sobell & Sobell 1973, 1976; Vogler, Weissbach & Compton 1977; Vogler et al. 1977). The details of these studies are beyond the scope of this chapter and have been reviewed elsewhere (Hamburg 1975; Lloyd & Salzburg 1975; Marlatt & Nathan 1978; P. M. Miller 1977; W. A. Miller 1976; Pattison, Sobell & Sobell 1977; Sobell & Sobell 1978). Suffice it to say that with rare exceptions (e.g., Ewing & Rouse 1973) a consistently high percentage - usually over 60 percent - of clients seeking and treated with a goal of controlled drinking have been found to attain and to maintain nonproblematic moderation. These findings are in striking contrast to the percentage of clients who become controlled drinkers following abstinence-oriented treatment, usually about five percent (Emrick 1974).

Our own research over the past five years has explored the relative effectiveness of alternative outpatient treatment approaches to controlled drinking for problem drinkers. These interventions have ranged from unitary approaches focusing only on drinking behavior to broad spectrum programs targeting presumed underlying and related problem behaviors. The amount of therapist time required has varied from minimal contact in self-help programs to extensive modalities with weekly sessions of three hours or more. From this series of studies has emerged a treatment approach we have called "behavioral self-control training" because most of its components have derived directly from the more general self-control literature (Thoresen & Mahoney 1974). It is a flexible treatment program, amenable to presentation in a variety of modalities, including bibliotherapy, individual and group therapy. The basic strategies included in this program will be described first, before we turn our attention to the research from which it grew.

The behavioral self-control training program at present progresses through six phases. These will be outlined briefly here, and are described in greater detail elsewhere (Miller & Muñoz 1976).

1. Setting Limits. The first step in this program involves the client in setting limits for his or her own drinking. Three educational elements are included in this phase: (1) how to standardize alcohol consumption into a "one drink" (SEC) unit, as described above; (2) normative information about American drinking practices; and (3) information regarding blood alcohol concentration. As part of the last of these educational components the client is provided with an individualized table for estimating blood alcohol level from drinking data (Matthews & Miller 1979) and a list of the expected effects of various blood alcohol concentrations. The client then chooses two goal limits. The first of these, the regular limit, represents the client's goal for maximum number of drinks on an average day. This goal appears to be heavily influenced by information we provide regarding normative drinking practices. The second goal, the absolute limit, represents a maximum which the client chooses not to exceed on any drinking occasion. This latter goal is chosen on the basis of a blood alcohol ceiling that the client wishes to observe, which is then translated into alcohol consumption limits. Roth goals represent long term objectives, and we typically set weekly goals that successively approximate the desired limits. It has been our experience that clients more readily control peak blood alcohol within early weeks of the program and so obtain their absolute limit goal first. Reduction in number of drinks occurs more gradually.

2. Self-Monitoring. A procedure for self-monitoring is explained to the client, who is then provided with a supply of daily data cards. Clients record the date, time, type, and amount of each drink as well as relevant antecedent and consequence information. Instructions are to record each drink just before taking the first sip. Practice in recording is provided, as is role playing of possible situations that could interfere with recording. We have found that self-monitoring alone often produces a substantial decrease in alcohol consumption, although without further measures it seems likely that this reduction would be transitory. A sample self-monitoring card is shown below.

Week Beginning: _____ Card # _____ I.D. # _____

	Day	Time	Drink Type	Amount	Where	With Whom
1						
2						
3						
4						
5						
6						
7						
8						

3. Rate Control. Next the client is instructed in procedures for slowing down consumption rate, based upon the work of the Sobells (1973). Clients are instructed to select beverages with lower alcohol concentration, to take smaller sips and to space sips more widely, to observe a minimum time limit before starting another drink, to intersperse nonalcohol beverages, and so on. Role playing on how to refuse unwanted drinks is also included.

4. Self-Reinforcement. Clients are taught to recognize small signs of progress on self-monitoring cards and to reinforce themselves accordingly. Conventional 'self-reinforcement contracts are encouraged, as are positive self-statements and covert self-instructions. Self-punishment is used cautiously within contracts, usually employing constructive but aversive events as a consequence of nonfulfillment.

5. Functional Analysis. When several weeks of daily record cards have been completed the process of functional analysis begins. Data cards are examined for consistent antecedents or consequences of heavy drinking. We uniformly find that overdrinking is not a random behavior but corresponds with various environmental events (e.g., certain companions or locations, specific times of day or days of the week, certain concomitant activities) or reported feelings (e.g., depression, anger! anxiety, tension, hunger, fatigue). This analysis provides direction for the final phase of the program.

6. Alternatives to Drinking. When high risk situations have been identified a variety of strategies may be implemented. Stimulus control procedures may be used to alter environmental conditions associated with high probabilities of overdrinking. Frequent antecedents of overdrinking often represent situations in which alcohol is being used as a coping strategy, suggesting the utility of teaching alternative coping skills. This phase of the program may include training in skills for coping with problems such as anxiety, depression, insomnia, boredom, and interpersonal conflicts. Both problem focus and intervention methods during this phase are highly individualized and prescriptive (Dimond, Havens & Jones, 1978; Goldstein & Stein, 1976).

Treatment Outcomes Research

Each of the five studies described below included one or more forms of behavioral self-control training, comparing the relative effectiveness of alternative approaches. In each study we were treating self-referred problem drinkers whose goal was moderation. The average age of our clients was about 40. They had been drinking on the average for about 25 years and had been problem drinkers (by their own definition) for about 9 years. Almost all scored within the "alcoholic" range on the Michigan Alcoholism Screening Test (mean score around 18), evidencing serious life problems related to drinking. Their mean alcohol consumption at intake was equivalent to more) than two fifths of 100 proof spirits per week. At the outset of this series of studies behavioral self-control training was only one alternative approach. As support for this approach accumulated, we began exploring the necessary and sufficient components as well as the effectiveness of some alternative formats for behavioral self-control training.

The first study in this series (Miller 1978a) was begun in 1974 and evaluated the relative effectiveness of three treatment modalities: (1) electrical aversion therapy; (2) behavioral self-control training; and (3) an extensive individual treatment program similar to that described by Vogler, Compton & Weissbach (1975) and modeled after techniques introduced by Sobell and Sobell (1973) and by Lovibond and Caddy (1970). All three modalities involved individual therapy sessions, although the last of these required three hours per week, whereas the former two required only 30- to 50-minute sessions weekly. All three modalities proved to be about equally effective at one year followup. From this it seemed reasonable to conclude that behavioral self-control training, which required less therapist contact and no special equipment, is the most cost effective of these approaches. It was a somewhat serendipitous finding, however, that was to suggest our second study. We prepared a brief self-help manual that included the basic instructions for behavioral self-control and also included consideration of motivations for drinking, with suggested alternative coping strategies, such as progressive deep muscle relaxation and assertion training. We had originally intended to distribute this to all treated clients at termination, but decided instead to randomly select half of our cases to receive the manual. The other half were not given the manual until the three-month followup interview. The result was that clients who received and read the manual showed continued gains and were significantly more improved at followup than were those who did not receive the manual. At one year followup, after all clients had been given the manual, this difference disappeared.

So here was an interesting and unplanned finding- that a self-help manual used as a supplement to therapy significantly improved maintenance of gains. We particularly noted that the manual seemed most beneficial to clients in the aversive counterconditioning group, who had not received self-control training and for whom it thus contained the most new information.

This raised a new question: how effective could such a manual be by itself, without the assistance of a therapist? (Actually our original question was: how muchbetter will clients do with the help of a therapist than with only a manual?) In our second study (Miller, Gribskov & Mortell 1978) we randomly assigned 31 clients-to a Manual Only group who were interviewed and then provided with a manual mailers for self-monitoring cards, or to a Manual Plus Therapist group, who received ten individual therapy sessions focusing on the same self-control methods covered by the manual. The results (reported briefly by Miller 1977) surprised us. Both groups were quite successful, with no significant differences on outcome variables. The differences that did obtain were in favor of the manual only group, which was maintaining an 84 percent improved rate at three-month followup compared to a 79 percent rate in the therapist-administered group. Following this study, an expanded version of our original self-help manual was published by Prentice-Hall under the title How to Control Your Drinking (Miller & Muñoz 1976).

We next explored the feasibility of providing this kind of self-control training within a group setting, offering classes in moderation through a California community center (Miller, Pechacek & Hamburg 1978). In the course of a year we offered four such classes, this time using the

expanded manual as a textbook. Of the 27 problem drinkers completing all or most of this class, 19 (70 percent) were classified as considerably or moderately improved, 6 were slightly or not improved, and 2 were lost to followup. The results were still encouraging by comparison with Emrick's (1975) normative statistics on treatment outcome, but the success rate was notably lower than that attained by manual only clients in our second study. Data from this third study have been briefly reported by Miller (1977).

Cur two most recent studies have been conducted at the University of New Mexico (Miller & Taylor 1978a, 1978b). The first of these was designed as a partial replication of the preceding three studies. A total of 41 clients were randomly assigned to one of four treatment conditions: (1) Manual Only (2) Behavioral Self-Control Training with individual therapist, 3) Behavioral 'Self-Control Training Plus Relaxation Training with therapist, and (4) Group Therapy classes of our relaxation training and replicating the self-control classes of our third study. At three-month followup the overall success rates (i.e., abstinent + considerably improved + moderately improved, as described by Miller 1978) were, respectively, 83, 80, 75, and 100 percent. Preliminary data from one-year followup (with 92 percent of cases interviewed) provided the following success rates, again in order of groups presented above: 75, 40, 75, and 89 percent. These findings replicate the cost effective superiority of the manual only condition over all alternatives except, perhaps, group therapy.

Cur fifth and most recent study (Miller & Taylor, 1978b) was designed to explore the relative contribution of a broad spectrum component when added to the basic program in self-control. Clients were randomly assigned to one of four treatment modalities: (1) Manuals Only, wherein clients received a copy of Miller & Muñoz (1976) and their choice of three additional self-help manuals from a selection of behaviorally oriented books chosen to deal with hypothesized motivations for drinking (2) Behavioral Self-Control Training, involving six sessions with assertion training; and (3) Behavioral Self-Control Training Plus Designated Modules in relaxation training, communication skills, and assertion training; and (4) Behavioral Self-Control Training Plus Individualized Modules, chosen by the client from 10 alternative modules focusing upon motivations for drinking (e.g., insomnia, depression, anxiety). Each module was four weeks in length, was therapist-directed, and was based upon behavioral intervention strategies. The latter two groups thus received 18 weeks of individual therapy, as compared to 6 weeks for group 2 and no therapy for clients in the manuals only condition. Data from termination yielded the following rates of successful outcome: 60, 70, 89, and 89 percent. For the first time in our five years of research the "expected" pattern of findings was obtained, with successful outcome being associated with increasing amounts of therapeutic contact. It should be noted that these are preliminary findings and that followup interviews will yield more definitive data. Nevertheless this is the lowest percentage of success that we have observed for a bibliotherapy group. The greater success of prior bibliotherapy groups receiving only the alcohol manual suggests that the use of additional self-help books in this case not only failed to augment effectiveness but may have diminished it.

Across the five studies our overall success rates, even for minimally treated clients? have been quite consistent with the 60 to 70 percent rates reported in other studies, of controlled drinking therapies. In another series of studies, Vogler and his colleagues (1975, 1977) have found similar success rates with no significant differences in effectiveness among treatment modalities that ranged from a minimal educational program to anextensive and expensive individual treatment package.

What can be concluded from research at the present time? The following assertions seem justified in light of current data:

1. Moderate drinking outcomes can and do occur among problem drinkers, many of whom could have been classified as "alcoholic" by current diagnostic practices. For others, particularly those with more severe or advanced problems, abstinence represents the only safe and realistic goal for recovery.

2. Moderate drinking outcomes are more likely when the goal of treatment has been moderation than when treatment was oriented toward total abstinence.

3. A wide variety of behavioral/educational strategies can result in successful controlled drinking, with an average effectiveness rate between 60 and 70 percent.

4. Minimal therapist contact programs appear to be as effective as extensive therapist-administered programs for a majority of problem drinking clients seeking moderation.

5. Multimodal ("broad spectrum") programs for problem drinkers result in slightly but not significantly greater overall success rates than do those focusing only on the moderation of drinking.

Maintenance

Maintenance of treatment gains is a critical issue in all clinical research, and is of particular importance for problem areas known to be characterized by high recidivism. There is disagreement about the necessary length for adequate followup in treating problem drinkers, but it is clear that assessment beyond termination is essential.

A number of outcome studies of controlled drinking therapies have included followup data at one year or longer following termination (Caddy & Lovibond 1976; Miller, 1978; Miller & Taylor 19789; Sobell & Sobell 1976; Vogler et al. 1975, 1977a). Two findings have been rather consistent. The first of these is that success rates show some attrition over the year following treatment but generally hold up quite well through the period of followup. The second is that a client's status at three month followup is a relatively good predictor of longer term success (c.f., Hunt, Barnett & Branch 1971; Rohan 1970). In two of the studies described above (Miller 1978a, Miller & Taylor 1978a) which have included both three and twelve-month followups, 89 percent of cases judged to be successful at three months retained this status at one year following termination.

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Also of interest are strategies that may improve the probability of maintenance or continued gains following treatment. Different strategies may be required for successful maintenance than for effective treatment (Christensen, Miller & Muñoz 1978; Kingsley & Wilson 1977). Continued periodic contact has been found to improve maintenance of abstinence (e.g., Stojiljkovic 1969; Voegtlin et al. 1941) and is emphasized as an essential element of Alcoholics Anonymous (1960). Analysis of antecedents of relapse may provide clues toward prevention (Marlatt & Gordon 1978). Miller (1978a) found a self-help manual to promote continued improvement after treatment. Research designed to evaluate and compare alternative maintenance strategies is relatively inexpensive and is more readily conducted within standard treatment settings than is controlled treatment outcome research (Miller 1979). Yet this type of research design has been largely unused within program evaluation. Studies of this kind may be particularly fruitful in an area such as problem drinking, where most treatment interventions are reputed to be about equally (in)effective.

SUBSTANCE ABUSE: SOME AREAS OF COMMONALITY

Our discussion so far has focused primarily upon some new developments in alcohol treatment and assessment, particularly those relevant to the outcome goal of moderate drinking. What implications might these new developments have for other areas of substance abuse: overeating, smoking, and drug abuse? In what ways might this view of problem drinking share common ground with (and differ from) other addictive behaviors?

Issues of Assessment

The issue of dichotomous versus continuous outcome measures is relevant to each area of substance abuse. Within smoking and drug abuse research, outcome has been viewed dichotomously with few exceptions. Overeating and obesity, on the other hand, have of necessity been viewed as continuous. Quantification of consumption data poses problems of varying complexity. For each area the concentration or dose of consumed substance is of concern, be it alcohol proof, calories, nicotine content, or purity of drug.

In each area of substance abuse the focus of concern is not so much with the behavior itself as with the untoward consequences of its abuse. Each poses major health hazards to the over-user and, to varying extents, creates social problems as well. Illegality is an issue in drug abuse, as it is under certain age limits for smokers and drinkers. Comprehensive assessment will focus not only upon the consumatory behavior but also on its consequences for the individual and for society.

Verification of self-report, which is an important issue in alcohol research, presents even more serious problems when the target behavior is drug use, a seldom observed phenomenon. Smoking may similarly be difficult to verify, depending upon the individual's pattern of public or private use. In these cases corroborative data may be obtained from physiological measures such as urine, breath, or blood tests. A weigh-in provides a convenient corroboration for self-report of eating behavior.

Each of these four addictive behaviors has also been notoriously difficult to treat, with high attrition and relapse rates. Dropouts and clients lost to followup pose problems for analysis and interpretation of data. Clients failing in the program under study may soon enroll in a different intervention program, complicating interpretation of improvement.

Issues of Etiology

Addictive behaviors seem uniformly to elude unitary models of etiology. Each area struggles with multiple determinants of the target behavior, constructing complex multimodal theories and interventions.

One common issue in etiology is the concept of addiction itself. All of the four substance abuse behaviors have some addictive properties, ranging from habitual use and psychological dependence to tissue tolerance and well-defined withdrawal syndromes. The importance of addiction as an explanatory factor is controversial in each area. The above discussion has argued that the concept of physiological addiction is important in understanding alcoholism, but has been overextended in attempting to explain the behavior of all problem drinkers. Addiction has been an almost unquestioned explanation for drug use, yet many drugs of abuse are not pharmacologically addicting and the withdrawal syndrome associated with heroin is far less severe than that for alcohol. Perhaps here, too, the importance of addiction has been overstated. On the other hand, recent evidence suggests that we may have underestimated the importance of nicotine addiction in maintaining smoking behavior (Schachter 1978). It is possible that certain foods may also have addictive properties in the sense that predictable physiological changes may occur upon their withdrawal. The puzzle for all of these substances is to sort out the motivational properties attributable to physiological addiction from those related to psychosocial factors.

An interesting line of research relevant to this endeavor has been pursued by Marlatt and his colleagues (1973; Marlatt 1978). In the typical study half of all subjects receive alcohol and half do not. Within each of these groups half believe that they are drinking alcohol and half do not. Studies using this paradigm have suggested that many effects previously attributable to pharmacological actions of alcohol (e.g., craving, sexual arousal, aggression) are more influenced by cognitive than by chemical factors. This paradigm could readily be extended to research with smoking and drug use, and even to the use of specific foods (e.g., artificial sweetener versus sugar).

Issues of Treatment

Perhaps the most controversial issue touched upon here is that of total abstinence versus moderation. Whereas controlled drinking therapies have been under study for almost ten years, only recently has the possibility of controlled smoking been explored seriously (see chapter by Frederiksen in this book). If "safer" cigarettes are truly safer (c.f., Schachter. 1978) and if minimally dangerous levels of smoking can be established, controlled smoking may be a viable goal. Certainly the analogies of decreasing concentration of drug, slowing consumption rate, and setting limits are interesting. The popular lore is that moderate smoking is impossible and that abstinence is the only alternative to

abuse once heavy smoking has been established, but a similar impression of problem drinking dominated professional opinion ten years ago. With regard to illicit drugs, the issue of moderation versus abstinence takes on legal implications. To condone moderation with an illicit drug is to support criminal activity. A similar dilemma faces the alcohol professional who recognizes the importance of "responsible drinking" but works with minors. To assist a minor in attaining moderate alcohol use is to condone illegal behavior - with potential repercussions from parents, supervisors, and the courts. The only area of substance abuse wherein abstinence is not an issue is, of course, overeating. The necessity of moderation as the goal in this area has contributed treatment techniques that have been most useful when applied to problem drinking.

Many standard behavioral self-control strategies apply equally well to all addictive behaviors, although sometimes requiring modification to fit the particular behavior and individual. An interesting example is stimulus control. Stuart (1967; Stuart & Davis 1972) generally instructs overeaters to restrict the stimulus situations in which they eat. Narrowing the band of eating situations seems to aid in the control of food intake. The same strategy might be applied to smokers seeking moderation. Many problem drinkers and drug abusers, however, normally consume their drug within one or two rather circumscribed settings. Many of our clients have been exclusive "home alone" drinkers, or have had a favorite bar where the bulk of their drinking was done. For these individuals it has been important to broaden the range of social drinking situations while decreasing or avoiding drinking in the original setting. We have focused functional analysis on identifying situations in-which drinking tends to be controlled as well as those in which overdrinking occurs (Miller & Muñoz 1976). When the stimulus elements associated with control are established! drinking behavior is moved toward those situations and away from higher risk settings. The stimulus control strategy here, then, is not one of restricting or narrowing the band so much as choosing situations that alter the probability of overdrinking. If abstinence is the goal, a similar strategy may be used to identify and control situations associated with urges to begin drinking.

One final issue relevant to each area is that of optimal level of intervention. For each of the four addictive behaviors, conventional treatment programs have tended to fall into one of several "standard therapy" ruts. For alcoholics, standard treatment consists of detoxification (whether or not it is needed), prescription of disulfiram, and a regimen of educational lectures on the effects and disease aspects of alcohol abuse. Standard treatment for heroin addicts features confrontation and methadone maintenance. Treatment packages for smokers and overeaters are offered by private and franchised clinics in most cities. In none of these cases is selection of treatment based upon the demonstrated superiority of the "standard" approach over available alternatives, nor are significant efforts typically made to individualize the treatment package for different clients. There is much need for research exploring the necessary and sufficient conditions for effecting and maintaining changes in addictive behaviors. It is becoming increasingly, clear that bigger treatments are not necessarily better treatments. The feasibility and effectiveness of self-help interventions for substance abusers should be systematically

evaluated. Research described above suggests that suchmethods may be effective for many problem drinkers (c.f., Miller 1978b). The effectiveness of self-help procedures for smokers, drug abusers, and the obese is less clear, and requires further attention. The efficacy of self-help groups such as Alcoholics Anonymous, Synanon, Weight-watchers and Drinkwatchers has been the subject of too few studies, limited perhaps by the anonymity often inherent in these groups. It would seem prudent to explore the limits of these more minimal interventions rather than to continue to construct expensive standardized multimodal "shotgun" treatment packages to be administered to all comers. Shotguns are characterized both by expensive ammunition and by a tendency toward overkill. It is time to seriously examine cost effectiveness and differential diagnosis and to make treatment decisions accordingly.

REFERENCES

Alcoholics Anonymous. Alcoholics Anonymous: The Story of How Many Thousands of Men and Women Have Recovered from Alcoholism. New York: A.A. Publishing, 1960.

Armor, D.J., Polich, J.M., and Stambul, H.B. Alcoholism and Treatment. Santa Monica: The Rand Corporation, 1976.

Caddy, G. R. , and Lovibond, S.H. Self-regulation and discriminated aversive conditioning in the modification of alcoholics' drinking behavior. Behav Ther, 7:223-230, 1976.

Cahalan, D. Problem Drinkers, a National Survey. San Francisco: Jossey Bass, 1970.

Christensen, A. , Miller, W. R., and Muñoz, R. F. Paraprofessionals, partners, peers, paraphernalia, and print: Expanding mental health service delivery. Prof Psychol, 9:249-270, 1978.

Dimond, R.E., Havens, R.A., and Jones, A.C. A conceptual framework for the practice of prescriptive eclecticism in psychotherapy. Am Psychol, 33:239-248, 1978.

Emrick, C.D. A review of psychologically oriented treatment of alcoholism. I. The use and interrelationships of outcome criteria and drinking behavior following treatment. Q J Stud Alc, 35:523-549, 1974.

Emrick, C.D.. A review of psychologically oriented treatment of alcoholism. II. The relative effectiveness of different treatment approaches and the effectiveness of treatment versus no treatment. J Stud Alc, 36:88-108, 1975.

Ewing, J.A., and Rouse, B.A. Outpatient group treatment to inculcate controlled drinking behavior in alcoholics. J Alc Rel Addict (Zagreb), 9:64-75, 1973.

Goldstein, A.P., and Stein, N. Prescriptive Psychotherapies. New York: Pergamon, 1976.

Gottheil, E., Murphy, B.F., Skoloda, T.E., and Corbett, L.O. Fixed interval drinking decisions: II. Drinking and discomfort in 25 alcoholics. Q J Stud Alc, 33:325-340, 1972.

Hamburg, S. Behavior therapy in alcoholism: A critical review of broad-spectrum approaches. J Stud Alc, 36:69-87, 1975.

Hedberg, A. G. , and Campbell, L.M. A comparison of four behavioral treatment approaches to alcoholism. J Behav Ther Exp Psychiatry, 5:251-256, 1974.

Hunt, W.A., Barnett, L.W., and Branch, L.G. Relapse rates in addiction programs. J Clin Psychol 27:455-456, 1971.

Kingsley, R.G., and Wilson, G.T. Behavior therapy for obesity: A comparative investigation of long-term efficacy. J Consult Clin Psychol, 45:288-298, 1977.

Kiresuk, T. J. Measuring treatment outcome with goal attainment scaling. Paper presented at the annual meeting of the American Psychological Association, Honolulu, September, 1972.

Lloyd, R.W., Jr., and Salzberg, H.C. Controlled social drinking: An alternative to abstinence as a treatment goal for some alcohol abusers. Psychol Bull, 82:815-842, 1975.

Lovibond, S.H., and Caddy, G.R. Discriminated aversive control in the moderation of alcoholics' drinking behavior. Behav Ther 1:437-444, 1970.

Marlatt, G.A. The Drinking Profile: A questionnaire for the behavioral assessment of alcoholism. In; Mash, E.J., and Terdal, L.G., eds. Behavior Therapy Assessment: Diagnosis, Design and Evaluation. New York: Springer, 1976. pp. 121-137.

Marlatt, G.A. Craving for alcohol, loss of control, and relapse: A cognitive-behavioral analysis. In: Nathan, P.E.; Marlatt, G.A.; and Løberg, T., eds. Alcoholism: New Directions in Behavioral, Research and Treatment. New York: Plenum, 1978.

Marlatt, G.A., Demming, B., & Reid, J.B. Loss of control drinking in alcoholics: An experimental analogue. J Abnorm Psychol 81:233-241, 1973.

Marlatt, G.A., and Gordon, J.R. Determinants of relapse: Implications for the maintenance of behavior change. Paper presented at the Tenth International Conference on Behavior Modification, Banff, Alberta, March, 1978.

Marlatt, G.A., and Nathan, P.E., eds. Behavioral Approaches to Alcoholism. New Brunswick: Rutgers Center of Alcohol Studies, 1978.

Matthews, D.B., and Miller, W.R. Estimating blood alcohol concentration: Two computer programs and their applications in therapy and research. Addict Behav, 4:55-60, 1979.

Miller, P.M. Behavioral Treatment of Alcoholism. New York: Pergamon, 1977.

Miller, P.M., Hersen, M., Eisler, R.M., and Watts, J.G. Contingent reinforcement of lowered blood/alcohol levels in an outpatient Chronic alcoholic. Behav Res Ther 12:261-263, 1974.

Miller, W.R. Alcoholism scales and objective assessment methods: A review. Psychol Bull, 83:649-674, 1976.

Miller, W.R. Behavioral self-control training in the treatment of problem drinkers. In: Stuart, R.B., ed. Behavioral Self-Management: Strategies, Techniques and Outcomes. New York: Brunner/Mazel, 1977. pp. 154-175.

Miller, W.R. Behavioral treatment of problem drinkers: A comparative outcome study of three controlled drinking therapies. J Consult Clin Psychol, 46:74-86, 1978 a.

Miller, W.R. Effectiveness of nonprescription therapies for problem drinkers. Paper presented at the annual meeting of the American Psychological Association, Toronto, Ontario, August, 1978 b.

Miller, W. R. Maintenance of behavior change: A note on experimental design. Manuscript submitted for publication, University of New Mexico, 1979.

Miller, W.R., and Caddy, G.R. Abstinence and controlled drinking in the treatment of problem drinkers. J Stud Alc, 38:986-1003, 1977.

Miller, W. R., Crawford, V.L., and Taylor, C.A. Significant others as corroborative sources for problem drinkers. Addict Behav, 4:67-70, 1979.

Miller, W.R., Gribskov, C., and Mortell, R. Effectiveness of a self-control manual for problem drinkers with and without therapist contact. Manuscript submitted for publication, University of Oregon, 1978.

Miller, W.R., and Joyce, M.A. Prediction of abstinence, controlled drinking, and heavy drinking outcomes following behavioral self-control training. Manuscript submitted for publication, University of New Mexico, 1978.

Miller, W.R., and Muñoz, R.F. How to Control Your 'Drinking. Englewood Cliffs: Prentice-Hall, 1976.

Miller, W.R., Pechacek, T.F., and Hamburg, S. Group behavior therapy for problem drinkers. Unpublished manuscript, Palo Alto Veterans Administration Hospital, 1978.

Miller, W.R., and Taylor, C.A. Relative effectiveness of bibliotherapy, individual and group self-control training in the treatment of problem drinkers. Unpublished manuscript, University of New Mexico, 1978 a.

Miller, W. R., and Taylor, C.A. Evaluation of a module program for problem drinkers. HEW/NIAAA Grant No. 1-RO3-AA03450-01, University of NewMexico, 1978 b.

National Council on Alcoholism, Criteria Committee. Criteria for the diagnosis of alcoholism. A J Psychiatry, 129:127-135, 1972.

Orford, J. A comparison of alcoholics whose drinking is totally uncontrolled and those whose drinking is mainly controlled. Behav Res Ther, 11:565-576, 1973.

Pattison, E.M., Sobell, M.B., and Sobell, L.C. Emerging Concepts of Alcohol Dependence. New York: Springer, 1977.

Pomerleau, O., Pertschuk, M., Adkins, D., and Brady, J.P. A comparison of behavioral and traditional treatment for middle-income problem drinkers. J Behav Med, 2:187-200, 1978.

Popham, R.E., and Schmidt, W. Some factors affecting the likelihood of moderate drinking by treated alcoholics. J Stud Alc, 37:868-882, 1976.

Reinert, R.E., and Bowen, W.T. Social drinking following treatment for alcoholism. Bull Menninger Clin, 32:280-290, 1968.

Reyes, E., Miller, W.R., Taylor, C.A., and Spalding, C.T. The activity of y-glutamyl transpeptidase in the serum of problem drinkers. Proc West Pharmacol Soc, 21:281-297, 1978.

Rohan, W.P. A follow-up study of hospitalized problem drinkers. Dis Nerv Syst, 31:259-265, 1970.

Schachter, S. Pharmacological and psychological determinants of smoking. Ann Intern Med, 88:104-114, 1978.

Selzer, M.L. The Michigan Alcoholism Screening Test: The quest for a new diagnostic instrument.. Am J Psychiatry, 127:1653-1658, 1971.

Shaw, S., Lue, S., and Lieber, C.S. Biochemical tests for the detection of alcoholism: Comparison of plasma alpha-amino-n-butyric acid with other available tests. 'Alcoholism: Clin Exp Res, 2:3-7, 1978.

Smart, R.G. Characteristics of alcoholics who drink socially after treatment. Alcoholism: Clin Exp Res, 2:49-52, 1978.

Sobell, M.B., and Sobell, L.C. Individualized behavior therapy for alcoholics. Behav Ther, 4:49-72, 1973.

Sobell, M.B., and Sobell, L.C. Second year treatment outcome of alcoholics treated by individualized behavior therapy: Results. Behav Res Ther, 14:195-,215, 1976.

Sobell, M.B., and Sobell, L.C. Behavioral Treatment of Alcohol Problems. New York: Plenum, 1978.

Sobell, M.B., Sobell, L.C., and Samuels, F.H. Validity of self-reports of alcohol-related arrests by alcoholics. Q J Stud Alc, 35: 276-280, 1974.

Stojiljkovic, S. Conditioned aversion treatment of alcoholics. Q J Stud Alc, 30:900-904, 1969.

Stuart, R.B. Behavioral control of overeating. Behav Res Ther, 5:357-365, 1967.

Stuart, R.B., and Davis, B. Slim Chance in a Fat World. Champaign: Research Press, 1972.

Thoresen, C.E., and Mahoney, M.J. Behavioral Self-Control. New York: Holt, 1974.

Voegtlin, W.L., Lemere, F., Broz, W.R., and O'Hollaren, P. Conditioned reflex therapy of chronic alcoholism. IV. A preliminary report on the value of reinforcement. Q J Stud Alc, 2:505-511, 1941.

Vogler, R.E., Compton, J.V., and Weissbach, T.A. Integrated behavior change techniques for alcoholism. J Consult Clin Psychol, 43:233-243, 1975.

Vogler, R.E., Weissbach, T.A., and Compton, J.V. Learning techniques for alcohol abuse. Behav Res Ther, 15:31-38, 1977.

Vogler, R.E., Weissbach, T.A., Compton, J.V., and Martin, G.T. Integrated behavior change techniques for problem drinkers in the community. J Consult Clin Psychol, 45:267-279, 1977.

World Health Organization, Expert Committee on Mental Health, Alcoholism Subcommittee. Second report. W.H.O. Tech Rep, No. 48, August, 1952.

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Chapter 12

Studies in Blood Alcohol Level Discrimination: Etiologic Cues to Alcoholism

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A number of studies exploring the utility of controlled drinking treatment approaches have incorporated blood alcohol level (BAL) discrimination training into their program. In general, the authors of these studies (e.g., Caddy and Lovibond 1976; lovibond and Caddy 1970; Miller 1978; Vogler, Compton, and Weissbach 1975; Vogler, Weissbach, Compton, and Martin 1977) have maintained that training in BAL discrimination allows the alcoholic to monitor his level of intoxication and that this ability can be incorporated within a treatment program designed to aid the alcoholic to maintain more moderate BALs.

The first study of BAL, discrimination training was reported by Lovibond and Caddy (1970). The goal of that study was to establish accurate BAL discrimination abilities in alcoholic subjects and thence to induce a discriminated conditioned aversion to high BALs (defined as those over 65 mg/%). Of 44 alcoholic subjects accepted into the treatment program, 31 were assigned to an experimental group and 13 to a control group.

Experimental subjects were trained in BAL discrimination in the first phase of treatment. At the beginning of the single 90-to 12O-minute training session, subjects were given a scale describing the typical behavioral effects of different BALs. Next, they ingested an alcohol end fruit juice mixture, then were asked to examine their subjective experiences as a basis for estimating BAL. Every 15-20 minutes of the session, subjects received Breathalyzer tests, estimated their BAL, then were given immediate feedback on actual BAL.

Conditioning procedures were implemented during the second, treatment, phase of the study. Subjects consumed their preferred alcoholic beverage at an experimenter-determined rate designed to raise BALs to approximately 65 mg/% by the end of 90 minutes. As before, subjects made BAL estimates, then received accurate feedback every 15-20 minutes. However, when BALs rose above 65 mg/%, as they were programed to do, painful (4-7 mA) electric shocks were delivered to subjects' faces on a partial reinforcement schedule. Subjects were required to continue drinking throughout the entire session. Treatment lasted 6-12 sessions; subjects received between 30 and 70 shocks in all. Control subjects received the same BAL discrimination training but, throughout the aversive conditioning phase of the study (which lasted only three sessions), shocks were administered on a randombasis.

Although Lovibond and Caddy did not report data on acquisition rates of BAL discriminations, they did report that "after a single training-session, errors in excess of ± .01% (10 mg/%) rarely occur (p. 440)." Nonetheless, because pretraining data on BAL estimation accuracy were not reported and the discrimination accuracy of a control group was not assessed, it cannot be concluded unequivocally that subjects' posttraining accuracy was due to training per se. Further, because BAL estimates by subjects were never made in the absence of BAL feedback, it is not possible to be certain that posttraining estimation accuracy was maintained when feedback was removed.

In a followup comparison of these experimental and control subjects, a greater pre-post reduction in alcohol intake was reported for the former group than for the latter. Lovibond and Caddy attributed the greater improvement in experimental subjects' drinking patterns to a change in their motivation to drink to high BALs, produced as a result of the pairings of shock with ostensibly readily discriminated BALS.

Along with a too ready acceptance of the efficacy of electrical aversion conditioning with alcoholics (cf., Nathan and Briddell 1977; Wilson, Leaf and Nathan 1975), the validity of conclusions drawn by Lovibond and Caddy on the basis of their outcome data can be questioned. First, outcome was assessed on the basis of self-report data whose validity and reliability were not measured. Second, by virtue of the differential attrition rates of the two groups (control subjects: 61 percent; experimental subjects: 10 percent), it appears that the control procedure was probably not a very convincing one. Hence, posttreatment group differences might well have been due to such nonspecific factors as differential expectancies for improvement and other demand characteristics than to the specific procedures employed. Finally, because the authors never established that BAL discrimination training via internal cues had both taken place and been maintained over time it is difficult to accept this aspect of their intervention as responsible for the short term improvement in drinking pattern they reported.

In an effort both to replicate and to extend Lovibond and Caddy's exploration of the blood alcohol level discrimination training paradigm, Silverstein, Nathan and Taylor (1974) designed a study initially including four male "gamna" alcoholics who participated as inpatients in both phases of a two part, 36-day study. The goal of the first phase of the study (which lasted 10 days) was to examine some of the factors involved in training alcoholics to estimate BAL accurately. Drinking was programmed in five 2-day cycles such that BAL rose on the first day of a cycle to 150 mg/%, then fell overnight and over the next day to zero. During the first (baseline) 2-day cycle, subjects estimated BAL approximately ten times per day without receiving feedback on accuracy. During the following three 2-day

cycles, subjects were continuously alerted to the emotional and physical correlates of changing levels of blood alcohol while receiving feedback 1) after each BAL estimate; 2) after 50 Percent of their estimates; and 3) after 50 percent of their estimates with Positive reinforcement (tokens exchangeable for money t the end of the study) delivered contingent on accurate BAL estimation. During the final 2-day cycle of this phase of the study, which represented a return to baseline conditions, subjects were again required to make their BAL estimate in the absence of training, feedback, or contingent reinforcement.

During the second phase of the study (which lasted 26 days), three of the four subjects who had participated in the study's first phase were trained to drink to, then maintain, a prescribed BAL (80 mg/%). Three converging behavioral shaping procedures were utilized for this purpose: 1) Responsibility for control over drinking was gradually shifted from the experimenter to the subject; 2) The range of positively reinforced BALs was successively narrowed closer and closer to the target BAL of 80 mg/%; 3) All reinforcement and feedback were gradually faded out over the nearly four weeks of this phase of the study.

Data from the first phase of the study shaved that the most power— ful factor influencing BAL estimation accuracy was, simply, the presence or absence of accurate feedback on blood alcohol level. Whether this feedback was continuous or intermittent, or accompanied or unaccompanied by reinforcement for accuracy, was unimportant; estimation error scores during the three training cycles were uniformly lower than those during the initial pretraining or concluding posttraining baseline periods of this phase of the study. During the second, control training phase of the study, subjects were able effectively to control their drinking -to maintain BAL within the prescribed range -but only so long as feedback on BAL was provided. Degree of control decreased significantly when feedback was removed (during the postexperimental baseline assessment period).

These data by Silverstein and his colleagues called into question Lovibond and Caddy's explanation of their successful treatment outcomes, that subjects maintained the ability to discriminate BAL from internal cues through the followup period. Though the Silverstein study affirmed that alcoholics can learn to discriminate BAL with considerable accuracy and, following acquisition of that skill, confine their drinking behavior to narrowly defined limits, both abilities were significantly attenuated once external feedback of accurate BAL was removed.

Specifically relevant to the results of the studies by Lovibond and Caddy and Silverstein, Nathan, and Taylor are data from a clinical report by Paredes, Jones and Gregory (1974), who trained a single alcoholic subject to discriminate BAL. Although he did, in fact, learn to monitor rising and falling BALs, whether he did so on the basis of training in the use of subjective experience for this purpose

or from the accurate feedback on BAL he was continuously provided throughout training could not be determined from the research design employed. What was clear, however, was that the subject did not attain the high degree of estimation accuracy, even after approximately 50 hours of training, either group of alcoholics studied previously (by Lovibond and Caddy, and Silverstein and his colleagues) attained. Studies in which BAL discrimination training comprised a component of a comprehensive behavior therapy package have also been reported. Most of these studies employed BAL discrimination training to establish discriminated aversions to BALs above a certain level (for example, Caddy and Lovibond 1976; Miller 1978; Vogler, Compton, and Weissbach 1975; Vogler, Weissbach, Compton and Martin 1977; Wilson and Rosen 1975). Overall, these studies have not contributed to a fuller understanding of the issues discussed in this paper thus far. For one thing, they were not designed to permit inquiry into the actual acquisition patterns of BAL discrimination. For another, assessment of these acquired discriminations following termination of training was not among the studies' goals. Finally, the authors of most of these studies presumed both that alcoholics can acquire accurate BAL discrimination abilities and that these discriminations can be established on the basis of sensory awareness training alone. However, neither of these latter assumptions had been proven when these studies were undertaken. Data bearing on the BAL discrimination ability of alcoholics at the time these treatment studies were planned were both sparse and equivocal.

A series of investigations exploring these issues with both alcoholic and nonalcoholic subjects were then initiated; some were conducted at the Alcohol Behavior Research Laboratory, Rutgers University; others, at other research facilities in North America. It is to this body of research that we now turn.

In a study similar in intent to that of Silver-stein, Nathan and Taylor (1974), Bois and Vogel-Sprott (1974) reported some success in training social drinkers to estimate BAL and, subsequently, to use these estimates to self-titrate alcohol intake. Nine males participated in each of six daily sessions. During the first three sessions, all subjects consumed an amount of ethanol equivalent to 135 ml for a 150 lb individual. This was mixed with an equal volume of "7-UP." During Session 1, subjects consumed four equal portions of the drink at 20 minute intervals, estimating BAL ten times during that time. Accompanying each estimate, subjects provided "symptom reports" describing their immediate subjective experiences. Feedback of actual BAL was delivered only once during this session, when BAL had reached its peak. Session 2 was identical to Session 1 except that accurate feedback was provided subjects following each BAL estimate. Session 3 was identical to Session 1; it was designed to tap posttraining discrimination accuracy. Estimation accuracy improved significantly from Session 1 to Session 2. A nonsignificant decrease in accuracy from Session 2 to Session 3 was also reported.

These data suggest that these subjects, who were social drinkers, acquired - and maintained - BAL estimation accuracy on the basis of internal cues. However, BAL feedback was provided during Sessions 1 and 3, and amount and rate of drink consumption were identical all three sessions. As a result, subjects my have linked these external cues to the feedback provided in Session 2 and, in that way, learned to formulate subsequent estimates on this basis, rather than on the basis of internal cues.

Sessions 4, 5, and 6 were designed to assess subjects' ability to maintain discrimination accuracy when some of the external cues previously provided them were modified by altering the manner in which the drinks were constituted. Thus, drinks given in Session 4 averaged 100 ml of ethanol (instead of 135) and 160 ml of "7-Up" (instead of 135). Subjects were not given ethanol during Sessions 5 and 6 as before but,-instead, their-preferred alcoholic beverage. In addition, during all three of these sessions, rate and amount of alcohol consumed were determined by the subjects themselves. During all three sessions, subjects were required to select a target BAL (between 40 and 60 mg/%) and, on the basis of internal sensations, stop drinking when this level had been reached. Ten minutes following the decision to stop drinking, subjects were asked to give a report on subjective sensations, then to make a BAL estimate. Ten minutes later, a second estimate and symptom report were obtained and BAL feedback was again provided. Five subsequent symptom reports and estimates were then taken at ten-minute intervals.

Results of these experimental manipulations were that estimation errors increased moderately, though nonsignificantly, from Session 3 to Session 4. Estimation accuracy improved markedly, however, from Session 4 to Session 6. Although estimation accuracy apparently improved through these three sessions, the improvement may actually have been more apparent than real. First, although subjects were informed that their Session 4 drinks would differ from those previously consumed, these differences were not in fact substantial. Actually, if subjects had been discriminating the strength of their drinks, they might have programmed their Session 4 drinking to parallel that which characterized previous sessions. As a result, SAL estimates could have been made on the basis of feedback first delivered during Session 2. Likewise, estimates during Sessions 5 and 6 may have been guided by subjects' familiarity with their "customary" drinks and by the limited feedback which was available during these sessions rather than by the internal cues training provided earlier.

One of the most adequately controlled studies in this area was reported by Huber, Karlin and Nathan (1976). Its principal finding was that nonalcoholics can acquire and maintain accurate BAL discriminations whether provided internal or external cue training. Thirty-six nonalcoholic college students participated in three day-

long experimental sessions. In each, subjects consumed a total of seven ounces of vodka mixed with tomato juice, randomly distributed across six drinks. In an initial session, measures of pretraining estimation accuracy were obtained. In the second, subjects were assigned, on the basis of pretraining accuracy scores, to one of three training groups: Internal training only (I); External training only (E); or Internal and External training (I+E). Internal training was designed to teach subjects to focus on changes in mood and bodily sensations as a basis for identifying changes in BAL. External training relied on a programs learning booklet designed to teach subjects relationships between the amount and frequency of alcohol intake andchanges in BAL.

In order to disguise the alcholic content of drinks during Sessions 2 and 3, subjects were required to gargle before every drink with au anesthetic mouthwash. In both of these sessions, subjects also estimated the alcoholic content of their drinks in order to permit. assessment of discriminability of drink strength. During training, BAL estimates, made seven times, were immediately followed by feedback. Subjects who received external training were told immediately prior to each estimate what the actual alcoholic content of the immediately preceding drink was; they were to use this information and the formulae taught them in the programmed learning booklet to estimate BAL. Subjects who received internal training were not told the alcoholic content of their drinks during training; they were to formulate BAL estimates on the basis of internal sensations and feelings. Subjects in the I+E group made two sets of estimates: one based on external cues, the other, on internal cues.

In the third, test, session of this study, subjects made four BAL estimates; no feedback was given following any of these estimates. Prior to these estimates, half the subjects in each group were told the actual alcoholic content of their drinks, the other half were not. An analysis of variance revealed that all subjects significantly improved BAL estimation accuracy during training, then maintained this improved accuracy in the third session. This improvment was independent of the kind of training provided and whether or not subjects had been told the alcoholic content of their drinks in the third session. These results suggested that these nonalcoholic subjects could use internal and external cues equally well to estimate BAL. However, a word of caution regarding interpretation of these data is also necessary. Despite the elaborate procedures employed to disguise the strength of drinks, subjects were able to discriminate the various drink dosages to a limited extent; as a consequence, discriminability of drink doses may have played sane role in subjects' improved posttraining BAL estimation accuracy,

Given, though, that these data and those reported earlier suggest that nonalcoholics can, in fact, learn to discriminate BAL on the basis of changes in mod and bodily sensations, it was still an open question whether alcoholics could learn to make BAL discriminations on the basis of the same cues. Data from the study by Silverstein

and his colleagues suggested that alcoholics and nonalcoholics might well differ on this basis. No study of alcoholic subjects, however, had yet explored the differential efficacy of BAL discrimination training methods focussing on external and internal cues. Instead, research in this area, almost entirely clinical, had attempted to train alcoholics to discriminate BAL only via internal cues, despite the dearth of evidence that alcoholics can in fact do so. This research lacuna required a direct comparison of the effectiveness of external and internal training methods with alcoholics, a comparison which would afford evidence as to the optimal mode of training BAL discrimination skills for treatment Purposes. To fill this research void, alcoholic subjects were selected for a partial replication of the Huber et al. (1976) study which, like it, was conducted at the Alcohol Behavior Research Laboratory, Rutgers University. The replication also served as a test of the hypothesis first advanced by Huber and his coworkers that the effects of tolerance to ethanol may be reflected in differences between alcoholics' and nonalcoholics' abilities to utilize internal and external cues to discriminate BAL.

Like the 1976 study of nonalcoholics by Huber and his colleagues, subjects in this study (by Lansky, Nathan, and Lawson, in press) participated in three day long experimental sessions. The internal and external training methods used in this study were identical to those used by Huber et al. The study differed from that of Huber et al. in the following ways: First, only two of the six experimental conditions of the earlier study were replicated: Internal and External training, alcoholic content of third session drinks known. Second, one extra BAL estimate was obtained in all sessions in order to increase the number of analyzable data points. Third, there were slight differences in the programming of drinks (the interval between drinks was five minutes longer) and BAL estimates (the interval between drinks and estimates was five minutes shorter). Fourth, the scale on which subjects based their BAL estimates was modified in order to make it more suitable for alcoholic subjects. Finally, while training followed baseline assessment and testing followed training in the former study by, respectively, one to two weeks and three days, all sessions in this study were separated from each other by one day.

Two separate groups of four chronic alcoholic subjects lived in the Alcohol Behavior Research Laboratory for two week periods. During those periods, one group of four was given training in BAL discrimination via internal cues while the other received external cue training. All subjects participated in three experimental sessions, each separated by a day on which no experimental activities took place. An initial baseline session was designed to obtain pretraining measures of all subjects' BAL discrimination accuracy. Subjects were given six drinks containing a total of seven ounces of 80 proof vodka over a three-hour period; they were required to estimate BAL four times. Blind as to actual alcoholic content of drinks, subjects were nonetheless required to estimate the amount of alcohol contained in each drink. During Session 2, the training session, subjects who received external training were given programmed learning booklets detailing

BAL dose relationships; those receiving internal training were to focus on the physiological and affective concomitants of different BALs. During this session subjects were again administered seven ounces of 80 proof vodka and required to estimate drink strength. They estimated HAL eight times in the course of the session and were given feedback on actual BAL following each estimate. During this and the final experimental session, subjects gargled with an anesthetic mouthwash in order to mask the strength of drinks. Session 3, designed to assess posttraining discrimination accuracy, was identical to Session 1 except that subjects were told the alcoholic content of each drink and were required to gargle with the mouthwash.

Prior to training, both groups of alcoholics were unable to estimate BAL with accuracy. During training (Session 2), when veridical BAL feedback was available, estimation accuracy increased significantly and equally for both groups: both groups of alcoholics acquired the ability to estimate actual SAL and to follow the changes which took place in BAL over the course of the session. Results of the third (test) session revealed, however, that once feedback of actual BAL was removed, only the externally trained alcoholics maintained the ability accurately to estimate SAL and to follow changes in actual BAL.

It was concluded that, unlike the nonalcoholics et al. (1976) studied, the alcoholics in this study were not able to learn to discriminate HAL effectively on the basis of internal feelings and sensations, although they could do so by referring to external cues. These findings, then, supported an hypothesis first made by Silverstein, Nathan, and Taylor (1974), subsequently refined by Huber, Karlin, and Nathan (1976) - that alcoholics have a fundamental deficit in the ability to discriminate blood alcohol level on the basis of internal cues. Huber and his colleagues had suggested, in addition, that the relative inability of alcoholics to monitor internal cues may be a function, at least in part, of shifting levels of tolerance experienced by them during their lengthy drinking histories. As a result of these varying tolerance levels, discrete sets of internal cues had likely become associated with many BALs, not just one (the latter presumably required for accurate BAL discrimination). Alternatively, alcoholics may experience no internal cues at moderate BALs, because of a high threshold for the effects of intoxication, due to tolerance. Finally, alcoholics may have an inherited dysfunction of internal receptors.

The tolerance and inheritance hypotheses were tested in a recent study (Lipscomb and Nathan 1978) within this program of research at the Alcohol Behavior Research Laboratory. Twenty-four male Rutgers University undergraduates were selected to fall into four experimental groups on the basis of usual drinking pattern (heavy versus light) and familial alcoholism (present in close biological relatives versus absent). Subjects were also tested on a standing steadiness measure before and after consuming alcohol, then divided into high and low tolerance groups based on changes in standing stability under alcohol. Because standing steadiness is an extremely

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sensitive measure of intoxication, it has also been suggested as a potentially valuable measure of tolerance Moscowitz, Daily, and Henderson 1974).

Subjects participated in a three session blood alcohol level discrimination training program which utilized only internal cue training. During Session 1, the baseline session, subjects consumed alcohol in six programmed doses and made eight estimates of intoxication without training or feedback on actual BAL. Accurate BAL feedback following each estimate and internal cue training were provided in Session 2. During the session's training sequence, subjects identified bodily sensations and feelings with the aid of relaxation instructions and adjective checklists, then matched these with the BAL feedback provided. Subjects made BAL estimates without training or feedback during Session 3, the test session. A week separated each of the three sessions.

Results showed that groups differing in drinking pattern or familial alcoholism did not differ in ultimate BAL estimation accuracy following internal training. By contrast, when subjects were grouped according to tolerance, "low tolerant" subjects (those whose body sway sober and drunk differed markedly) were found to have been significantly more accurate in their Session 3 estimates than "high tolerant" subjects (those whose body sway sober and drunk differed very little). An analysis of covariance indicated that this effect could not be accounted for by pretraining differences, suggesting that low tolerant subjects were better able to use internal training.

These findings have important implications. Of greatest interest, in all likelihood, is that these data extend results of our previous research to the effect that alcoholics are less able than nonalcoholics to utilize internal cue training to attain BAL estimation accuracy in the absence of external feedback. The current finding - that low tolerance is associated with estimation accuracy - suggests that the high tolerance characteristic of alcoholics may interfere with estimation accuracy.

The exact process by which this interference takes place remains unknown. Nathan has hypothesized that shifting levels of tolerance cause different sets of intoxication cues to be associated with the same BAL, in that way inhibiting association of one set of internal cues with one BAL. Alternatively, it is possible that alcoholics no longer experience cues to intoxication at low to moderate BALs. Preliminary support for this explanation was also found in the current data. High tolerant subjects - less accurate at BAL estimation - showed no increase in mean body sway under alcohol. This finding suggests, in turn, that the dose administered had minimal intoxicating effects on this group, in contrast to low tolerant subjects, who greatly increased body sway. Consequently, internal cues to intoxication might have less salience for high-tolerant subjects and, accordingly, be more difficult to use as markers for the purpose of

BAL estimation. This line of reasoning suggests as well, that high tolerance subjects could estinmate BAL more adequately in a higher BAL range, a possibility With but limited utility for alcoholics since the purpose of BAL discrimination training is moderate drinking.

Identification of a relationship between tolerance and BAL estimation ability also contributes to a conceptual model for the development of alcoholism. According to this model, early heavy, prolonged drinking precipitates rapid acquired tolerance Which, in turn, interferes With the utility of internal cues to monitor intoxication. Sensitivity to these cues may serve as "brakes" or moderators for the typical social drinker. While the social drinker may not be able to label a given state of intoxication according to specific SAL referents, he or she may recognize the appropriate BAL at Which to stop drinking. Without this ability, by contrast, the heavy drinker continues on to even heavier drinking and, in cyclical fashion, to greater tolerance.

The treatment implications of this model are clear. Clinicians must provide the alcoholic With an external set of "brakes" to substitute for the internal cues used, by social drinkers. One approach to this problem is the external BAL discrimination training program introduced by Huber, Karlin, and Nathan (1976). Accurate BAL discrimination, however, is only one goal of a multifaceted treatment program for alcoholics. It is well known, for sample, that motivation is a critical treatment issue for alcoholics Whether the goals of treatment are abstinence or controlled drinking. Even if SAL discrimination were successfully learned, the alcoholic would also have to be motivated to use this new skill. A program designed to increase alcoholics' treatment motivation through external supports and constraints has recently been developed by Hunt and Azrin (1973). In their "community reinforcement" program, natural reinforcers including jobs, family attention and access to a social club were made contingent upon abstinence. A similar program could be applied to the goal of controlled drinking by making the same reinforcers contingent upon moderation.

The necessary movement to external controls for the treatment of alcoholism reflects current treatments for obesity (Stunkard 1972), suggesting an interesting parallel between research findings in the two areas. Recent evidence suggests that the obese may be more dependent on external cues, such as time of day or physical presence of food, than they are on internal hunger cues to determine quantity and frequency of food consumed. The nonobese, on the other hand, are said to rely on internal cues to regulate eating (Nisbett and Storms 1974; Schachter 1971). This distinction between the obese and nonobese may apply as well to alcoholics and nonalcoholics. Alcoholics may be less able than nonalcoholics to use internal cues to estimate BAL, an observation recently supported by Ludwig and his colleagues (1978). Working independently Within a different research paradigm, these researchers also conclude that alcoholics, unlike nonalcoholics, appear not to possess the necessary interoceptive processes to modulate their drinking. Taken collectively, these

findings suggest that alcoholisn and obesity - conditions that are both compulsive, self-destructive behavior - may have a basic, underlying process in common: the inability to monitor bodily reaction to the abused substance.

Another implication of the current findings is that a behavioral measure may be a more sensitive indicator of tolerance than drinking pattern. In this study, for example, drinking pattern did not predict differential performance on the standing steadiness task, even though this measure was sensitive to BAL. It is likely that, in the young, college-aged population studied, tolerance to alcohol was more a function of initial reactivity to alcohol or "initial tolerance"(Kalant et al. 1971), the amount of alcohol necessary upon first exposure to produce a behavioral effect, than of chronic tolerance, the acquired lessening of effect due to repeated exposure to alcohol. While initial tolerance levels are subsequently modified by drinkingpattern, this process occurs gradually, making drinking pattern an unreliable predictor of tolerance in younger, nonalcoholic subjects. A recent finding by Ogurszoff and Vogel-Sprott (1976) to the effect that young social drinkers grouped according to drinking pattern did not differ in BAL discrimination ability confirms this view. This finding, replicated in the current study, underscores the importance of viewing tolerance distinct from drinking pattern. While the importance of tolerance has long been recognized in theoretical models of alcoholism, it has been largely ignored as an independent variable because of inability. to this time, reliably to measure it.

Considerable caution should be exercised in making any predictions regarding differential risk for alcoholism between the tolerance groups of nonalcoholics in the current study. At present, it is not known whether there are predisposing factors involved in the acquisition of tolerance. For example, it is not clear that the "high tolerance" subjects in this study will acquire additional tolerance at a faster rate than "low tolerance" subjects. The possibility remains of an inherited predisposition for tolerance acquisiton. To investigate this issue most effectively, measures of tolerance should be included as a premeasure in long term studies of the development of alcoholism.

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REFERENCES

Bois, C. and Vogel-Sprott, M. Discrimination of low blood alcohol level and self-titration skills in social drinkers. Q J Stud Alc, 1974, 35: 8697.

Caddy, G.R. and Lovibond, S.H. Self-regulation and discriminated aversive conditioning in the modification of alcoholics' drinking behavior. Behav Ther, 1976, 7: 223-230.

Huber, H., Karlin, R., and Nathan, P.E. Blood alcohol level discrimination by nonalcoholics: The role of internal and external cues. J Stud Alc, 1976, 37: 27-39.

Hunt, G.M., and Azrin, N.H. The community reinforcement approach to alcoholism. Behav Res Ther, 1973, 11: 91-104.

Kalant, H., LeBlanc, A.E., and Gibbins, R.J. Tolerance to and dependence on alcohol. In Israel, Y., and Mardones, J. (Eds.) Biological Basis of Alcoholism. New York: John Wiley and Sons, Chapter 9, 235-270, 1971.

Lansky, D., Nathan, P.E., and Lawson, D. Blood alcohol level discrimination by alcoholics: The role of internal and external cues. J Consult Clin Psychol, in press.

Lipscomb, T.R. and Nathan, P.E. Effect of family history, of alcoholism, drinking pattern, and tolerance on blood alcohol level discrimination. Manuscript in preparation, 1978.

Lovibond, S.H., and Caddy, G.R. Discriminated aversive control in the moderation of alcoholics' drinking behavior. Beh Ther, 1970, 1: 437-444.

Ludwig, A.M.; Bendfelt, F.,; Wikler, A.; and Cain, R.B. "Loss of Control" in alcoholics. Arch Gen Psychiat, 1978, 35: 370-373.

Miller, W.R. Behavioral treatment of problem drinkers: A comparative outcome study of three controlled drinking therapies. J Consul Clin Psychol, 1978, 46: 74-86.

Moscowitz, H., Daily, J., and Henderson, R. Acute Tolerance to Behavioral Impairment by Alcohol in Moderate and Heavy Drinkers. Report to the Highway Research Institute, National Highway Traffic Safety Administration, Department of Transportation, Washington, D.C., April, 1974.

Nathan, P.E. and Briddell, D.W. Behavioral assessment and treatment of alcoholism. In B. Kissin & H. Begleiter (Eds.), The Biology of Alcoholism, Volume 5. New York: Plenum Press, 1977.

Nisbett, R.E., and Storms, M.D. Cognitive and social determinants of food intake. In H. London and R.E. Nisbett (Eds.) Thought and Feeling: Cognitive Alteration of Feeling States. Chicago: Aldine, 1974.

Ogurszoff, S. and Vogel-Sprott, M. Low blood alcohol discrimination skills of social drinkers With Widely varied drinking habits. Can J Beh Sci, 1976, 8: 232-242.

Paredes, A.; Jones, B.M.; and Gregory, D. An exercise to assist alcoholics to maintain prescribed levels of intoxication. Alc Tech Rep 1974, 2: 24-36.

Schachter, S. Some extraordinary facts about obese humans and rats. Am Psychol, 1971, 26: 129-144.

Silverstein, S.J.; Nathan, P.E.; and Taylor, H.A. Blood alcohol level estimation and controlled drinking by chronic alcoholics. Beh Ther, 1974, 5: 1-15.

Stunkard, A. New therapies for eating disorders: Behavior modification of obesity and anorexia nervosa. Arch Gen Psychiat, 1972, 26: 391-398.

Vogler, R.E.; Compton, J.V.; and Weissbach, T.A. Integrated behavior change techniques for alcoholics. J Consult Clin Psychol, 1975, 43: 233-243.

Vogler, R.E.; Weissbach, T.A.; Compton, J.B.; and Martin, G.T. Integrated behavior change techniques for problem drinkers in the community. J Consult Clin Psychol, 1977, 45: 267-269.

Wilson, G.T.; Leaf, R.C.; and Nathan, P.E. The aversive control of excessive alcohol consumption by chronic alcoholics in the laboratory setting. J Appl Beh Analy, 1975, 8: 13-26.

Wilson, G.T., and Rosen, R. Training controlled drinking in an alcoholic through a multi-faceted behavioral treatment program: A case study. In J.D. Krumboltz & C.E. Thoresen (Eds.), Counseling Methods. New York: Holt, Rinehart, &Winston, 1975.

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Chapter 13

A Cognitive-Behavioral Model of the Relapse Process

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Few would doubt that the techniques of behavior therapy or behavior modification are capable of bringing about meaningful changes in behavior. In the past two decades, we have developed a plethora of intervention procedures which have proven effective in modifying a wide variety of target behaviors ranging from snake phobias to sexual dysfunctions. Despite our successes in being able to initiate changes in behavior, we are still grappling with the difficulties involved in maintaining behavioral change over time and across situations.

The study of addictive behaviors provides ample opportunity to examine the maintenance problem, for recidivism rates are notoriously high across the spectrum of such behaviors. The commonality of relapse rates across these problem behaviors is striking: about two thirds of all relapses occur within the first ninety days following treatment (Hunt, Barnett and Branch 1971). These data strongly suggest the possibility of common elements underlying the mechanism of relapse itself. While the importance of individual properties of various substances cannot be ignored, particularly as they affect the development of abuse patterns within user groups, the approach we have adopted seeks to understand the determinants and reactions to the relapse episode itself, viewed as a discrete behavioral entity.

Our approach applies specifically to the study of relapse in human subjects, where cognitive factors play a paramount role as they interact with other behavioral and physiological factors. For this purpose, we have defined relapse as any discrete violation of an imposed rule or set of rules governing the rate or pattern of consumatory behaviors. The criterion of abstinence, the most stringent and absolute rule one can adopt in this regard, is violated by a single occurrence of target behavior.

The study involves the comparative analysis of a large number of relapse episodes, drawn from individuals who have received treatment of problems associated with the use of alcohol, tobacco, and heroin. gather than focusing on the internal, physiological factors

associated with the particular addictive properties of these three substances, we have based our analysis on the situational or environmental determinants of relapse, and on the individual's cognitive interpretation of the relapse episode. Because we have been concerned with the connection between the initial relapse episode and subsequent use of the substance, our theoretical model has been designed to predict reactions to the relapse based on cognitive-behavioral theoretical principles.

The development of this model began with a study evaluating the effectiveness of aversive conditioning procedures with chronic alcoholics (Marlatt 1973). The results of this study revealed the presence of powerful interpersonal forces as determinants of relapse. Over fifty percent of all relapse situations fell into one of the following two categories: (a) situations in which the patient was frustrated or angered, usually in an interpersonal or social situation; and (b) situations in which the patient was confronted by social pressures to resume drinking, usually from a drinking partner or family member. The results indicated the need for an expanded classification system of relapse situations and a new study that would evaluate its effectiveness over a larger sample of subjects. Accordingly, we obtained detailed accounts of relapse episodes from a total of 137 individuals, all of whom were involved in treatment programs for either alcoholism, smoking or heroin addiction (Marlatt and Gordon 1978).

The alcoholism sample consisted of seventy subjects, all male chronic alcoholics (average age in the mid-forties range) drawn from two inpatient treatment programs (forty-eight subjects from a state hospital inpatient program and twenty-two from an inpatient Veterans Administration hospital program). All alcoholics participated in programs with abstinence as the primary goal of treatment. Data on smoking relapses were obtained from thirty-five subjects, college-age males and females, who participated in a smoking cessation program conducted at the University of Washington. Descriptions of relapse were also obtained from thirty-two heroin addicts (both male and female young adults), who were assessed following termination of treatment as part of a statewide evaluation of services. A relapse was defined as the first use of illegal heroin or other opiates for this group of subjects. For the alcoholics and the smokers, the first drink or the first use of tobacco constituted the relapse episode.

All subjects were contacted within ninety days of the termination of the subject's treatment program for followup assessment. The alcoholics and heroin addicts were interviewed in person at this time, whereas the smoking subjects filled out a detailed questionnaire designed to obtain the same information. Most of the questions asked were patterned after the followup version of the Drinking Profile (Marlatt 1976). As in the previous study, each subject was asked to give the date and time of the relapse episode and to describe the setting in which the episode occurred (place, and presence/absence of other individuals). In addition, the following open-ended questions were asked, to provide the descriptive basis for the subsequent content analysis ratings: (a) When I took my first drink (or cigarette, or fix of heroin), the

situation was as follows (briefly describe the important features of the situation which led you to take the first drink); (b) What would you say was the main reason for taking that first drink?; (c) Describe any inner thoughts emotional feelings (things within you as a person) that triggered off your need or desire to take the first drink at that time; and (d) Describe any particular circumstances or set of events, things which happened to you in the outside world, which triggered off your need or desire to take the first drink. Other questions were asked concerning the subject's reactions to the relapse episode, including whether or not the first "slip" was followed by subsequent use of the substance on the same or on following occasions.

The next step involved the development of a classification system to enable the assignment of each relapse episode to an independent category. The first category, intrapersonal/environmental determinants, was used whenever the relapse episode involved a response to primarily psychological or physical events (e.g., coping with intrapersonal emotional states, giving in to "internal" urges, etc. or a response to a nonpersonal environmental event (e.g., misfortune, accident, financial loss, etc.). Here, the emphasis is on precipitating events in which another person or group of individual is not a significant factor. The second major category, interpersonal determinants, applied whenever the relapse episode involve the significant influence of other individuals (e.g., coping with interpersonal conflict, social pressure, etc.).

After the classification system was derived, two students were trained to assign category scores for the relapses described in the questionnaires mentioned above. Training continued until a high degree of agreement between raters was obtained: in an independent test of reliability, the inter-rater agreement was eighty-eight percent for category assignment. Each rater was then asked to score approximately half of the 137 relapse episodes given by subjects in the alcoholism, smoking and heroin addiction treatment groups. The results of this classification system are presented

The data in Table 1 indicate that over three-quarters (76%) of all relapse episodes fall into just three categories: coping with negative emotional states (37%), social pressure (24%), and coping with interpersonal conflict (15%). For the remaining twenty-four percent of all relapses, the distribution was as follows: giving into temptations or urges (7%), enhancement of interpersonal positive emotional states (3%), negative physical states (4%), testing personal control (4%), and enhancement of intrapersonal positive emotional states (6%).

The majority (58%) of all relapses involved intrapersonal or environmental determinants; forty-two percent involved primarily interpersonal determinants. In the interpersonal settings, almost all (82%) of the relapse episodes involved coping with frustration or anger. In the intrapersonal settings, however, the results were reversed, with eighty-five percent of relapses triggered by emotional states other than frustration and anger. These results seem to indicate that frustration and anger associated with relapse

TABLE 1

Analysis of Relapse Situations with Alcoholics, Smokers, and Heroin Addicts

Situation	Alcoholics (N = 70)	Smokers (N = 35)	Addicts (N = 32)	All Subjects (N = 137)
Intrapersonal Determinants	61%	57%	53%	58%
Negative Emotional States	38%	43%	28%	37%
Negative Physical States	3%	---	9%	4%
Positive Emotional States	---	8%	16%	6%
Testing Personal Control	9%	---	---	4%
Urges and Temptations	11%	6%	---	7%
Interpersonal Determinants	39%	43%	47%	42%
Interpersonal Conflict	18%	12%	13%	15%
Social Pressure	18%	25%	34%	24%
Positive Emotional States	3%	6%	---	3%

stem primarily from interpersonal sources (arguments with others, etc.), whereas other negative emotions (fear, anxiety, etc.), seem to predominate as determinants of relapse when significant other individuals are not involved. These findings were consistent for each of the three subject groups in our sample.

Coping with negative physical states accounted for only four percent of all relapses and mostly involved the heroin addict group. None of the alcoholics or smokers cited physical withdrawal as a determinant of relapse, a finding which casts doubt on theories which posit withdrawal symptoms as the primary precipitating factor in relapse (Marlatt 1978). Temptations or urges may be related to the subjective experience of craving. sometimes posited as a conditioned response to cues associated with prior withdrawal (Ludwig and Wikler 1974). Yet this category accounted for only seven percent of all relapses, most of which occurred in the alcoholic group, with relatively few smokers and no heroin addicts citing this as a determinant. In addition, the use of a substance to enhance positive emotional states, whether in an intrapersonal or interpersonal situation, accounted for relatively few relapses (9%). These findings suggest that coping with stress (whether it is associated with negative emotional states, interpersonal conflicts, or a response to social pressure, etc.) is a much stronger determinant of relapse than the desire to "feel good," to enhance already existing positive emotional states, or to cope with negative physical states.

Only among the alcoholic sample was testing personal control given as a determinant of relapse. For a small subgroup of the alcoholics (9%), the desire either to test one's ability to have a drink or two and then stop, or the intention to test the effects of the abstinence-oriented treatment program, was given as the precipitating event. As none of the smokers or heroin addicts cited tests of personal control as the primary determinant, it seems likely that some alcoholics are particularly susceptible to this temptation.

Approximately one-fourth of all relapses were classified under the social pressure category. Whether the influence of social pressure was direct or indirect in nature interacted in an important way with the substance or drug used. For alcoholics and heroin addicts, the predominant relapse situation involved direct social pressure, or actual contact between users (e.g., meeting an old drinking buddy who puts pressure on the person to begin drinking again; or the addict running across someone who offers some of his/her stash). For the smokers, on the other hand, the pattern was reversed. Smokers showed a greater tendency to succumb in situations where others were smoking (observation of models), even though the other smokers put no direct pressure on the observers to join in the indulgence. This finding may reflect the fact that smoking is a far more public behavior (exhibited across a wide variety of situations) than is drinking or the illicit use of narcotics.

Our three groups relapsed within a relatively short time of completing their respective treatment programs. For our sample,

the average number of days between beginning abstinence and the subsequent date of relapse was seventeen days for smokers, thirty days for the alcoholics, and thirty-two days for the heroin addicts. These figures must be interpreted with caution, however, because of differences among the treatment programs involved.

To account for the similarity of the relapse process across different consumatory 'behaviors, we have constructed a theoretical model based on a cognitive-behavioral orientation. Underlying this model of relapse is a cognitive process which we have labeled the Abstinence Violation Effect (AVE) . The AVE is postulated to occur under the following conditions: (a) The individual is personallv committed to an extended or indefinite period of abstinence from engaging in a specific behavior; (b) The behavior occurs during this period of voluntary abstinence.

We hypothesize that the AVE itself is characterized by two key cognitive elements:

(1) A cognitive dissonance effect (Festinger 1964) wherein the occurrence of the previously restricted behavior is dissonant with the cognitive definition of oneself as abstinent. Cognitive dissonance is experienced as a conflict state, and underlies what most people would define as guilt for having “given in to temptation."

(2) A personal attribution effect (cf., Jones, Kanouse, Kelley et al. 1972), wherein the individual attributes the occurrence of the taboo behavior to internal weakness or personal failure, rather than to external situational or environmental factors. The additive effects of both reactions will greatly increase the probability of repeating the restricted behavior and engaging in a full blown relapse. From this perspective, relapse is determined in large part by the alcoholic's perception of having “lost control” when the first slip occurred.

The conditions under which the AVE would come into play are mediated by the individual's overall sense of personal self-efficacy and the dynamics of the relapse situation itself. While the factors that determine relapse are interwoven in a network of complex interactions, the basic sequence of cognitive events appears consistent across substances. Thus, our model for the conditions of a full blown relapse is summarized as follows:

(a) The abstinent individual feels “in control” until s/he encounters a high risk situation which challenges his/her perception of control;
(b) The individual lacks an appropriate method of coping with the high risk situation, or fails to engage in a coping response;
(c) S/he has positive expectancies about the effects of the substance or behavior s/he is abstaining from;
(d) S/he engages in that behavior or consumes that substance;
(e) S/he experiences one or both components of the Abstinence Violation Effect;
(f) The probability of continued use of that substance markedly increases.

Most traditional treatment programs for addictive behaviors, including those for alcoholism, smoking control, and heroin addiction, tend to ignore the relapse issue altogether in their intervention procedures. Yet, teaching skills that may help an individual to cope successfully with a relapse would seem to be a matter of common sense. Skills offer more help to the individual than relying on vague constructs such as "will power" or trying to adhere to the advice implied by various slogans. With this in mind, the following is a brief description of intervention strategies for coping with a potential relapse situation. (See Figure 1).

A. High Risk Situation. The first step to take in the prevention of relapse is to train the client to recognize those high risk situations which are likely to increase the probability of relapse. The goal would be to teach the client to recognize the discriminative stimuli that are associated with "entering" a high risk situation and to use these warning signals as cues to implement an alternative sequence of behavior. Self-monitoring procedures (McFall 1977) provide an effective means of identifying potential high risk situations as do the Drinking Profile (Marlatt 1976) and the Situational Competency test (Chaney, O'Leary, and Marlatt 1978).

B. Coping Responses If the client has never learned the appropriate coping response to high risk situations. the emphasis should be on teaching the requisite-skills involved. On the other hand, if the response is available in the client's repertory but is blocked by an inhibiting influence, the therapist must first deal with the client's reactions so that the response can be performed with minimal anxiety. One suggestion that may increase the generalization of newly acquired coping skills is to require the client to practice the adaptive behavior in the actual high risk situation. The therapist who is working with smokers or drinkers who have recently pledged themselves to abstinence could, for example, take a group of clients to an actual bar or nightclub for a "dry run" experience. The effectiveness of a skill training approach with chronic alcoholics is described in a recent study by Chaney, O'Leary, and Marlatt (1978).

C. "Self-Efficacy and Lifestyle Intervention. In addition to providing the client with a set of specific skills, each designed. as a coping response to a particular high risk situation, the therapist can also impart a number of global strategies or procedures which provide a broader framework for the relapse prevention program. Some of these might be general problem solving strategies, decisionmaking skills, skills for increasing a general sense of self-efficacy and control (i.e., jogging, meditation or relaxation training). These activities also represent alternate forms of "self-indulgence" and relaxation to substance use.

D. Outcome Expectancies of Substance Use. This phase of the program involves the provision of information about the long range effects of excessive substance use on physical health and social-well-being. This information is necessary in order to counter the tendency to think only of the initial pleasant short term effects of substance use.

E. Initial Use of Substance: What to Do if a Slip Occurs. Here, the client can be prepared in advance to cope with this possible outcome, and try to apply some "brakes" so that the

FIGURE 1

LIFE-STYLE INTERVENTION TO BALANCE WANTS + SHOULDS
DESEN-SITIZATION IF INHIBITED BY ANXIETY
TRAINING IN MODERATE OR CONTROLLED USE SKILLS
PROGRAMMED RELAPSE
HIGH-RISK SITUATION
NO COPING RESPONSE
DECREASED SELF-EFFICACY + POSITIVE OUTCOME EXPECTANCIES (FOR SUBSTANCE EFFECTS)
INITIAL USE OF SUBSTANCE
ABSTINENCE VIOLATION EFFECT
SELF-MONITORING AND BEHAVIORAL ASSESSMENT
SKILL-TRAINING IF DEFICIT
EDUCATION ABOUT SUBSTANCE EFFECTS E. G. BIPHASIC RESPONSE EFFECTS
COGNITIVE RE-STRUCTURING AND SELF-CONTROL INTERVENTION

slip does not escalate into a full blown relapse. A combination of specific skills and cognitive intervention strategies would seem to offer the greatest advantage for relapse prevention. For a more detailed presentation of the relapse prevention approach, the reader is referred to two recent publications (Marlatt 1979; Marlatt and Gordon 1978).

REFERENCES

Chaney, E.F., O'Leary, M.R., and Marlatt, G.A. Skill training with alcoholics. Journal of Consulting and Clinical Psychology, 1978, in press.

Festinger, L. Conflict, Decision and Dissonance. Stanford: Stanford University Press, 1964.

Hunt, W.A., Barnett, L.W., and Branch L.G. Relapse rates in addiction programs. Journal of Clinical Psychology, 27:455-456, 1971.

Jones, E.E., Kanouse, D.E., Kelley, H.H., Nisbett, R.E., Valins, S., and Weiner, B. (Eds.). Attribution: Perceiving the Causes of Behaviors. Morristown, N.J.: General Learning Press, 1972.

Ludwig, A.M. and Wikler, A. "Craving" and Relapse to Drink. Quarterly Journal of Studies on Alcohol, 35:108-130, 1974.

Marlatt G.A. A Comparison of Aversive Conditioning Procedures in the Treatment of Alcoholism. Paper presented at the meeting of the Western Psychological Association, Anaheim, Calif., 1973.

Marlatt, G.A. The drinking profile: A questionnaire for the behavioral assessment of alcoholism. In: Mash, E.J. and Terdal, L.G., eds. Behavior Therapy Assessment: Diagnosis, Design, and Evaluation. New York: Springer, 1976.

Marlatt, G.A. Craving for alcohol, loss of control, and relapse: A cognitive-behavioral analysis. In: Nathan, P.E., Marlatt, G.A., and Loberg, T., eds. Alcoholism: New Directions in Behavioral Research and Treatment. New York: Plenum, 1978.

Marlatt, G.A. Alcohol use and problem drinking: A cognitive-behavioral analysis. In: Kendall, P.C., and Hollon, S.P., eds. Cognitive-Behavioral Interventions: Theory, Research and Procedures. New York: Academic Press, 1979, in press.

Marlatt, G.A. and Gordon, J.R. Determinants of relapse: Implications for the maintenance of behavior change. In: Davidson, P., ed. Behavioral Medicine: Changing Health Lifestyles. New York: Brunner/Mazel, 1978, in press.

McFall, R.M. Parameters of self-monitoring. In: Stuart, R.B., ed. Behavioral Self Management: Strategies, Techniques, and Outcomes: New York: Brunner/Mazel, 1977.

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Part IV Obesity

Chapter 14

Current Status of Behavioral Treatment of Obesity

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It is not unfair to say that behavioral treatment programs for obesity have arrived at something of an impasse. The publication of Stuart's landmark paper in 1967 reporting unprecedented success in the treatment of obesity triggered a sudden burst of research on behavior therapy for obesity. The initial results appeared to be encouraging. In 1972 Albert Stunkard declared that behavior modification was the most successful form of treatment for obesity. Coming from the authority who had earlier issued an extremely pessimistic and widely quoted[1] verdict on the efficacy of medical and nonbehavioral treatment approaches to obesity (Stunkard 1958), this favorable assessment of behavior modification provided another significant impetus for behavioral researchers in this area. So intense has the research activity in this area been that approximately a decade after Stuart's (1967) report, Jeffery, Wing, and Stunkard (1978) reflected a growing concern that "research on the behavioral treatment of obesity has achieved a popularity verging on faddism" (p.189). More importantly, after the initial success in the application of behavioral methods for obesity, therapeutic advances have seemed to have leveled off. In particular, the sparse data on long-term efficacy proved disappointing (Stunkard & Penick in press). To many, behavioral treatment of obesity had flattered only to deceive. Within the behavior therapy camp, Aubrey Yates (1975) described the treatment of obesity as an instance of "when behavior therapy fails" (p.133). Nonbehavioral critics, particularly those committed to sane form of biological interpretation of obesity, have reaffirmed their belief that a learning-based treatment method is unlikely to have much of a long-term effect on weight reduction.

The purpose of the present paper is to take a close look at the apparent impasse in the behavioral treatment of obesity and to suggest future research directions. What then is the current empirical status of outcome research on the behavioral treatment of obesity? This can be summarized in the following five points: (1) Behavioral treatment has proved more effective in producing weight loss than alternative treatment methods in the short term; (2) studies canparing the long-term success of behavioral treatment of obesity have been conspicuous by their relative absence and where data on long-term efficacy exist they are often discouraging; (3) behavioral treatment programs have almost always produced weight losses that fall short of clinical

significance even if they are statistically significant within individual studies; (4) behavioral treatment programs have been consistently characterized by massive inter-individual variability in outcome; and (5) reliable predictors of treatment outcome have yet to be identified.

This pattern of findings, particularly the relative lack of convincing data on long-term efficacy, has led to the conclusion that behavior therapy offers little or limited clinical utility in the treatment of obesity. However, there are alternative ways of interpreting the available evidence. Of course, the possibility exists that obesity is caused and maintained by physiological or metabolic factors that are as yet not fully understood. Certainly enough data currently exist indicating that the role ofbiological factors in obesity cannot be overlooked (Stunkard &Mahoney 1976). It may be that the effects of these biological factors in maintaining obesity cannot (or, possibly, should not) be overcome through the use of behavioral methods aimed at altering eating and exercise habits. Or it may even be the case that behavioral procedures are not the optimal psychological means of controlling obesity even if this condition is amenable to non-physical interventions.[2] These are open questions that will eventually be decided on the basis of the appropriate **research. The** thesis I wish to advance here is that another explanation for the relatively unimpressive long-term clinical findings from the behavioral treatment of obesity is that most treatments to date have constituted inadequate or incomplete applications of behavior therapy. It maybe that we have not obtained better results, particularly maintenance of treatment-produced weight loss with at least mild to moderate cases of obesity, because we have failed to implement treatment programs that are consistent with what is currently known about the optimal methods for producing and sustaining long-term changes in chronic, refractory behavioral problems such as obesity. In short, I am suggesting a sophisticated behavioral approach to the treatment of obesity as yet to be properly tested. The remainder of this paper indicates what directions the development of a more effective behavioral treatment approach might take.

There is good reason to suggest that the effort to improve upon existing behavioral programs might pay dividends. To begin with, there is the fact that despite the limitations of the current empirical status of behavior therapy for obesity as indicated in the five-point summary above, definite benefits have accrued from the application of behavioral methods over the past dozen years. It is worth noting sane of these benefits. First, as mentioned above, behavioral treatments have proved to be superior to alternative psychological methods at least in the short term. Second, the effects of behavior therapy have been replicable across a broad range of different therapists, subjects, and situations. Third, behavioral procedures have proved widely disseminable. For example, behavioral methods have been incorporated by Weight Watchers International, the largest and most successful commercial organization for the treatment of obesity (Stuart 1978). Although the evidence is not unambiguous, Nidetch (1978) has claimed that the introduction of behavioral methods into the Weight Watchers program has resulted in dramatically improved weight

losses. Fourth, behavior therapy has been shown to be a safe form of treatment that does not appear to produce any adverse side-effects. This is an important consideration given the frequently voiced concern that obesity is a biologically normal state, the reduction Of which might occasion negative physical and emotional consequences (cf. Nisbett 1972). Finally, research on the behavioral treatment Of obesity has yielded valuable information about the specific effects of particular procedures. For example, we have begun to learn which techniques work (e.g., self-monitoring of caloric intake) and which do not (e.g., covert sensitization - see Franks and Wilson, 1975-78). Identifying treatment-specific effects across different disorders is the hallmark of an emerging science of clinical behavior change.

In discussing how behavioral treatment programs for obesity might be improved, it is important to distinguish between the initial induction of weight loss and its subsequent maintenance over time. It is, especially the latter that has been ignored in most programs and it is the development of effective maintenance strategies that must be among the highest priorities of clinical researchers (cf. Wilson, in press).

TREATMENT PROGRAMS

Almost without exception, the behavioral treatment programs that have been evaluated in outcome studies have represented one or other variation of the basic program used by Stuart (1967) and described more fully by Stuart and Davis (1972). As such, the principal techniques used are behavioral self-control methods that include some form of self-monitoring, stimulus control, self-reinforcement, contingency contracting, and procedures designed to control the act of eating directly. Treatment is almost invariably conducted on a group basis. The average duration of treatment ranges from approximately four to 12 weeks. Most studies have not included an explicit emphasis on physical exercise. Of those that do, few incorporate a systematic program of exercise despite the fact that Stuart and Davis (1972), among others, have stressed its importance.

The remarkable consistency with which essentially the same treatment program has been adopted from study to study bespeaks the premature formalization of the behavioral treatment of obesity. It is not uncommon, for example, to read research reports describing the application of the "standard Stuart and Davis (1972) treatment program." This premature standardization of a behavioral treatment program has been unfortunate for several reasons. In principle, it runs counter to a cardinal tenet of behavior therapy that treatment is individually tailored to the particular needs of each individual (Lazarus 1971; Mischel 1968). Stuart and Davis (1972) themselves cautioned that one of the myths in the treatment of obesity is that any program is useful for everyone. Formalization of the treatment program for obesity has also served to discourage active development of alternative cognitive-behavioral strategies that might prove useful. Finally, it has been pointed out that some of the fundamental assumptions underly-

ing the use of the Stuart and Davis-type procedures have gone either unexamined or unvalidated[3] (cf. Mahoney 1976).

The following are some recommendations about how behavioral treatment programs might be revamped in a manner consistent with the knowledge of behavior change that we have gathered from the assessment and modification of a broad range of disorders.

Group Versus Individual Treatment

In his original study, Stuart (1967) treated his clients on an individual basis and emphasized the importance of individualizing treatment. It is not without interest, therefore, that subsequent treatment studies have overwhelmingly used a group setting. There appears to have been no discernible rationale or empirical justification for this uniform policy. It is probably attributable to the fact that group treatment is more efficient and to the apparently widespread perception that the treatment techniques could be implemented on a standardized, group basis. In the only study of its kind, Kingsley and Wilson (1977) directly compared the effects of individual versus group behavioral treatment of obesity. The results showed that at the end of an eight week treatment phase, individual treatment had an edge over group treatment although this difference did not even approach statistical significance. Of considerable importance, however, is the fact that subjects treated on an individual basis showed significant relapse over the one-year followup period whereas group behavioral treatment resulted in successful maintenance of weight loss. At the one-year followup assessment the group treatment was significantly superior to the individual treatment in terms of weight lost. These results indicate that a group setting might be especially useful for maintaining weight loss.

Caution should be had, however, before concluding that individual treatment confers no significant advantage over group treatment in the initial stage of therapy. An analysis of the actual procedures used in the Kingsley and Wilson (1977) individual treatment condition reveals substantial overlap with the relatively standard group treatment they employed. Furthermore, the actual range of techniques used in the individual treatment condition in this study proved to be relatively narrow given the broad spectrum of cognitive-behavioral methods that are currently available. The issue of the multifaceted treatment of obesity, using a wider range of methods than is typically the case in most studies, is discussed in the following section. What can be concluded at the present is that there is insufficient evidence on the relative advantages of individual versus group treatment. It might be, as Kingsley and Wilson (1977) have hypothesized, that an optimal treatment approach would consist of sane combination of individual and group treatment. A combined approach of this nature would ensure the detailed and individualized assessment of each individual's particular problem in addition to taking advantage of the motivational benefits afforded by the group context. Such a treatment strategy seem worth pursuing.

Broadening the Treatment Base

The typical behavioral treatment program thus far has been unnecessarily limited in nature. Deriving from too simple an operant conditioning model, the exclusive focus was on environmental cues that were assumed to govern overeating. Although described as behavioral self-control, the methods used actually amounted to external situational control of behavior (Stuart 1972). The basic components of the typical program have almost invariably comprised stimulus control, behavioral management, and contingency contracting of one kind or another. One of the few widely used techniques that departs somewhat from this heavy emphasis on external control of environmental cues has been self-reinforcement, a procedure that has shown considerable promise in the treatment of obesity (Bellack 1977; Mahoney 1974).

It is my impression that the behavioral treatment literature on obesity shows surprisingly little evidence of the systematic use of additional behavioral procedures that have been found to be of value in the treatment of other clinical disorders. Some examples may be mentioned. Social skills training that would enable obese individuals to cope more constructively with problem situations has been demonstrated to produce impressive improvement among diverse patient populations, including alcoholics (Chaney, O'Leary, & Marlatt 1978; Sobell & Sobell 1978). Many of the social or interpersonal difficulties faced by the problem drinker are shared by the obese. Declining a cocktail or postprandial cognac when dining out with friends or acquaintances at a restaurant is not terribly different from refusing dessert. The obese person has to have the assertive skills to be able to say "No" without becoming a killjoy and without suffering feelings of guilt, shame or rejection. The obesity treatment literature does contain scattered references to explicit assertion or social skills training (e.g., Musante 1976), but they are surprisingly rare.

Although the laboratory-based research findings are mixed (Abramson & Wunderlich 1972; McKenna 1972), few therapists would dispute the contention that emotional factors are often., albeit not always, critical antecedents of overeating and obesity. Thorough behavioral assessment frequently reveals that obese individuals overeat in response to anxiety, anger, or depression. Once again the parallel to alcohol abuse can be drawn where the clinical evidence strongly implicates the role of emotional distress among the important precipitants of excessive drinking (e.g., Hodgson, Stockwell, & Rankin 1978; Miller & Mastria 1977). It follows that a canprehensive treatment program would include techniques designed to neutralize the situations that elicit anxiety, anger, or depression and to equip these individuals with effective, alternative coping skills. Behavior therapy is demonstrably successful in reducing stress or anxiety (e.g., Goldfried 1977; O'Leary & Wilson 1975) and, more recently, effective treatment programs for coping with anger (Novaco 1977) and depression (Rush, Beck, Kovacs, & Hollon 1977) have been developed. It is time that these treatment methods are incorporated into more intensive weight reduction programs that are based more closely on adequate behavioral assessment.

Another limitation of the standard behavioral treatment program for obesity has been the failure to address clients' cognitive activities regarding food and their obesity. This neglect of the role of cognitive processes in the maintenance and modification of obesity is directly traceable to the hard-line operant conditioning model from which the behavioral treatment of obesity was originally derived. Stuart and Davis (1972) characterized this position well in their influential text by emphasizing that "the environment rather than the man is the agent of control in human behavior, so that efforts to modify behavior should be addressed to changing the environment rather than the man" (p.62). However, not all behavior therapists hold such an extreme view of environmental influence on behavior. The alternative, social learning viewpoint recognizes the importance of environmental influences on behavior but emphasizes that the impact of these influences is, to a large extent, cognitively mediated. In terms of this social learning or cognitive-behavioral view, the person is both the object as well as the agent of behavior change (Bandura 1977b; Mahoney 1974; Wilson & O'Leary, in press). It follows directly from this view that cognitive processes will feature prominently in an effective treatment program. Suffice it to note here the current enthusiasm for "cognitive-behavior therapy" and the mounting evidence of its therapeutic efficacy with such problems as anxiety, anger, depression, and others (cf. Beck 1976; Mahoney & Arnkoff, in press; Meichenbaum 1977; Rachman &Wilson, in press).

The importance of these relatively recent therapeutic developments is underscored by the fact that there is good evidence that cognitive factors influence the obese person's eating behavior (e.g., Mahoney 1975; Wooley & Wooley 1975). A recent self-help book by Mahoney and Mahoney (1976) has emphasized the importance of cognitive factors and includes several cognitive treatment methods. However, systematic research investigations of this promising approach remain to be completed. In an initial evaluation of the efficacy of a cognitive-behavioral treatment program for obesity, Collins (1978) has obtained preliminary, short-term findings suggesting that a combined cognitive-behavioral program might be significantly more effective than either the standard behavioral treatment or a cognitive treatment alone. The cognitive-behavioral treatment program employed in this study was an amalgam of principles and procedures derived from the cognitive-behavior therapies of Beck (1976), Ellis (1970), and Meichenbaum (1977) which was combined with the conventional behavioral methods. These results encourage further research along these lines, whatever the long-term findings prove to be.

Another dimension of treatment that has been overlooked in the behavioral literature on weight reduction programs concerns the obese person's interpersonal relationships, particularly his or her marital relationship. The earlier comments about the likely value of assertion training are pertinent to this discussion. However, the interpersonal dimension of psychological functioning involves more than assertive ness. The obese person requires social support if (s)he is to lose a significant amount of weight and keep it off. In this connection the actions and attitudes of the person's spouse are of the utmost

importance. For example, Stuart and Davis (1972) concluded that some husbands" . ..are not only contributors to their wives' efforts to lose weight, but may actually exert a negative influence" (pp. 19-20). Specifically, husbands were more likely than their overweight wives to initiate conversation of food-related topics and were more likely to criticize their wives' eating behavior than they were to praise moderation. Mahoney and Mahoney (1976) reported an apparent relationship between treatment outcome and estimated family support of subjects. These authors computed a family support index based upon family attendance at therapy sessions and subjects' reports of encouragement that they received. A positive correlation between weight loss and family support was statistically significant at the end of the 10 weeks treatment program but not at the 6-month followup. Similarly, Jeffery et al. (1978) reported a significant positive correlation between weight loss and social support in their uncontrolled clinical treatment series. In the first experimentally controlled evaluation of the therapeutic impact of including the spouse in the behavioral weight reduction treatment program, Brownell (1977) found that treating couples rather than individual subjects produced significantly greater weight losses. These findings are discussed more fully under maintenance of treatment effects below.

The foregoing has called attention to the need for an individualized, multifaceted treatment of obesity based on a more comprehensive assessment of the specific maintaining variables in each case. The effective treatment of complex clinical disorders would seem to demand such an expanded approach (Bandura 1969; Lazarus 1976; O'Leary &Wilson 1975). It is interesting to note that in his recent self-help book on weight control, Stuart (1978) outlines a multimodal treatment approach that incorporates an emphasis on emotional and cognitive factors and goes well beyond his original Program.

The Duration and Scheduling of Treatment

As mentioned earlier, the typical length of the average behavioral treatment program for obesity has ranged from 4 to 12 weeks. As with the use of a group setting, the rationale for a time-limited, modal treatment duration of about 8 weeks has never been spelled out. It could be argued that since a good deal of the treatment outcane research has been conducted within university departments, the length of treatment has been determined in large part by the length of the semester. Many university activities, including university clinic-based treatment programs, come to a conclusion at the end of a semester! The fact programs have been invariably time limited is attributable to research designs that require uniform treatment across conditions. This is a common constraint that is imposed in controlled therapy outcome studies across different problems.

It may be that a refractory problem such as obesity requires more protracted treatment than is commonly the case. In their analysis of

the behavioral treatment literature on obesity, Jeffery et al. (1978) found that the longer the duration of treatment the greater the weight loss at the end of treatment. However, their own findings at the Stanford Eating Disorders Clinic indicated that increasing treatment length did not facilitate long-term success. Time-limited treatment programs pose specific problems. It appears to make better behavioral sense to decide to continue or terminate treatment as a function of change in the behavior in question than to impose treatment limits arbitrarily on the basis of sane factor that is unrelated to the person's behavioral performance. Given the assumptions underlying the behavioral approach to weight reduction, treatment decisions of this sort would presumably be based on changes in eating habits rather than weight loss per se. However, recent research has indicated that in addition to actual behavior change, the person's expectations of self-efficacy that derive from such change might be a more powerful predictor of future performance (Bandura 1977a; Wilson, in press a).

Related to this question about relatively brief, time-limited treatment is the observation that the sort of weight loss that is typically produced in treatment outcome studies is not sufficiently reinforcing in itself to ensure continued weight-reducing efforts. But what if treatment were continued until sizeable amounts of weight loss were produced? More particularly, what if treatment were continued until the subject's individual target weight is reached, however long that treatment takes? It might be that at this level subjects will be more motivated to adhere to weight control methods. Since so many overweight clients are seriously overweight, renewed attention might be given to rapid methods of facilitating substantial weight loss such as drugs or special diets. These methods that have been readily dismissed by behavior therapists might be useful adjuncts as part of the initial treatment program. They could then be faded out as progress towards the ultimate goal of behavior self-control over eating habits and exercise patterns is gradually established.

Aside from the duration of treatment, the frequency and pattern with which treatment sessions are scheduled demands future research attention. In their survey of the literature, Jeffery et al. (1978) reported that greater weight losses tended to be associated with a higher frequency of treatment sessions. Stuart's (1967) original study, for example, combined frequent sessions of intensive treatment over a full year of treatment. The usual practice of scheduling treatment sessions on a fixed, weekly basis is an arbitrary one that undoubtedly is based more on the convenience it affords the investigators than on any advantage it may offer the subjects. Fixed, weekly treatment sessions may do for some obese clients but prove a less satisfactory arrangement for others. Especially difficult cases may require more frequent, intensive treatment sessions several times a week, at least at the start of therapy. Thereafter treatment sessions may be distributed over longer time intervals. In addition to actual treatment sessions, the value of frequent (daily?) telephone contacts

300-345 0 - 79 - 14

should be explored. Intensive support for behavior change could also be provided by some form of self-help group participation that serves as an adjunct to more fomal treatment.

Who Administers Treatment?

The individuals who administer treatment in behavioral outcome studies on the treatment of obesity range from undergraduates to professional therapists. The fact that qualifications of therapists in these studies are described only sketchily, if at all (Wilson 1978), illustrates the fact that this aspect of treatment is downplayed in behavior therapy. This is unfortunate, since there are clear indications from the treatment of other problems that the therapist can make a significant contribution to treatment outcome (Wilson & Evans 1977). On the one hand, while behavioral treatment of obesity is restricted to highly standardized procedures that are administered in a group context in a frequently didactic manner, the influence of the individual conducting treatment is unlikely to be a factor. In fact, it may be that self-help manuals are as effective as therapist-administered treatment in the short term (Hagen 1974). (Rut see Brownell, Heckerman, and Westlake [l978] as a cautionary note in this regard). On the other hand, to the extent that behavioral treatment of obesity becomes more individualized as a result of a searching assessment of the full range of maintaining variables, the role of the therapist will inevitably become more important and may influence treatment outcome in significant ways. Once again firm evidence is lacking, but it should be noted that Jeffery et al. (1978) reported that experienced therapists produced greater weight loss in their behavioral treatment program and that Levitz and Stunkard (1974) found that professional behavior therapists obtained significantly better results than lay therapists in their investigation.

MAINTENANCE STRATEGIES FOR LONG-TERM WEIGHT LOSS

The development of effective strategies to maintain treatment-produced imrovement has received little systematic attention in the behavior therapy literature. The treatment of obesity has been no exception to this general trend and it is unlikely that impressive long-term efficacy will be demonstrated until appropriate maintenance strategies are included as integral parts of therapy programs. Many of the problems and potential involved in maintenance strategies for weight loss are discussed by Franks and Wilson (1978), Stunkard and Penick (in press), and Wilson (in press a). The analysis that follows is geared directly to the problem of maintaining weight loss. However, the conceptual issues this analysis raises and the recommendations that are offered would appear to be directly relevant to the treatment of substance abuse in general.

Multifaceted Treatment Programs

To begin with, the type of treatment program that is used undoubtedly influences subsequent maintenance of weight loss. In terms of a social

learning approach, durability of initial treatment-produced change is a function of the scope of the therapy program employed and large-scale, multifaceted treatment program are the order of the day (cf. Azrin 1977; Bandura 1969; O'Leary & Wilson 1975). In his multimodal behavior therapy approach, Lazarus (1976) goes as far as to state flatly that lasting treatment effects depend on the comprehensive treatment of seven separate but interactive modalities of psychological functioning. These modalities are behavior, affect, sensation, imagery, cognition, interpersonal relationships, and biolgoical factors. As indicated in the preceding section, complex problems usually require multifaceted treatment program. Consistent with this view are the findings of Collins (1978) and Dunkel and Glaros (1978). In both these studies, a combined cognitive behavioral approach was superior to either a cognitive or a behavioral treatment alone at admittedly short followups of 12 and 7 weeks respectively. However, a caveat must be issued in this respect. More is not always better. I have elsewhere discussed the finding from the treatment of problems as diverse as anxiety, cigarette smoking, and obesity that treatment programs that combine different techniques are occasionally less effective than the use of a single procedure (Franks &Wilson 1977). In the case of obesity, for instance, McReynolds and Paulsen (1976) compared a comprehensive behavioral treatment program to a more narrowly defined treatment emphasizing stimulus control procedures. There was no difference between the two groups at posttreatment. At followup evaluations of three and six months, however, the more limited stimulus control treatment was significantly superior. (Danaher [l977] has reported similar findings from the behavioral treatment of cigarette smoking).

Assuming that this occasionally detrimental or less than optimal effect of combining specific treatment techniques into a broader program is a real phenomenon - and I believe that it is - it requires explanation. Briefly, I have speculated that the negative impact of combining different treatment techniques might be attributable to its effect on subjects' adherence to therapeutic prescriptions. A striking characteristic of behavior therapy is that clients are asked to do sanething. The success of these behavioral methods is directly dependent on the degree to which they are implemented by the person (Wilson & Evans 1977). The systematic analysis of the variables that determine adherence is just beginning, but already it seems clear that complexity of treatment is a critical factor (cf. Blackwell 1976; Dunbar & Stunkard, in press). The results from the medical literature indicate that the more complex the treatment regimen, the less the adherence. Behavioral treatment programs for obesity are usually complex, and clients may not be given sufficient time to digest each technique and incorporate it into their daily routine. This possibility relates back to the point made in the previous section concerning the duration of treatment. In addition to researching <u>what</u> behavior change techniques to use and <u>how</u> to employ then, we also have to learn <u>when</u> to use then. The timing of interventions is crucial in all forms of therapy (Strupp 1977) and behavior therapy is no exception to this rule. A multifaceted treatment pro-

gram has to be sequenced properly. A technique employed at one point in a sequence of interventions may be less effective than at another time (e.g., Barlow, Reynolds, & Agras 1973). We know very little about such niceties of optimal therapeutic practice at the present time. However, it will be useful to be aware of these issues.

An important aspect of a comprehensive treatment program for obesity that is frequently omitted or underemphasized is an explicit program of physical exercise. The possible role of physical exercise in the maintenance and modification has been discussed in several places and need not be detailed here (cf. Mahoney, Rogers, Straw, & Mahoney, in press). More to the point, outcome studies have clearly shown the beneficial effect of including an exercise component in a behavioral weight control program. Harris and Hallbauer (1973) found no difference between behavioral treatment focusing on changing eating habits and an expanded treatment program that was designed to increase exercise in addition to decreasing food intake at the end of a 12 week treatment period. At a four-month followup, however, the treatment that included an emphasis on exercise produced significantly more weight loss. More recently, Stalonas, Johnson, and Christ (1978) have described the positive effects on the maintenance of weight loss of including an explicit exercise component in a behavioral treatment program.

Physical exercise has direct relevance to obesity in that it increases the expenditure of calories. Beyond this effect, however, exercise might contribute importantly to a more general change in life style. To the extent that a person becomes invested in systematic exercising and enjoys the experience (i.e., becoming an enthusiastic jogger), an alternative activity to the addictive behavior is established. As such, physical exercise would be recommended as a therapeutically desirable activity across the full range of addictive behaviors. Marlatt and Gordon (in press) have this consideration in mind in their advocacy of developing a "positive addiction" to facilitate the life style change that is involved in giving up substance abuse.

Booster Sessions

Within behavior therapy, booster sessions have long been proposed as a means of maintaining behavior change (e.g., Eysenck & Rachman 1965). Taking their cue from the uncontrolled finding of Voegtlin, Lemere, Broz, & O'Hallaren, (1942) that indicated the value of posttreatment booster sessions with alcoholics, behavioral researchers have evaluated the benefits of booster sessions as a maintenance strategy in the treatment of obesity. Most of this research is reviewed by Wilson (in press a) and can be summarized briefly here.

In the first of a related series of three studies, Kingsley and Wilson (1977) found that booster sessions produced significantly greater weight loss during the three months they were in effect, irrespective of whether the initial treatment had been individual behavior therapy, group behavior therapy, or group social pressure. Booster sessions

were discontinued after three months following treatment and at a one year followup there was no longer any significant difference between the booster and the no booster conditions. A second study by Ashby and Wilson (1977) failed to replicate this finding of the value of booster sessions. An evaluation of the effects of different types of booster sessions scheduled at different frequencies found no significant difference between booster and no booster conditions. Finally, Wilson and Brownell (in press) reported the absence of a significant effect of booster sessions during a six-month followup of a group behavioral treatment program. Similarly negative results were obtained by Hall, Hall, Borden, and Hanson (1975).

These inconsistent results of booster sessions as a maintenance strategy are not restricted to the treatment of obesity. Positive results using booster sessions to maintain treatment effects with cigarette smokers have been reported by Colletti and Kopel (1978) and Kopel (1974). Yet Relinger, Bornstein, Bugge, Carmody, and John (1977) found that booster sessions did not facilitate maintenance of treatment effects over a three-month followup interval. Indeed, there was sane indication that those subjects who received booster sessions showed greater relapse rates than subjects in the no booster session condition. In view of these inconsistent outcomes and changing theoretical perspectives about behavior change, I have suggested that we have to revise our thinking about the nature and purpose of booster sessions (see Franks & Wilson [1978]). The use of booster sessions derives from the conditioning model in which they are designed to strengthen conditioned responses that were established in treatment. These conditioned responses are considered to be the result of an automatic conditioning process which is subsequently weakened by the natural course of extinction. However, in terns of a social learning analysis, conditioned reactions are self-activated rather than automatically elicited (Bandura 1977b). This latter framework emphasizes self-regulatory strategies rather than stimulus-response bonds and the person assumes greater responsibility for self-directed behavior change. Booster sessions that are prearranged to occur at fixed time intervals following treatment may amount to a case of too little too late.

In terms of a self-regulatory model of behavior the obese individual would need to monitor potentially problem behavior and institute the appropriate corrective strategy at the first sign of loss of control such as weight gain. These corrective or self-regulatory strategies are presumably acquired during the initial treatment phase. It may be that clients need to have access to a treatment program contingent upon the inmediate signs of their deteriorating self-control as opposed to an arbitrary interval schedule of treatment contact which is what most booster session maintenance strategies amount to. This reasoning is an extension of the point made earlier in this paper about the scheduling and termination of the initial treatment phase being made more responsive to subjects' behavioral performance rather than has usually been the case.

Social Support Systems

There are many sources of social support that could be drawn upon to help the obese individual maintain weight loss. Possibly the most powerful form of social support would come from the active involvement of the obese person's spouse or family. In an initial investigation of the therapeutic potential of including family members in the treatment process, Wilson and Brownell (in press) failed to obtain positive results over a six-month followup. However, in subsequent, better controlled study along the same lines, Brownell (1977) demonstrated that the active involvement of the obese person's spouse in the treatment program can result in a substantial increase in therapeutic efficacy. The details of this investigation are described by Brownell in his volume and Will not be repeated here. Suffice it to point out that the significant impact of involving the spouse in the treatment program in this study only became evident during the six months following the termination of treatment. 'Ibis indicates that participation by the spouse or family members is especially useful as a maintenance strategy regardless of the nature of the initial treatment program. In terms of amount of weight lost, the results of this investigation are perhaps the most encouraging yet obtained in a controlled outcome study.

Another source of social support Would be a specifically constituted group whose function would be to reinforce behavioral changes achieved during treatment. These groups could embody the useful features of the group process that is part of the self-help groups that currently exist (e.g., TOPS), while incorporating the greater structure and specific goals and procedures of the behavioral treatment approach. Maintenance groups of this nature might be particularly valuable in the case of obese individuals Who for one reason or another do not have the support of a spouse or family. Two larger social support systems that go beyond the family and the treatment group and which might contribute powerfully to the control of obesity are the person's larger social community and the work or industrial setting. The pioneering efforts of Maccoby et al. (1977) in the Stanford Three Community study demonstrate that community education via mass media can be effective in altering dietary habits and cigarette smoking and thus in improving cardiovascular health in the community as a whole. Programs for intervening in the work setting to encourage positive health behavior and control obesity have just begun and should prove cost-effective.

COGNITIVE CONTROL

Earlier in this paper the point was made that the role of cognitive factors in the maintenance and modification of obesity has been neglected by behavioral researchers. This has been especially true with respect to developing effective maintenance strategies for treatment-produced improvement. Research on maintenance strategies has been too narrowly focused on the specific parameters of conditioning techniques (e.g., partial reinforcement schedules) and on attempting

to change the posttreatment environment to which the person returns (cf. Atthowe 1973). Recently, the significance of individuals' cognitive appraisals of their own actions has been emphasized in cognitive-behavioral formulations of the phenomena of relapse (Marlatt &Gordon, in press; Wilson, in press b). Elsewhere in this volume Marlatt presents a detailed cognitive-behavioral analysis of the relapse process and the implications this has for designing innovative and effective treatment program and maintenance strategies for addictive disorders in general. The following comments indicate briefly how this cognitive-behavioral model of relapse applies to the treatment of obesity.

Consider the case of an obese individual who has been treated successfully and has lost a substantial amount of weight. At sane point after the termination. of treatment, the person starts slipping and begins to deviate from the strictures of the behavioral self-control Program. At this point, Whether the person reverts to previous patterns of overeating (and failure to exercise sufficiently), or re-establishes control by him/herself, or re-enters treatment for this purpose, will be influenced in part by the way in which this person construes the violation of posttreatment adherence to a program for control of weight gain. In other words, it may not be the slips per se that will determine subsequent behavior but the meaning that the person attaches to then. Marlatt and Gordon (in press) point out that a typical negative reaction is for the person to attribute the transgressions to What in the terminology of attribution theory would be an internal-stable cause (Weiner 1974). In short, the person sees in his/her failure to adhere to the requirements of the weight control program an affirmation of his/her personal inability to regulate weight. previous treatment success, albeit short-term, is dismissed or discounted as insignificant. Among the adverse sequelae of such an attribution is a sense of helplessness and the conviction that the battle of the bulge is irretrievably lost.[5] Other self-defeating cognitions involve extensive rationalization. For example, the obese person who eats too much on occasion might decide that since (s)he has "blown" the treatment program for that day, why not go ahead and overindulge for the remainder of the day and return to the treatment program tomorrow. Of course, tomorrow often does not come.

Wilson (in press b) has suggested that the degree to which the client Will be able to resist these negative cognitive reactions to post-treatment setbacks in adhering to a controlled behavioral routine Will depend on treatment-induced expectations of self-efficacy. As proposed by Bandura (1977a), efficacy expectations are the conviction that one can cope successfully with a given sitaution. Self-efficacy theory holds that efficacy expectations will determine whether coping behavior Will be initiated, with what effort, and how resolute one will be in continuing to cope in the-face of the inevitable pressures and problems that are encountered by the individual struggling to control weight. The client who, as a result of treatment, has strong efficacy expectations about coping with high risk situations is more likely to overcome the potentially destructive

consequences of a posttreatment transgression.

Several specific treatment and maintenance strategies derive from these cognitive-behavioral formulations of the maintenance of treatment effects. It is important to anticipate possible or probable setbacks or transgressions during treatment, and to equip the client With cognitive and behavioral coping strategies for negotiating such mishaps. Ensuring that the client has the necessary interpersonal skills as described earlier in this paper would be an important facet of this approach. In a related fashion, Lazarus (1977) has described how imagery techniques can be used to practice "emotional fire-drills" for coping with anticipated difficulties or "future shock." In addition to imaginal rehearsal of coping behaviors, specific attention would be paid to the self-statements Which are likely to be elicited in such a situation. The clients would be taught to avoid thoughts of self-pity or self-blame. Instead of using the transgression to punish themselves With in a self-defeating fashion, clients can be shown how to take a more constructive view and learn from the experience so as to avoid a similar mistake in the future. Meichenbaum's (1977) stress inoculation procedure is especially useful in this regard.

CONCLUDING COMMENT

In the foregoing analysis, I have tried to indicate the form a comprehensive cognitive-behavioral treatment program for obesity might take consistent With what is currently known about the modification of long-standing behavioral problems of a refractory nature. With this in mind it is obvious that there is considerable roan for improvement in the majority of behavioral programs that are currently used in controlled outcome studies.

The development of more extensive and intensive treatment programs for obesity should be pursued With appropriate professional caution and With the realization that as yet imperfectly understood biological factors might limit the success that can be achieved through any psychological approach. Specifically, weight control programs should include, in addition to measures of Weight loss, concurrent assessment of the person's moods, emotional states, and broader behavioral activities so that any adverse side-effects might be detected (Wilson 1978). Ultimately, it may prove to be the case that sane forms of obesity are better suited than others for psychological treatment programs. In the meantime, it should be evident from the analysis presented here that some of the pessimism about the utility of a behaviorally-based treatment approach notwithstanding, the battle is far from lost. In a fundamental sense, it is really just beginning.

FOOTNOTES

[1]"Most obese persons Will not stay in treatment for obesity. Of those Who stay in treatment most will not lose weight and of those who do lose Weight most Will regain it" (Stunkard 1958, p.79).

[2]It is unlikely that nonbehavioral psychotherapies will prove to be effective in the treatment of obesity. Although controlled evaluations of psychotherapy for obesity are a rarity - an interesting comment in its own right - the evidence that does exist provides little indication that this is an effective form of treatment (cf. Leon 1976).

[3]Historically, in developing their treatment techniques, Stuart and Davis (1972) were influenced by Schachter's (1971) well-known theory that obese individuals are more responsive to external cues and less responsive to internal cues than normal Weight individuals. As a result, behavior modification focused almost exclusively on external controls. Schachter's externality notion has been criticized (e.g., Wooley & Wooley 1975). Of course, the fact that the externality notion might be invalid does not necessarily undermine the value of treatment procedures which were once related to it. Similarly, underlying the early Stuart and Davis (1972) treatment program was the implicit notion of a generalized distinction between the obese and the nonobese eating style. More recent evidence provides little unequivocal support for such a distinction and eating style appears to be heavily influenced by situation specific variables as one would predict from social learning theory (Mahoney 1975).

[4]A post hoc analysis of the results from this study indicated that subjects who were switched to a different therapist during the maintenance phase fared particularly poorly compared to subjects who continued with their original therapist.

[5]Marlatt and Gordon (in press) refer to this as the Abstinence Violation Effect (AVE). A related concept, specifically in connection With overeating, is the so-called counter-regulatory effect (Polivy 1976). This latter term has been used to describe the finding that individuals who are dieting (i.e., score highly on the Restrained Eating Scale - see Herman and Polivy [1975]) appear to consume more rather than less food following a specific caloric preload. While the concept of the counter-regulatory effect might have some merit, recent research has shown that it is not related to obesity (Ruderman 1978).

REFERENCES

Azrin, N.H. A strategy for applied research: Learning based but outcome oriented. Amer Psychol, 32:140-149, 1977.

Abramson, E., and Wunderlich, R.A. Anxiety, fear and eating: A test of the psychosomatic concept of obesity. J Abnorm Psychol, 79:317-321, 1972.

Ashby, W.A., and Wilson, G.T. Behavior Therapy for obesity: Booster sessions and long-term maintenance of weight loss. Beh Res Ther, 15:451-466, 1977.

Atthowe, J.M. Behavior innovation and persistence. Amer Psychol, 28:34-41, 1973.

Bandura, A. Principles of Behavior Modification. New York: Holt, Rinehart & Winston, 1969.

Bandura,A. Self-efficacy: Toward a unifying theory of behavioral change. Psychol Rev, 84:191-215, 1977a.

Bandura, A. Social Learning Theory. Englewood Cliffs, NJ: Prentice-Hall, 1977b.

Barlow, D.H., Reynolds, E.J., and Agras, W.S. Gender identity change in a transsexual. Arch Gen Psychiat, 28:569-576, 1973.

Beck, A.T. Cognitive Therapy and the Emotional Disorders. New York: International Universities Press, 1976.

Bellack, A.S. Behavioral treatment for obesity: Appraisal and recommendations. In: M. Hersen, R.M. Eisler, & P.M. Miller (Eds.), Progress in Behavior Modification, Vol. 4. New York: Academic Press, 1977.

Blackwell, B. Treatment adherence. Brit J Psychiat, 129:513-531,1976.

Brownell, K.D. Couples training and spouse-cooperativeness in the behavioral treatment of obesity. Unpublished Doctoral Dissertation, Rutgers University, 1977.

Brownell, K.D., Heckerman; C.L., and Westlake, R.J. Therapist and group contact as variables in the behavioral treatment of obesity. J of Consult Clin Psychol, 46:593-594, 1978.

Chaney, E.F., O'Leary, M.R., and Marlatt, G.A. Sill training with alcoholics. J Consul Clin Psychol; 46:1092-1104, 1978.

Colletti, G., and Kopel, S. Maintaining behavior change: An investigation of three maintenance strategies and attributional processes in the long-term reduction of cigarette smoking. Unpublished manuscript, State University of New York at Binghamton, 1978.

Collins, B.L. Comparative efficacy of cognitive and behavioral approaches to weight reduction and maintenance. Personal Commmunication, Rutgers University, 1978.

Danaher, B.G. Rapid smoking and self-control in the modification of smoking behavior. J Consult Clin Psychol 45:1068-1075, 1977.

Diament, C., and Wilson, G.T. An experimental investigation of the effects of covert sensitization in an analogue eating situation. Behav Ther, 6:499-509, 1975.

Dunkel, L.D., and Glaros, A.G. Comparison of self-instructional and stimulus control treatments for obesity. Cog Ther Res 2:75-78, 1978.

Dunbar, J.M., and Stunkard, A.J. Adherence to medical regimen. In: Levy, R., Rifkind, B., Dennis, B., and Ernst, N. (eds.). Nutrition, Lipids, and Coronary Heart Disease. New York: Raven Press, in press.

Ellis, A. The Essence of Rational Psychotherapy : A Comprehensive Approach to Treatment. New York: Institute for Rational Living, 1970.

Eysenck, H.J., and Rachman, S. Causes and Cures of Neuroses. London: Routledge and Kegan Paul, 1965.

Franks, C.M., and Wilson, G.T. Annual Review of Behavior Therapy: Theory and Practice, Vol. 3, New York: Brunner/Mazel, 1975.

Franks, C.M., and Wilson, G.T. Annual Review of Behavior Therapy: Theory and Practice, Vol. 4, New York: Brunner/Masel, 1976.

Franks, C.M., and Wilson, G.T. Annual Review of Behavior Therapy: Theory and Practice, Vol. 5, New York: Brunner/Mazel, 1977.

Franks, C.M., and Wilson, G.T. Annual Review of Behavior Therapy: Theory and Practice, Vol. 6, New York: Brunner/Mazel, 1978.

Goldfried, M.R. The use of relaxation and cognitive relabeling as coping skills. In: Stuart, R.B. (ed.). Behavioral Self Management. New York: Brunner/Mazel, 1977.

Hagen, R.L. Group therapy versus bibliotherapy in Weight reduction. Behav Therap 5:222-234, 1974.

Hall, S.M., Hall, R.G., Borden, B.L., and Hanson, R.W. Follow-up strategies in the behavioral treatment of overweight. Beh Res Ther 13:167-172, 1975.

Harris, M.B., and Hallbauer, E.S. Self-directed Weight control through eating and exercise. Beh Res Ther 11:523-529, 1973.

Herman, C.P., and Polivy, J. Anxiety, restraint, and eating behavior, J Abnorm Psychol, 84:666-672, 1975.

Hodgson, R.J., Stockwell, T.R., and Rankin, H.J. Can alcohol reduce tension? Unpublished manuscript, Addiction Research Unit, Institute of Psychiatry, London, 1978.

Jeffery, R.W., Wing, R.R., and Stunkard, A.J. Behavioral treatment of obesity: The state of the art 1976. Beh Ther, 9:189-199, 1978.

Kingsley, R.G., and Wilson, G.T. Behavior therapy for obesity: A comparative investigation of long-term efficacy. J Consult Clin Psychol, 45:288-298, 1977.

Kopel, S.A. The effects of self-control, booster sessions, and cognitive factors on the maintenance of smoking reduction. Dissertation Abstracts International, 1974, 35B,4182. (University Microfilms No. 75-3895,67).

Lazarus, A.A. Behavior Therapy and Beyond. New York: McGraw-Hill, 1971.

Lazarus, A.A. Multimodal Behavior Therapy. New York: Springer, 1976.

Lazarus, A.A. In the Mind's Eye. New York: Rawson, 1977.

Leon, G.R. Current directions in the treatment of obesity. Psychol Bull, 83:557-578, 1976.

Levitz, L.S., and Stunkard, A.J. A therapeutic coalition for obesity: Behavior modification and patient self-help. Amer J Psychiat, 131: 424427, 1974.

Maccoby, N., Farquhar, J., Wood, P.D., and Alexander, J. Reducing the risk of cardiovascular disease: Effects of a community-based campaign on knowledge and behavior. Journal of Community Health, 3:100-114,1977.

Mahooney, M.J. Self-reward and self-monitoring techniques for weight control. Behav Ther 5:48-57, 1974.

Mahoney, M.J. Fat fiction. Behav Ther, 6:416-418, 1975.

Mahoney, M.J. The behavioral treatment of obesity: A reconnaissance. Biofeedback and Self-Regulation, 1:127-133, 1976.

Mahoney, B.K., Rogers, T., Straw, M.K., and Mahoney, M.J. Human Obesity: Assessment and Treatment. Englewood Cliffs, NJ: Prentice-Hall, in press.

Mahoney, M.J., and Arnkoff, D. Cognitive and self-control therapies. In: Garfield, S.L., & Bergin, A.E. (eds.). Handbook of Psychotherapy and Behavior Change, 2nd Ed. New York: Wiley, in press.

Mahoney, M.J., and Mahoney, K. Permanent Weight Control. New York: W.W. Norton, 1976.

Marlatt, G.A., and Gordon, J.R. Determinants of relapse: Implications for the maintenance of behavior change. In P. Davidson (ed.), Behavioral Medicine. New York: Brunner/Mazel, in press.

McKenna, R.J. Sane effects of anxiety level and food cues on the eating behavior of obese and normal subjects. J Pers Soc Psychol, 22:311-319, 1972.

McReynolds, W.T., and Paulsen, B.K. Stimulus control as the behavioral basis of weight loss procedures. In: G.J. Williams. S. Martin, & J. Foreyt (eds.). Obesity: Behavioral Approaches to Dietary Management. New York: Brunner/Mazel, 1976.

Meichenbaum, D. Cognitive Behavior Modification. New York: Plenum Press, 1977.

Miller, P.M., & Mastria, M.A. Alternatives to Alcohol Abuse. champaign, IL: Research Press, 1977.

Mischel, W. Personality and Assessment. New York: Wiley, 1968.

Musante, G.J. The dietary rehabilitation clinic: Evaluative report of a behavioral and dietary treatment of obesity. Behav Ther, 7:198-204, 1976.

Nidetch, J. Foreword in: Stuart, R.B. Act Thin, Stay Thin. New York: Norton, 1978.

Nisbett, R. Hunger, obesity, and the ventromedial hypothalamus. Psychol Rev, 79:433-470, 1972.

Novaco, R.W. Stress inoculation: A cognitive therapy for anger and its application in a case of depression. J Consult Clin Psychol, 45:600-608, 1977.

O'Leary, K.D., and Wilson, G.T. Behavior Therapy: Application and Outcome. Englewood Cliffs, NJ: Prentice-Hall, 1975.

Polivy, J. Perception of calories and regulation of intake in restrained and unrestrained subjects. Addict Behav, 1:237-244, 1976.

Rachman, S., and Wilson, G.T. Effects of Psychotherapy (2nd Edition). oxford: Pergamon Press, in press.

Relinger, H., Bornstein, P.H., Bugge, I.D., Cammody, T.P., and John, C.J. Utilization of adverse rapid smoking in groups: Efficacy of treatment and maintenance procedures. J Consult Clin Psychol, 45:245-249, 1977.

Ruderman, A. Obesity, restraint, and the counter regulation effect. Unpublished Masters Thesis, Rutgers University, 1978.

Rush, A.J., Beck, A.T., Kovacs, M., and Hollon, S. Comparative efficacy of cognitive therapy and pharmacotherapy in the treatment of depressed out-patients. Cog Ther Res, 1:00-00, 1977.

Schachter, S. Sane extraordinary facts about obese humans and rats. Amer Psychol, 25:129-144, 1971.

Sobell, M.B., and Sobell, L.C. Behavioral Treatment of Alcohol Problems. New York: Plenum, 1978.

Stalonas, P.M., Johnson, W.G., and Christ, M. Behavior modification for obesity: The evaluation of exercise, contingency management, and program adherence. J Consul Clin Psychol, 46:463-469, 1978.

Strupp, H.H. A reformulation of the dynamics of the therapist's contribution. In:. Gurman, A., & Razin, A. (eds.). Effective Psychotherapy. New York: Pergamon Press, 1977.

Stuart, R.B. Behavioral control of overeating. Beh Res Ther, 5:357-365, 1967.

Stuart, R.B. Situational versus self-control. In: Rubin, R.D., Fensterheim, H., Henderson, J.D., & Ullmann, L.P. (eds.). Advances in Behavior Therapy. New York: Academic Press, 1972.

Stuart, R.B. Act Thin, Stay Thin. New York: Norton, 1978.

Stuart, R.B., and Davis, B. Slim Chance in a Fat World. Champaign, IL: Research Press, 1972.

Stunkard, A.J. The management of obesity. N Y J Med, 58: 79-87, 1958.

Stunkard, A.J. New therapies for the eating disorders. Arch Gen Psychiat, 26:391-398, 1972.

Stunkard, A.J., and Mahoney, M.J. Behavioral treatment of the eating disorders. In: Leitenberg, II. (ed.). Handbook of Behavior Modification and Behavior Therapy. New York: Appleton-Century-Crofts, 1976.

Stunkard, A.J., and Penick, S. Behavior modification in the treatment of obesity: The problem of maintaining Weight loss. Arch Gen Psychiat, in press.

Voegtlin, W.L., Lemere, F., Broz, W.R., and O'Hallaren, P. Conditioned reflex therapy of chronic alcoholism. Q J Stud Alc, 2:505-511, 1942.

Weiner, B. Achievement Motivation and Attribution Therapy. Morristown, NJ: General learning Press, 1974.

Wilson, G.T. Methodological considerations in treatment outcome research on obesity. J Consult Clin Psychol, 46:687-702, 1978.

Wilson, G.T. Behavioral treatment of obesity: Maintenance strategies and long-term efficacy. In: Gotestam, G. (ed.). Trends in Behavior Therapy. New York: Academic Press, in press a.

Wilson, G.T. Booze, beliefs, and behavior: Cognitive processes in alcohol use and abuse. In: Nathan, P.E., and Marlatt, G.A. (eds.). Alcoholism: New Directions in Behavioral Research and Treatment. New York: Plenum Press, in press b.

Wilson, G.T., and Brownell, K.D. Behavior therapy for obesity: Including family members in the treatment process. Behav Ther, in press.

Wilson, G.T., and Evans, I.M. The therapist-client relationship in behavior therapy. In: Gurman, A.S., & Basin, A.M. (eds.). The Therapist's Contribution to Effective Psychotherapy: An empirical Approach. New York: Pergamon Press, 1977.

Wilson, G.T., and O'Leary, K.D. Principles of Behavior Therapy. Englewood Cliffs, NJ: Prentice-Ball, in press.

Wooley, O.W., and Wooley, S.C. Short term control of food intake. In: Bray, G. (ed.). Obesity in Perspective. Washington, D.C.: U.S. Government Printing Office, 1975.

Yates. A. Theory and Practice in Behavior Therapy. New York: Wiley, 1975.

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Chapter 15

Obesity and Adherence to Behavioral Programs

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Thirty percent of all men and 40 percent of all women between the ages of 40 and 49 are considered obese by the criterion of being at least 20 percent above ideal weight (Metropolitan Life Insurance Company 1960). The prevalence is even higher among persons in lower socioeconomic groups (Goldblatt, Moore, and Stunkard l965), with advancing age (Build and Blood pressure Study l959), and in a variety of ethnic groups (Stunkard 1975). Since 1900, the prevalence of obesity has doubled (Waxler and Leef 1969); and the Build and Blood Pressure Study (1959) and the Health and Nutrition Survey (1976) showed continuing weight gains in Americans in the past 27 years. The U.S. Department of Health, Education, and Welfare (1966) has labeled obesity the number one dietary problem.

For many years, few questioned that obesity was a serious disorder. Recently, however, skeptics have become more forceful, particularly in public circles and in the scientific community. One lay group, the National Association to Aid Fat Americans, maintains that some persons may lead more fulfilling lives if they are overweight and that society should be educated to cease discriminating against fat people rather than advocating dieting at any cost. This movement has gained momentum, despite mounting evidence that obesity carries a high risk of physical and psychological problems.

Obesity is strongly associated with several established precursors to coronary heart disease, including hypertension, increased low density lipoproteins and decreased high density lipoprotein cholesterol, hypertriglyceridmia, increased insulin production, and impaired glucose tolerance (Kannel and Gordon 1977). There is sane dispute as to whether obesity is a risk factor independent of its association with other risk factors (Mann 1974), yet it seems certain that obesity is medically undesirable. Data from the Framingham Study indicate that if everyone were at optimal weight there would be 25 percent less coronary heart disease and 35 percent fewer episodes of congestive heart failure and cerebrovascular accidents (Gordon and Kannel 1976). Kannel and Gordon (1977) have gone even further, to claim that ".. .correction of overweight is probably the most important hygienic measure (aside from avoidance of cigarettes) available for the control of cardiovascular disease."

There have been innumerable attempts to help overweight persons lose weight. Sane are scientifically sound; most are not. A

glance into almost any popular magazine reveals diets that promise miraculous weight loss, happiness, and sexiness. Diets, pills, devices, and spiritual plans—many of which defy reason--are comercially successful. This may be testimony to how desperatemany obese persons are to reduce, and to how little confidence they have in scientists to help them achieve this goal. Are they right?

I will give a brief history of the treatment of obesity, concentrating on recent evidence from behavioral approaches. A new concept for the treatment of obesity will be offered. The most promising new treatments will be discussed, and, finally, several new directions will be explored.

HOW EFFECTIVE IS TREATMENT?

Almost 20 years ago, Stunkard (1958) issued a most pessismistic verdict: "Most obese persons will not enter treatment for obesity. Of those who enter treatment, most will not lose weight and of those who do lose weight, most will regain it." From 20 to 80 percent of obese persons were found to drop out of traditional medical treatment programs, and of the few persons left, fewer than 25 percent lost as much as 20 lb (9.1 kg); only 5 percent lost as much as 40 lb (18.2 kg)(Stunkard and McLaren-Hume 1959). To make matters worse, emotional symptoms have been documented in at least 50 percent of persons treated for obesity by either outpatient dieting or inpatient fasting (Stunkard and Rush 1974).

In 1967, Stuart brought new hope to this discouraging area. In a study entitled "The Behavioral Control of Overeating," Stuart reported the results of a year-long, muiltifaceted behavioral treatment program for eight subjects. Even though Stuart's results were from uncontrolled case studies, the weight losses were impressive enough to spur dozens of later studies: 30 percent of Stuart's subjects lost more than 40 lb (18.2 kg) and 60 percent lost more than 30 lb (13.6 kg).

Until recently, Stuart's treatment procedures--known as the behavioral package-have remained unchallenged and have been used in nearly every study on the behavioral treatment of obesity. In the years since Stuart's work, there have been major advances in our understanding of treatment techniques. The first logical step was to determine whether Stuart's subjects would have improved without treatment.

Harris (1969) addressed this question by assigning subjects to behavioral groups or to a no treatment control group. Subjects given behavioral treatment lost more weight than control subjects, and even continued losing weight after treatment ended. Wollersheim (1970) then compared behavior therapy to placebo conditions and found that behavior therapy was more effective. Harris and Wollersheim significantly improved treatment methods, and it appeared that behavior therapy was better than other available approaches. The effect of experimenter bias in these studies could not be ruled out: It is possible that enthusiastic doctoral students in behavioral programs could have influenced the outcome of their studies.

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A study by Penick et al. (1971) attempted to control for expermenter bias by biasing the outcome against the behavioral approach. In this study, behavioral groups were conducted by inexperienced therapists and traditional treatment groups were conducted by therapists with much experience. The behavioral groups did better. This study strengthened the belief that behavior therapy was the most effective approach for obesity and suggested that this type of therapy could be carried out by persons with little training or experience.

The possibility that the content of behavioral programs was more important than the quality of the therapist prompted several researchers to investigate therapy without a therapist. Hagen (1974) replicated Wollersheim's (1970) treatment program under two conditions: group treatment led by a trained clinician and a bibliotherapy condition in which subjects received a written manual via mail, with little therapist contact. Both treatments were equally effective and were superior to a no treatment control condition. Similar studies by Ferstl, Jokusch, and Brengelman (l975) in Germany and by Hanson et al. (1976) in the United States also showed that bibliotherapy was as effective as group behavior therapy.

In contrast to these three studies, Brownell, Heckerman, and Westlake (1978) found that bibliotherapy was less effective than group therapy, although weight losses in both groups were not maintained. This suggested that the amount of contact maybe an important variable. Fernan (1973) answered this question by comparing minimal contact to no contact. The results showed that even minimal contact was more useful than no contact. It can tentatively be concluded, therefore, that any therapist contact is better than no contact, that after this minimal amount, additional therapist time may be of little use.

The next logical step was to concentrate on technique refinement. The behavioral package was thought to be effective, so research could focus on determining the active components of the multifaceted package or on enhancing the efficacy of any single component. Several studies, for example, evaluated the influence of self mpnitoring (Green 1978; Romanczyk 1974; Ronanczyk et al. 1973). Others investigated self reinforcement (Mahoney 1974), goal setting (Bandura and Simon 1977), covert sensitization (Diament and Wilson 1975; Foreyt and Hagen 1973; Foreyt and Kennedy 1971). exercise (Harris and Hallbauer 1973; Stalonas, Johnson, and Christ 1978), and so forth. The result has been a great improvement in treatment outcaome research, but little improvement in treating efficacy. Indeed, no studies have even approached Stuart's (1967) impressive results. How effective, then, is behavior therapy for obesity?

Jeffery, Wing, and Stunkard (1978) reviewed the results from 21 studies of behavioral treatment procedures and found an average weight loss of 11.5 lb (5.2 kg). The same authors reported the results for 125 patients from the Stanford Eating Disorders Clinic; average weight loss was 11.04 lb (5 kg). Brownell, Heckerman and Westlake (1976) studied 98 subjects in a behavioral weight loss program and found an average weight loss of 11.01 lb (5 kg).

The consistency of weight losses is striking considering that the studies differed widely in length of treatment, therapist training, patient characteristics, treatment fees, and a variety of program variables. We can predict with great certainty how much weight the average subject will lose in a behavioral treatment program; the ability of subjects to maintain their weight losses is another question.

The typical treatment outcome study provides followup data for 6 to 8 weeks. Even for such short followup periods, maintenance of weight losses has been conspicuously lacking. In a recent review of long term studies, Stunkard and Penick (in press) found that maintenance of weight loss has been exceedingly rare. There have been surprisingly few attempts to study the maintenance problem. The exception is a series of studies on booster sessions by Wilson and colleagues (Ashby and Wilson 1977; Kingsley and Wilson 1977; Wilson and Brownell in press). Since treatment-produced weight losses usually dissipate when sessions end, and since Stuart had achieved good results from continued contact with his patients over a 1-year period, booster sessions after treatment held the promise for enhancing maintenance. Unfortunately, the studies found that booster sessions were not effective in maintaining weight loss for subjects receiving group behavioral treatment, although booster sessions did seen to be effective for subjects in individual treatment.

Behavioral treatments are more effective at producing initial weight loss than are other treatments to which they have been compared, although the clinical significance of the weight losses can be questioned. The maintenance of weight loss on a long term basis is an elusive goal, and few treatment strategies have been effective for approaching it. It would appear, therefore, that maintenance of treatment-produced behavior changes is presently an area of great importance. However, increasing initial weight loss is also important if we wish to aid any but the most modestly obese.

Progress in approaching obesity and other health behavior changes requires a different conceptual viewpoint; this new conceptual scheme may prompt the use of behavioral procedures for a critical problem-program adherence.

OBESITY AS AN ADHERENCE PROBLEM

Most professionals approach weight loss by instructing the obese in <u>what</u> to eat. Health care professionals, in cases where they offer anything more than exhortation, typically give the obese a structured meal plan along with instructions to "quit eating too much." The most successful popular diet books are those that promise rapid weight loss by altering the type of foods to be eaten.

In contrast, behavioral programs have focused on <u>how</u> to eat. An individual is to control weight by controlling the environmental events that precipitate overeating. Eating patterns are to change as patients are instructed to slow the rate of eating, alter the stimulus environment so food is not available, reward new eating habits, increaseenergy expenditure, and monitor eating behaviors

as well as food intake. Very little mention is made of food, although about a 1200-calorie diet is usually nested in these programs.

The research that has resulted from this approach has focusedon the development of techniques designed to alter eating behaviors (for example, whether to monitor food intake before or after a meal). The relative efficacy of behavioral programs suggests that conceptualizing eating disorders in this fashion is worthwhile. Yet, weight losses have been consistent in behavioral studies and have not been clinically significant. In addition, long ten weight loss is very unusual. A new conceptual approach may be useful.

Perhaps the major question should change from what behaviors to prescribe to how to adhere to prescribed behaviors. The basic prescription for weight loss is simple—eat less and exercise more. The behavioral techniques may be helpful at encouraging these behaviors for a short time, but the almost universal relapse that occurs within the first year after treatment suggests that more needs to be done. In retrospect, it is easy to see that people with a lifelong history of overeating cannot achieve long term weight loss with a 10- or 12-week program that proposes new eating behaviors. The high attrition rates in cost studies show that patients have difficulty staying with any program long enough to attain ideal weight. I suggest that the principles of behavior be applied to the issue of adherence--how well people comply with prescribed behaviors in existing programs.

In the past several years, new methods for behavioral treatment have yielded very encouraging findings. These have been presented in detail in a recent review (Stunkard and Brownell, in press). However, the approaches with the greatest promise and greatest likelihood of influencing program adherence have involved intervention into the social environment. Interventions of this sort may also be relevant to other substance abuse areas.

MODIFYING THE SOCIAL ENVIRONMENT

For most people who engage in unhealthy life style practices (for example, overeating and smoking), there is a social environment that supports--if not directly encourages-these dangerous behaviors. Social environment can have a powerful impact. on behavior, and structuring these forces may be one method of encouraging adherence to behavior change programs. Three such environments are provided by the home, the work site, and the community.

Family Intervention

Eating is a social event for most people, and the family may be the source of many social interactions involving food. Someone in the family must purchase, prepare, and serve the meals. The family is a natural source of social influence. Several researchers have studied the importance of this effect on eating.

Stuart (reported in Stuart and Davis 1972) tape recorded and scored mealtime interactions between 14 overweight women and their husbands. They found that: 1) husbands were seven times more likely than their weight-reducing wives to initiate food-relevant topics of conversation; 2) husbands were almost four times as likely as their wives to proffer food to the spouse; 3) wives were slightly over twice as likely as their husbands to reject food offers; and 4) husbands were over 12 times as likely to offer criticism of their wives' eating behavior as they were to praise it. Stuart and Davis (1972, pp. 19-20) maintain that sane spouses, "...are not only not contributors to their wives' efforts to lose weight, but they may actually exert a negative influence."

Mahoney and Mahoney (1976) evaluated "social support engineering' as one component of a treatment program for obese subjects. A social support index was calculated based on attendance and therapists' reports of family cooperation. The correlations between the social support index and treatment outcome were 0.92 at posttreatment, 0.33 at 6 months, 0.34 at 1 year, and 0.63 at 2 years. Although the involvement of family members had been touted as a facilitative factor in weight control (Mahoney and Mahoney 1976; O'Leary and Wilson 1975; Stuart and Davis 1972), no direct studies of family intervention had been done.

In the first study to systematically manipulate and evaluate the influence of family intervention, Wilson and Brownell (in press) assigned obese subjects to either family-member-present or family-member-absent conditions. In the family-member-absent groups, subjects received the standard behavioral program described by Stuart and Davis (1972). In the family-member-present condition, subjects received the same program but were also required to attend all sessions with a family member in order to: 1) acquaint family members with the principles of behavioral weight control treatments; 2) instruct them to cease criticizing their partners' weight and eating behaviors; 3) teach them to reinforce improved eating habits; and 4) instruct them to assist their partners' attempts to restructure the conditions and consequences of eating. After an S-week treatment phase and a B-month followup, there were no differences in the amount of weight lost between persons assigned to the two conditions. The authors concluded that the failure of the family intervention may have resulted from a lack of structure for the family members' behavior, and from the fact that son-e of the family members were not exerting a powerful enough social influence (Some were sisters, daughters, and so forth).

A subsequent study by Brownell et al. (in press) evaluated the involvement of spouses in the treatment process. In this program, the couple rather than the individual was the focus of treatment. Subjects and spouses were instructed in a variety of behavioral techniques including mutual monitoring of food-related behaviors, stimulus control, modeling, and reinforcement. For each part of the patients' program there was a corresponding part for the spouses, who participated fully in each training session. Subjects were given a manual that described a 10-week sequence of behavioral techniques, and spouses were given their own manual to underscore the need for behavior change from both subjects and spouses. The

spouses were taught to model appropriate eating behaviors such as slowing the rate of eating and eating in particular locations to "set a good example." Similarly, they were instructed in stimulus control so that they would avoid exposing the subjects to food cues, and were encouraged to engage the subject during times of temptation in activities incompatible with eating. Each partner monitored the other partner's behavior as well as his or her own. The program stressed that mutual effort was critical to success.

The couples condition was compared with two other treatments in which subjects received essentially the same program, except as individuals rather than as couples. In one condition, subjects had spouses deemed "cooperative," as defined by their willingness to take part in the program. In the other condition, subjects had spouses deemed "uncooperative" as defined by their unwillingness to take part in treatment even though the subjects had been told treatment would not be available if the spouse did not participate. Subjects in these two conditions attended meetings alone. Treatment occurred once weekly for 10 weeks, followed by monthly follow-up meetings for 6 months.

Persons in all groups lost weight. At the end of the 10-week treatment program, mean weight losses were 20 lb (9.1 kg) for the couples training subjects, 15 lb (6.8 kg) for the "cooperative spouse-subject alone" condition, and 12 lb (5.5 kg) for the "non-cooperative spouse-subject alone" condition. These differences did not reach statistical significance, but at the 6-month follow-up, mean weight loss for the couples group had reached 30 lb (13.6 kg) which was significantly greater than the mean losses for the individual patient groups—19 and 15 lb (8.6 and 6.8 kg) each.

The results from the Brownell et al. (in press) study with couples are noteworthy for several reasons. First, weight losses in the couples condition were nearly triple the very consistent losses found in most behavioral studies. Second, for the subjects treated with spouses, nearly one-third of their total weight loss occurred after weekly treatment sessions had ended. Indeed, differences between the couples conditions and the other two conditions did not reach significance until the followup phase. It appears, therefore, that spouse intervention may enhance initial weight loss and may facilitate long term maintenance. However, this study was based on data from only 29 subjects, and a 6-month followup is not sufficient to determine long term maintenance. This study is being replicated by the author with a larger sample and a longer followup.

Work Site Intervention

A second forum for mobilizing social influence is the work site. Millions of people spend much of their day at a place of employment. Patterns of interaction develop among workers and between employees and employers. This naturally occurring social system has many advantages as a means for health behavior changes. Time away from work is kept to a minimum--an hour each week for 20 weeks may be sufficient for many life style change programs. The work site can provide space and clerical staff to support a program. The employer and fellow employees of an individual can exert strong sanctions

for attendance--a luxury not available in most leisure-time programs. The increased morale that may develop from cooperation or competition between groups at the work site may increase treatment efficacy. Such a program is a worthy investment for any industry that pays the health care costs for its employees. Health improvement can easily repay the costs of such programs through decreased absenteeism, improved work performance, decreased hospitalization, and through more intangible factors like improved morale (stunkard, in press).

A work site intervention program for the treatment of hypertension has shown the value of this approach. In this program, mm-hers of the United Store Workers Union in New York City took part in a hypertension control program at the Gimbels and Bloomingdales stores (Alderman 1976; Alderman and Schoenbaum 1975). Before the program, less than half of the hypertensive union members had achieved blood pressure control, and those who subsequently refused entry into the program continued at about this level of control. When the program began, blood pressure screening was done at the stores by nurse practitioners. Hypertensive persons were then seen by a physician and medication was prescribed, if necessary. Periodic meetings were scheduled and members were encouraged to attend through postcard reminders and calls from a union employee. Participants carried cards that showed their blood pressures and were awarded a certificate when blood pressure control was achieved. This work site program resulted in blood pressure control in SO percent of the participants and radically reduced days of hospitalization for cardiovascular disease.

This program stands in contrast to another work site program conducted in Canada for hypertensive foundry workers (Sackett et al. 1975). Participants were offered blood pressure treatment and screening but were not part of the same social influence system as outlined above. The espirit de corps engendered by the union support was lacking, and there were no rewards for adherence to the scheduled meetings. Blood pressure control occurred in 50 percent of the foundry workers.

It appears, therefore, that the work site is an ideal location for a weight reduction program, or for other programs that encourage health behavior changes (for example, smoking reduction). However, the manner in which the program is administered can be a critical factor. Social influence factors that operate at a work site can be quite Powerful, and a program must be designed to take full advantage of these factors.

In collaboration with Dr. Albert J. Stunkard, I am conducting a work site intervention program for weight reduction at the United Store Workers Union. A pilot program has been completed at one Gimbels store and has yielded promising results. We are experimenting with training union members to serve as group leaders and with holding sessions at different times of day and at different intervals.

The Community as A Social System

The community-itself is another naturally occurring social system with unique patterns of interaction among its members. Until

recently, it was thought that to allow for experimental control in a study of health interventions, members of a community should be randomized among treatment conditions. This, however, may dissipate the very social influence that could make a community intervention effective. It may be more fruitful to use entire communities as experimental groups and randomize interventions among communities (Stunkard, in press). The Stanford Heart Disease Prevention Program is an example of this (Farquhar et al. 1977).

In the Stanford program, large-scale interventions were used to reduce cardiovascular risk factors (Farquhar et al. 1977; Maccoby et al. 1977). An intensive and sophisticated 2-year campaign in this three-community study included 3 hours of television programs; 50 television snots; 100 radio spots; several hours of radio programming; weekly newspaper columns; newspaper stories and advertisements; posters used in buses, stores, and worksites; and printed materials mailed directly to participants. Three communities in northern California were used. The population of each was about 14,000. One town received the media campaign, and another served as a control and received no campaign. In the third community, the media campaign was supplemented by a face-to-face behavioral instruction program directed at t-thirds of the participants identified as being in the upper 25 percent of those at risk for coronary heart disease.

The results were most promising. After the second year of the campaign, the risk of coronary heart disease had decreased by 17 percent in the treatment communities, whereas the risk had increased 6 percent in the control community. In the treatment communities, there were reductions in cholesterol levels, smoking, and blood pressure. It is interesting that the media campaign and the face-to-face instruction had significant effects on all variables except relative weight. It is possible that more structured and intensive interventions are needed to supplement a media campaign if weight reduction is to occur.

The Stanford three-community study is informative for several reasons. First, it shows that media campaigns designed to reach large numbers of persons can be effective at changing some health-related behaviors. The long term maintenance of these changes has yet to be studied, but initial change is possible. Second, the media campaign may be effective in prompting people who need additional instruction to seek such assistance. Third, it may be possible to utilize the social pressures of a community and still maintain experimental control by testing an intervention on an entire community and using another community as a control. Fourth, specific behavioral instruction may be necessary for a health education program to be effective--disease information may not be sufficient.

CONCLUSIONS

Obesity may serve as a useful focal point for discussions of substance abuse, including smoking, alcoholism, and drug abuse. Because the dependent variable, weight, is so easily measured, obesity has served as a proving ground for countless behavioral and nonbehav-

ioral strategies. The result has been a dramatic increase in our knowledge of the principles of behavior in general, and in our ability to treat-the obese in particular.

Behavioral interventions have been reasonably effective at producing short term weight change. Controlled research has shown that behavior therapy is more effective than any treatment approach to which it has been compared. Early studies failed to include long term followup, and therefore them were enthusiastic claims of the potency of behavior therapy for the obese. As the long term results become available, it appears that permanent Wright control is something of a wish rather than a reality. Relapse, which plagues all areas of substance abuse, is a particular problem for the obese, because repeated weight loss followed by weight gain may be more dangerous than static obesity. Research on animals and humans has shown that repeated episodes of dieting can be associated with cardiovascular problems and psychological distress (Brownell 1978).

The lack of long term efficacy is not cause to abandon the behavioral approach. Initial behavior change and the maintenance of that change may be governed by different processes (Bandura 1969; Kazdin and Wilson 1978). Behavior therapy studies for the most part have focused on initial behavior change, and have been relatively successful. It is time for more research into the critical issue of maintenance. More specifically, why do so many people drop out of treatment, and of those who remain in treatment, why do so few adhere to program directives?

Conceptualizing the treatment of obesity as an adherence problem may lead to new ideas for research. Behavioral principles have been used almost exclusively for the modification of eating behaviors. Little effort has been devoted to testing methods of improving adherence to these eating behavior regimens. Implementing strong monetary contracts for caloric restriction or weight loss may be effective (Jeffery, Thompson, and Wing 1977). Altering the schedule of treatment meetings may also be useful: The most frequent contact could occur during the difficult maintenance period, rather than at the outset of a treatment program, when most people are strongly motivated. But the most promising approach to date is the modification of the social environment.

For any person, there are a number of naturally occurring social environments that can exert a powerful influence on behavior. The three major social environments am the home, work site, and community. Studies in each of the areas have been very encouraging, although the data are preliminary at best. Intervening in the social environment allows mobilization of social forces that may be much more powerful than the impact of treatment sessions scheduled once each week. This pervasive influence may lead to improved adherence to prescribed behaviors because of important sources of reinforcement that are available many times each day, and because of an increase in the number of discriminative stimuli that prompt appropriate behaviors.

REFERENCES

Alderman, M.H. Organization for long-term management of hypertension. Bull NY Acad Med, 52:697-717, 1976.

Alderman, M.H., and Schoenbaum, E.E. Detection and treatment of hypertension at the work site. N Engl J Med, 293:65-68, 1975.

Ashby, W.A., and Wilson, G.T. Behavior therapy for obesity: Booster sessions and long-term maintenance of weight loss. Behav Res Ther, 15:451-464, 1977.

Bandura, A. Principles of Behavior Modification. New York: Holt, Rinehart, and Winston, 1969.

Bandura, A., and Simon, K.M. The role of proximal intentions in self-regulation of refractory behavior. Cog Ther Res, 1:177-193, 1977.

Brownell, K.D. The psychological and medical sequelae of non-prescription weight reduction programs. Paper presented at the Annual Meeting of the American Psychological Association, Toronto, August, 1978.

Brownell, K.D., Heckerman, C.L., and Westlake, R.J. The behavioral control of obesity: A descriptive analysis of a large-scale program. Unpublished manuscript, Brown University, 1976.

Brownell, K.D., Heckerman, C.L., and Westlake, R.J. Therapist and group contact as variables in the behavioral treatment of obesity. J Consult Clin Psychol, 46:593-594, 1978.

Brownell, K.D., Heckerman, C.L., Westlake, R.J., Hayes, S.C., and Monti, P.M. The effect of couples training and partner cooperativeness in the behavioral treatment of obesity. Beh Res Ther, in press.

Build and Blood Pressure Study. Chicago: Society of Actuaries, 1959.

Diament, C., and Wilson, G.T. An experimental investigation of the effects of covert sensitization in an analogue eating situation. Beh Ther, 6:499-509, 1975.

Farquhar, J.W., Maccoby, N., Wood, P.D., Alexander, J.K., Breitrose, H., Brown, B.W., Haskell, W.L., McAlister, A.L., Meyer, A.J., Nash, J.D., and Stern, M.P. Community education for cardiovascular health. Lancet, 1:1192-1195, 1977.

Fernan, W.S. The role of experimenter contact in behavioral bibliotherapy of obesity. Unpublished manuscript, Pennsylvania State University, 1973.

Ferstl, R., Jokusch, V., and Brengelman, J.C. Die verhaltenstherapeutische Behandlung des Ubergewichts. Int J Health Ed, 18:119-136, 1975.

Foreyt, J.P., and Hagen, R.L. Covert sensitization: Conditioning or suggestion? J Abnorm Psychol, 82:17-23, 1973.

Foreyt, J.P., and Kennedy, W.A. Treatment of overweight by aversion therapy. Beh Res Ther, 9:29-34, l97l.

Goldblatt, P.B., Moore, M.E., and Stuakard, A.J. Social factors in obesity. JAMA, 192:1039-1044, 1965.

Gordon, T., and Kannel, W.B. Obesity and cardiovascular disease: The Framingham study. Clin Endocrinol Metabol, 5:367-375, 1976.

Green, L. Temporal and stimulus factors in self-monitoring by obese persons. Beh Ther, 9:328-341, 1978.

Hagen, R.L. Group therapy versus bibliotherapy in weight reduction. Beh Ther, 5:222-234, 1974.

Hanson, R.W., Borden, B.L., Hall, S.M., and Hall, R.G. Use of programed instruction in teaching self-management skills to overweight adults. Beh Ther, 7:366-373, 1976.

Harris, M.G. Self-directed program for weight control: A pilot study. J Abnorm Psychol, 74:263-270, 1969.

Harris, M.B., and Hallbauer, E.S. Self-directed weight control through eating and exercise. Beh Res Ther, 11:523-529, 1973.

Health and Nutrition Survey. Height and weight of adults 18-74 years of age in the United States. National Center for Health Statistics. Advance Data from Vital Health Statistics, No. 3, Nov. 19, 1976, pp. 1-18.

Jeffery, R.W., Thompson, P.D., and Wing, R.R. Effects on weight reduction of strong monetary contracts for calorie restriction or weight loss. Unpublished manuscript, Stanford University, 1977.

Jeffery, R.W., Wing, R.R., and Stunkard, A.J. Behavioral treatment of obesity: The state of the art in 1976. Beh Ther, 9:189-199, 1978.

Kannel, W.B., and Gordon, T. Risks and hazards of obesity. Paper presented at the Fogarty Conference on Obesity, Washington, D.C., 1977.

Kazdin, A.E., and Wilson, G.T. Evaluation of Behavior Therapy: Issues, Evidence, and Research Strategies. Cambridge, Mass: Ballinger, 1978.

Kingsley, R.G., and Wilson, G.T. Behavior therapy for obesity: A comparative investigation of long-tern efficacy. J Consult Clin Psychol, 45:288-298, 1977.

Maccoby, N., and Farquhar, J.W., Wood, P.D., and Alexander, J. Reducing the risk of cardiovascular disease: Effects of a community-based campaign on knowledge and behavior. J Community Health, 3:100-114, 1977.

Mahoney, M.J. Self-reward and self-monitoring techniques for weight control. Beh Ther, 5:48-57, 1974.

Mahoney, M.J., and Mahoney, K. Treatment of obesity: A clinical exploration. In: Williams, B.J., Martin, S., and Foreyt, J.P., eds. Obesity: Behavioral Approaches To Dietary Management. New York: Brunner/Mazel, 1976.

Mann, G.V. The influence of obesity on health. N Engl J Med, 291:178-185; 226-232, 1974.

Metropolitan Life Insurance Company. Frequency of overweight and underweight. Stat Bull Metropol Life Ins Co 41:4-7, 1960.

O'Leary, K.D., and Wilson, G.T. Behavior Therapy: Applications and Outcome. Englewood Cliffs, N.J.: Pretis-Hall, 1975.

Penick, S.B., Filion, R., Fox, S., and Stunkard, A.J. Behavior modification in the treatment of obesity. Psychosan Med, 33:49-55, 1971.

Romanczyk, R.G. Self-monitoring in the treatment of obesity: Parameters of reactivity. Beh Ther, 5:531-540, 1974.

Romanczyk, R.G., Tracey, D.A., Wilson, G.T., and Thorpe, G.L. Behavioral techniques in the treatment of obesity: A comparative analysis. Beh Res Ther, 11:629-640, 1973.

Sackett, D.L., Gibson, E.S., Taylor, D.W. et al. Randomized clinical trial of strategies for improving medication compliance in primary hypertension. Lancet, 31:1205-1207, 1975.

Stalonas, P.M., Johnson, W.G., and Christ, M. Behavior modification for obesity: The evaluation of exercise, contingency management, and program adherence. J Consult Clin Psychol, 46:463-469, 1978.

Stuart, R.B. Behavioral control of overeating. Beh Res Ther, 5: 357-365, 1967.

Stuart, R.B., and Davis, B. Slim Chance in a Fat World: Behavioral Control of Obesity. Champaign: Research Press, 1972.

Stunkard, A.J. The management of obesity. NY State J Med 58:79-87, 1958.

Stunkard, A.J. From explanation to action in psychosomatic medicine: The case of obesity. Psychosan Med, 37:195-236, 1975.

Stunkard, A.J. The practice of health promotion: The case of obesity. In: Ng, L., ed. The Promotion of Health: New Trends and Perspectives. New York: Van Nostrand Reinhold, in press.

Stunkard, A.J., and Brownell, K.D. Behavior therapy and self-help program for obesity. In: Munro, J.F., ed. The Treatment of Obesity. London: MTP Press, in press.

Stunkard, A.J., and McLaren-Hume, M. The results of treatment for obesity. Arch Intern Med, 103: 79-85, 1959.

Stunkard, A.J., and Penick, S.B. Behavior modification in the treatment of obesity: The problem of maintaining weight loss. Arch Gen Psychiatry, in press.

Stunkard, A.J., and Bush, A.J. Dieting and depression reexamined: A critical review of reports of untoward responses during weight reduction for obesity. Ann Intern Med, 81:526-533, 1974.

U.S. Department of Health, Education, and Welfare. Public Health Service. Obesity and Health. Washington, D.C., U.S. Government Printing Office, 1966.

Waxler, S.H., and Leef, M.F. Obesity - Doctor's dilemma. Geriatrics, 24:98-108, 1969.

Wilson, G.T., and Brownell, K.D. Behavior therapy for obesity: Including family members in the treatment process. Beh Ther, in press.

Wollersheim, J.P. Effectiveness of group therapy based on learning principles in the treatment of overweight women. J Abnorm Psychol, 76:462-474, 1970.

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Chapter 16

Obesity Treatment Reexamined: The Case for a More Tentative and Experimental Approach

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MODELS OF OBESITY

Behavioral treatment of obesity began in a climate very favorable to its rapid growth. Previous conceptualizations of obesity had stressed the primacy of emotional needs as causes of overeating and weight gain, a point of view which led to indirect forms of treatment aimed at resolution of psychological problems. The failure of traditional psychotherapy to produce significant or lasting weight loss was taken rightfully to mean that new methods of treatment were required. It was also taken, with somewhat less justification, as evidence that the etiologic concepts on which these treatments were based were incorrect. Direct attempts to modify habitual diet, usually consisting of such simple procedures as counseling patients in nutrition or prescribing fixed-calorie diets, had also failed. This result came as no surprise to those who had begun to appreciate the difficulties of changing habitual behaviors. The application of principles of learning to the task at hand followed logically enough.

Implicit in early behavioral interventions were the assumptions that obesity was caused by overeating and that overeating was to a significant extent a function of social learning. The tasks of treatment were to provide reinforcement for food abstention as strong as the intrinsic rewards of eating itself and to mitigate the effects of discriminative stimuli on eating either by eliminating food cues from the environment or by restricting eating to well-defined situations so that the range of discriminative stimuli would be narrowed. Some treatment forms, such as aversive conditioning, sought to directly lessen the reinforcing properties of foods. Later refinements of treatment involved modification of specific aspects of eating behavior such as bite size, rate, and composition, size, and timing of meals and snacks on the assumption that these behaviors bore a relationship to total food consumption. On the whole, application of these techniques has led to modest weight losses, averaging less than ten pounds according to a recent review of 42 behavioral studies (Wing and Jeffery 1978), withbetter than average maintenance in those instances in which followup has been conducted (e.g., see Leon 1976). Incremental increases in efficacy achieved through additional refinements of technique have usually been quite small.

Unfortunately, the assumptions which have guided treatment development must now be regarded as subject to very serious question. The results of more than 20 studies have shown that on the whole the obese eat no more than the lean (see Garrow 1974 for review of 13 studies; Thomson, Billewicz, and Passmore 1961; Hejda and Fabry 1964; Hampton, et al. 1967; Hanley 1969; Kissileff, Jordan, and Levitz 1978; Wooley, Tennenbaum, and Wooley, in press; Coll, Meyer, and Stunkard, in press). Although methodological criticisms may be made of each study individually, the combined data, collected by a wide variety of techniques, are undeniabley compelling. Similarly, attempts to correlate particular aspects of eating behavior with obesity - to discover an "obese eating style" - have not, on the whole, produced any replicable difference (Kissileff, et al. 1978; Coll, et al. in press; Meyer, Stunkard, and Coll 1977).

One apparent way out of this paradox is to suggest that during weight maintenance, the obese have essentially normal intake and eating habits, the added caloric requirements to maintain their greater body mass being offset by the somewhat lessened activity level which appears to accompany obesity. The data from obese individuals on weight reducing diets would tend to pull the group average down, while overeating by others coming off diets would tend to pull it up, resulting in the net finding of no obese-normal differences.

Such a hypothesis receives some support from the many studies of weight regulation in animals which show that animals will overeat in order to defend a body weight which has been experimentally lowered. This phenomenon can be observed in normal rats, rats with Ventral-Medial Hypothalamus and Lateral Hypothalamus lesions, genetically obese strains, and in rats who reach a higher weight equilibrium in response to a more palatable diet (e.g., see Keesey et al. 1976; Powley 1977; Stricker 1978).

However, more recent evidence demonstrates that defense of body weight does not depend on overeating, although this is one mechanism by which it may occur. In a dramatic demonstration, Boyle, Storlien, and Keesey (1978) found that rats brought to 80% of initial weight', gain 18 times as much weight as control rats on slightly less food (the quantity adjusted for the reduction in body mass). Numerous other studies have documented decreases in basal metabolic rate of 20-40% in rats and humans on restricted intake, and hyperlipogenesis, that is excess production of fat tissue, during refeeding (Apfelbaum, Bostsarron and Lacatis, 1971; Drenick and Dennin 1973; Buskirk, et al. 1963; Bray 1969; Garrow 1974; Howard, et al. 1978; Keys, et al. 1950; Klieber 1961). Following starvation and refeeding, even if body weight is held at a normal level-that is, does not overshoot the initial baseline-body composition will be altered with a considerably higher percent of fat tissue (Keys, et al. 1950, Szepesi 1978; Tepperman and Tepperman 1964).

The many studies of overfeeding of lean volunteers have shown that weight gain frequently falls far short of that predicted, and following forced feeding, weight returns rapidly and spontaneously to baseline levels (Ashworth, et al. 1962; Mann, et al. 1955; Sims and Horton 1968; Miller and Mumford 1967; Miller, Mumford, and Stock 1967). In short, overeating alone is not sufficient to produce lasting obesity. There is further evidence that thermogenesis, the waste of calories during

overfeeding, is decreased in the obese and after a period of underfeeding (Passmore, et al. 1963; Passmore, et al. 1955; Boyle, et al. 1978).

The implications of these findings challenge the logic of most forms of treatment. First, they suggest that reduction of food intake can be offset by changes in metabolic efficiency, so that after a period of time no further weight is lost. Second, they suggest that weight regain may occur in the absence of overeating or even on subnormal intakes. Finally, they suggest that dieting may possibly alter the response to food excesses in such a way as to produce a lasting propensity to obesity not experienced by those who have never dieted and who may overeat with relative impunity. These findings not only explain many of the phenomena which have been attributed to set points for weight in obese humans but explain how, in humans, set point may drift upward over time in response to alternating cycles of undereating and overeating.

Obviously the verdict implied herein is not absolute. Some people do lose large amounts of weight. Some maintain losses permanently. Perhaps they do it at the cost of chronic hunger, but this is not proven, and clinical experience suggests that it is not always the case. The point is not that dieting has been shown to be futile but that it is fraught with problems not anticipated by a learning model, and there is a great deal which we do not know about the prospects and requisite conditions for lasting weight loss.

TREATMENT DILEMMAS

Intelligent planning of treatment encounters several dilemmas. (1) On the one hand, moderate restriction of calories is not likely to lead to sustained weight loss; on the other hand, more severe restriction is apt to lead to more rapid regain and possibly to other detrimental changes in food utilization. It is possible that sharply limiting periods of restriction. to no more than two consecutive days, for example, might prevent or lessen compensatory metabolic changes. Such strategies should be tested.

(2) Studies of deprived animals and humans demonstrate, somewhat counterintuitively, that hunger is greater the more food is eaten, if the intake is below that required for weight maintenance. This phenomenon refers to periods of extended restriction and, in that context, loss of appetite may be seen as a defensive response associated with conservation of energy and inhibition of food--searching activity. This interpretation is strengthened by the finding that unpredictability of food availability seems to maintain hunger drive, whereas predictability can result in inhibition of appetite during periods in which food unavailability is clearly signalled. Konorski (1967), for example, notes that “a voracious animal who displays a strong motor excitement during the intertrial intervals . . . momentarily calms down when . . . the no-food (stimulus) is presented” (p. 325). (See Wooley, Wooley, and Dyrenforth, in press, for review of data on these questions.)

Thus, on the whole, extreme regimens in which the patient has no chance of access to food are apt to be well tolerated, but are inconsistent with the aims of learning new eating habits and achieving self-control which are fundamental to current behavioral treatments.

(3) Behavioral programs have generally included the goals of reducing responsiveness to food cues through stimulus control procedures and increasing sensitivity to internal regulatory signals. This dual concept of extrasensitivity to environmental stimuli and insensitivity to internal cues is, of course, the Schachterian (1968) model of obesity. Controls on the effects of external stimuli have been more systematically incorporated into behavioral treatments than training to respond to internal signals, which is generally regarded (if considered at all) as something which will rather mysteriously develop on its own as treatment progresses and other causes of eating are eliminated. Some techniques appear to actively oppose this process as, for example? the suggestion that when the patient feels hunger he should delay eating or do something else.

This may all be rather academic, however, for it appears that neither the goal of decreased externality or improved sensitivity to calories is likely to be achieved in the context of a weight reduction program; Animal studies have demonstrated that deprivation increases sensitivity to palatability and caloric density. Also, following deprivation, intake is greatly enhanced by increased length of access (exposure) to food (Booth 1972; Jacobs and Sharma 1969; Collier, Hirsch, and Kanarek 1977). Our own studies of sensitivity to calories as reflected in salivary responses to food following preloads of varying caloric density suggest that chronic dieters lose the sensitivity to calories displayed by unrestrained eaters, independent of weight (Wooley, Wooley, and Williams 1978). Thus, to the extent that there is evidence for either of the phenomena described by Schachter (1968), it appears to be an accompaniment and a consequence of dieting. Interventions designed to promote regulatory eating would be more logically carried out during weight maintenance, a conclusion which could also be reached more simply by noting that dieting, by definition, is not regulatory eating.

DIMENSIONS OF INDIVIDUAL DIFFERENCE

If generalities about hunger and weight regulation fail to point clearly to rational modes of treatment, consideration of individual differences may prove helpful from both a theoretical and practical standpoint. Appropriate avenues of intervention may have eluded us because we have looked only for patterns characteristic of obesity in general and have not sought to isolate sub-syndromes.

An example of this problem is found in the studies of eating styles in which obese and normal samples have been compared, with little result. Since the obese do not, as a group, consume more food than the lean, this experimental design cannot detect predictors of high consumption rates, nor can it detect particular constellations of behaviors, such as those characteristic of uses of food to control mood states or patterns specific to particular phases of obesity. For example, the data on meal frequency and obesity have been very inconsistent, but studies which have reported infrequent meals in the obese tend to be those which have been conducted on samples of older people who are not patients, suggesting that this may be a terminal adaptation to obesity (Fabry, et al. 1964; Hejda and Fabry 1964). In contrast, binge eating seems to be most frequent among young people still very concerned with dieting (Herman and Mack 1975).

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From the standpoint of improving prediction of outcome and facilitating selection of treatment strategy, several dimensions of individual variability appear to be particularly relevant.

The first of these is ease of weight loss. This can be estimated from careful history taking or discovered by a trial period during treatment. There is reason to believe that patients who maintain their weight on the lowest calorie intakes will require the most drastic restrictions to lose and will regain on the fewest calories. Martineaud and Tremoliere (see Garrow 1974) found that obese patients with the lowest initial resting metabolic rates showed the biggest decreases in metabolic rate when dieting.

A second important dimension is the degree of hunger experienced on caloric restriction. Despite the generalizations which can be drawn from animal studies on deprivation and hunger, in practice there is considerable variability among patients. Some report constant gnawing hunger on diets or fasts, while others report rarely having sensations they label as hunger. Stricker (1978) has suggested a distinction between primary obesity, in which metabolic abnormalities produce intense hunger in those below a given weight, and primary hyperphagia, in which overeating is a response to variables other than hunger but leads to obesity. In the former group, he suggests that hyperlipogenesis removes nutrients from the system so rapidly after eating that satiety cannot occur. This situation is corrected when fat stores are sufficiently repleted (see also Powley 1977). By this view, hunger induced by dieting is a negative prognostic indicator both because it makes control of food intake extraordinarily difficult and because it signals the operation of a set point mechanism involving a metabolic bias toward fat storage. Even if intake can be limited, other adaptations may restore the person to the obese state.

A third dimension is the use of food in the management of subjective states other than hunger a satiety. Stricker (1978) proposed that primary hyperphagia might consist of two separable syndromes in which food is used to decrease or increase arousal level. This suggestion is in keeping with recent findings emphasizing the interrelationship of neural activation of feeding and other behaviors.

The paradoxical suggestion that food may be used both to increase and to lower arousal is, in fact, quite plausible since sensory properties of food have an energizing effect on behavior, while satiety is associated with quiescence. Thus, the frequent ingestion of small snacks may heighten arousal while consumption of a large meal may reduce it. Conditioning may also play an important role. Thus, if food consumption has habitually been paired with relaxation, it may come to have a conditioned property of tension relief. Patterns may be idiosyncratic. Thus, for example, one person may eat to reduce arousal shortly after being placed in a stressful condition. while another may use food to speed relaxation once the stress is terminated. It is additionally possible that the same person uses food for both stimulating and sedative effects under differing conditions by adjusting dose, frequency, and setting variables. However, it probably makes sense to proceed first on the simpler notion that a particular pattern will predominate, reflecting a relative consistency of temperament and/or the nature of the person's environment.

Assessments on this dimension may be particularly helpful in selecting treatments. For patients who eat for stimulation, alternative sources of excitement may be sought. The removal of food cues from the environment could be quite helpful. For those high on arousal, alternate methods of tension release might be sought. Treatment strategies based on these concepts may be useful in prevention or early reversal of eating patterns which will lead to obesity, even if they do less for those in whom innate or acquired physiological characteristics oppose weight loss. It is also in this aspect of feeding that the applicability of an addiction model makes most sense.

It is interesting to note that since, unlike other abuse substances, food is a necessity, its nonuse may sometimes constitute abuse. Self-starvation, especially when accompanied by ketosis, produces marked psychological changes described by some patients as euphoria. The effects of not eating deserve consideration not only in the syndromes of anorexia and intermittent starvation and binge eating, but also in such patterns as meal skipping or night eating in which all or part of the day is spent fasting. It has been our clinical experience that binge and night eating are relatively easily understood as responses to extreme hunger. The behavior most resistant to change is the refusal to eat between binges, a pattern patients usually explain on the basis of fear of weight gain, but which is accompanied by a sense of control and often by a feeling of energization. It is doubtful that such patterns would evolve except in the context of strong social pressures to reduce, but the factors which maintain them may be more elaborate than the initial causes.

SELF-ESTEEM AND FAILURE

In behavioral as well as other forms of treatment there is typically an implicit or explicit message that if the obese patient will learn to eat like other people he or she will be cured. Clearly this is often not true. Many patients who comply will fail to lose weight and will blame themselves. As the feminist writer Aldebaran (1977) put it, "The....failure of reducing diets is fat people's collective experience and therapy tells us to ignore it. If you try hard enough, you can lose weight."

The fact of therapeutic failure deserves special consideration, for it compounds the already severe problems of self-esteem experienced by most overweight people. Intense prejudice against obese children, adolescents, and adults has been extremely well documented. Obesity is the most stigmatized physical feature except skin color, but unlike skin color is thought to be due to personal failings. The catalogue of negative traits attributed to the overweight is astonishing, and it is a mistake to suppose that this is not acutely sensed by obese people although, due to their highly precarious status, they are apt to endorse or even believe dominant cultural values and to be reluctant to express their feelings. (For review of these findings see Wooley, Wooley, and Dyrenforth, in preparation.)

To ignore these issues is to ignore important needs of obese patients. From this viewpoint treatments which increase shame, for example, by having patients rehearse the ideas that fat is ugly and thinness attractive, seem harmful. Caution is clearly required in use of

techniques which call negative attention to obese people and their eating habits, for example, by involving others in monitoring their behavior or in employing obtrusive techniques or mechanical devices. Behavioral treatment could be employed to combat these problems by developing techniques for improving body image? increasing assertiveness, encouraging socialization, and teaching patients to discourage others from belittling them or discriminating against them.

The devastating effects of repeated failure underscore the need to discover early predictors of success, to help patients view their situation objectively and to provide support for patients who choose not to continue at weight loss or who fail in their efforts.

TREATMENT STRATEGIES

In view of the many problems and uncertainties associated with treatment of obesity, we have adopted a plan which allows considerable flexibility and which we believe provides a useful interim model. The features of this program are presented not as final or even particularly satisfactory solutions, but rather ones we feel serve patients reasonably well in the absence of widely applicable techniques of proven usefulness.

During screening interviews the patient's history is analyzed with a view toward assessing the difficulty of past weight loss and maintenance and the current reasons for attempting weight loss, including health problems, social dysfunction, and external pressures. From the first contact, we share with patients information on the problems associated with dieting in order to relieve shame and self-blame over past failure and to engage them in a process of realistic planning. The aim of treatment is presented as helping each patient learn to maintain, without undue effort, a body weight at which he or she can be comfortable. Successful completion of the program may or may not involve weight loss. We expressly avoid placing any intrinsic value on slenderness but instead consider how it may (or may not) relate to attainment of other goals. Under this model no particular distinction needs to be made between obese patients, anorexics, binge eaters or any other disorders of body weight or food regulation. In fact, there seem to be some benefits in composing treatment groups consisting of three to five patients of individuals with varied problems.

The first phase of treatment involves collection of data on spontaneous eating patterns. Records, based on the Jordan-Levitz manual, require the listing of foods eaten, time, duration, place, mood, hunger level and activities associated with eating. We have added to this information a pleasure rating for each feeding (meal or snack). Patients are engaged with the therapist and other group members in the task of constructing idiographic theories of their own eating behavior.

Questions to be answered during this phase include (1) To what extent is eating in response to experienced hunger? (2) How does hunger vary as a function of inter-meal intervals, composition of diet, and manner in which foods are eaten (e.g., rate, setting conditions, palatability)? (3) What factors are associated with initiation of eating in the absence of hunger and perpetuation of eating past satiety? (4) How can extraneous causes of eating be minimized?

The first goal of treatment is maintaining entering body weight. There are several reasons for this.(l) In the case of obese patients, it is clearly an easier task than weight loss and is therefore a more suitable initial goal. (2) Unless a patient can learn a workable system of weight maintenance, weight reduction would seem to be contraindicated. (3) More can be learned about natural patterns of hunger, appetite, and nonnutritive uses of food under the more physiologically normal and stable conditions of energy equilibrium. (4) The period of maintenance provides patients with time and information to begin setting realistic goals for themselves. Determination of maintenance requirements permits some estimate of the reductions which will be required to sustain weight loss and to maintain lower weight. A period of weight stability and objective study of eating habits tend to lessen the sense of desperation felt by many patients who are then able to consider what, exactly, are the anticipated benefits of weight loss in relation to the anticipated personal cost.

The period devoted to learning weight maintenance skills may take as little as four weeks, but is continued as long as required. During this time, brief experiments are conducted to discover the patterning and mode of eating which results in the least hunger, the most pleasure, and weight stability. There is tremendous variability in the solutions devised by patients, perhaps the only relatively common feature being the establishment of predictable eating times.

Upon completion of maintenance training, patients must decide whether to undertake a weight loss trial. From the first, some discussion is devoted each meeting to personal and social issues relating to this decision. Self-esteem, body image, and social acceptance are topics so central to every patient's concerns that in an atmosphere encouraging a long range view, they require little elicitation; on the contrary, they can scarely be avoided. It has been our experience that most, though not all, patients decide to try losing weight but with a relatively novel attitudinal set: failure is possible and must not be defined as a disaster; great patience may be required; the decision must be periodically reevaluated.

Weight loss strategies are a logical extension of maintenance training. An effort is made to discover the smallest reduction in calories which will result. in loss, usually at the rate of half to one pound per week. If weight equilibrates at the new calorie level, patients must decide whether to make a further cut, increase their activity level, or return to maintenance eating for a while in the hopes of reestablishing the baseline maintenance requirements.

Strategies for reducing food intake include, but are not limited to, the many interventions included in other behavioral treatment programs. They are selected by patient and therapist on an individual basis. There is no standard set of lessons. We have found it helpful to give more attention than is ordinarily paid to details of the diet which affect hunger and satisfaction. Thus, foods high in sugar are eliminated by some patients if they find that they stimulate hunger, and increases in protein intake before or during meals is tested for its efficacy in modulating hunger. Considerable attention is given to optimal meal spacing. For whatever reasons, increasing the pleasure of eating seems to make diets better tolerated. This may involve legitimizing intake

of highly preferred foods usually omitted from diets, working to reduce guilt over eating, and improving the setting conditions of eating. The alternative to maximizing pleasure seems to be to perpetuate a sense of deprivation which, as often as not, leads to diet breaking.

For some patients weight loss proceeds relatively easily; for others it is extremely difficult. There is no time limit on the therapeutic contract and multiple options are 'left open. Thus, for some patients in whom massive obesity represents an insurmountable problem, brief periods of fasting may be included in later phases of treatments. For patients ready, but without psychological supports, to try to continue attempts at dieting and to stabilize at some degree of overweight, family therapy may be offered as an adjunctive treatment.

Obviously, it becomes quite difficult to quantify success in a program of this type, since a variety of outcomes are considered acceptable. We are in the process of collecting followup data on body weight, self-esteem, self-image, and the extent to which weight has remained a central preoccupation of the individual. One indication that the program is responsive to the needs of its clientele, if not successful in more traditional senses, is that the dropout rate has been extremely small and termination, unless forced by a geographic move or other extraneous factors, is based on the patient's decision that he/she has reached an acceptable stopping point. Continuing communications from patients often have more to do with their increasing sense of liberation or life accomplishments than with weight.

FINAL COMMENT

It is often said that obesity has increased because food is more available. Increased use of other substances has sometimes been similarly explained (e.g., heroin use by Vietnam soldiers). Obviously, such observations are true in the trivial sense that a substance cannot be used at all if it is completely unavailable and a certain degree of availability within the immediate social context is necessary to learn the behavioral repertoires involved in use.

However, it is not clear that once minimum conditions of availability are met, this generalization still pertains. Instead, it appears that the relationship between availability and use may reverse itself in line with the concept of supply and demand. Relatively unavailable commodities may be seen as more precious and be more sought after. The literature on schedule-induced substance use demonstrates that reduction of availability in one substance may bias toward use or abuse of another.

In animal studies availability can be defined entirely by the substances present in the immediate environment and by the schedule required to obtain them. In the case of humans, availability is a far more complex concept involving psychological and cognitive elements. For example, to someone on a diet, food is both available and out of reach. It is, in fact, everywhere, and the individual nearly always has the means to get to it. And yet at a psychological level, it is unavailable, or at least unpredictably available. The dieter knows that eventually his resolve will weaken and he will eat, but he doesn't know when this will happen. It is ironic that the desirability placed on thinness has actually made

food less available, in this sense, than at any time in recent history. On a prima facie basis, this seems as likely an explanation of the rising incidence of obesity as food abundance.

Many have cited the relationship between stress and substance abuse. In many instances stress may be said to represent unavailability of important gratifications. The incidence of obesity is many times greater in the lowest social classes, a fact which on the basis of current evidence is probably improperly, attributed to differences in diet composition or greater acceptance of obesity. It is not so much that food is more available to the impoverished ghetto mother than to a wealthy socialite but that it is nearly the only thing available. But not without the guilt which further heightens its value.

These considerations are mentioned because of the possibility that they may have important theoretical and practical implications. At a theoretical level, it may be necessary to consider that there is a psychological component to the concept of deprivation which takes into account the availability of a number of potential sources of gratification. The psychological state may interact with biological variables to produce important behavioral and physiologic changes. We have seen, for example, that in rats food deprivation sets in motion powerful compensatory metabolic changes. In humans, these changes may depend in part on the sense of deprivation, the experience of hunger or longing. The elicitation of emergency conserving mechanisms may, in short. involve both mind and body: Clearly, something is missing from our understanding, since animal models fail to perfectly predict human responses and that which is missing may be that which is peculiarly human: the ability to anticipate, think, worry, and want.

At a more immediate practical level, the poor success achieved in treatment of obesity is leading policymakers to contemplate the creation of national incentives for weight loss, such as differential health coverage benefits, and to emphasize prevention efforts likely to take the form of urging parents, especially obese ones, not to overfeed their children. Such interventions may well be premature. In the case of penalties for obesity, they are unfair. In both cases they seem as likely to worsen the problems as to alleviate them. Until we understand what conditions permit establishment and maintenance of a normal body weight, and unless we can rule out the plausible hypothesis that attempts to drive weight down to culturally rather than biologically normal values are themselves a causal factor in obesity, we should be wary of any programs which increase pressure to limit food intake, especially in the young.

REFERENCES

Aldebaran. Fat liberation - a luxury? An open letter to radical (and other) therapists. (Quotes taken from an unpublished manuscript supplied by the author; this article subsequently appeared in State of Mind, 5:35, 1977.)

Apfelbaum, M., Bostsarron, J.; and Lacatis, D. Effect of caloric restriction and excessive caloric intake on energy expenditure. Am J Clin Med Nutr, 24:1405-1409, 1971.

Ashworth, N.; Creedy, S.; Hunt, J.; Mahon, S.; and Newland, P. Effect of nightly food supplements on food intake in man. Lancet, 2:685, 1962.

Booth, D.A. Caloric compensation in rats with continuous or intermittent access to food. Physiol Beh, 8:891-899, 1972.

Boyle, P.C.; Storlien, L.H.; and Keesey, R.E. Increased efficiency of food utilization following weight loss. Physiol Beh, 21, 261, 1978.

Boyle, P.C.; Storlien, L.H.; Harper, A.E.; and Keesey, R.E. Metabolic rate during undernutrition and realimentation in the rat. Presented at Eastern Psychological Association, 1978.

Bray, G. Effect of caloric restriction on energy expenditure in obese patients. Lancet, 2:397, 1969.

Buskirk, E.R.; Thompson, R.H.; Lutwak, L.; and Whedon, G.D. Energy balance of obese patients during weight reduction: Influence of diet restriction and exercise. Ann NY Acad Sci, 110:918-940, 1963.

Coll, M.; Meyer, A.; and Stunkard, A.J. Obesity and food choices in public places. Arch Gen Psychiat, in press.

Collier, G.; Hirsch, E.; and Kanarek, R. The operant revisited. In Honig, W.K., and Staddon, J.E.R., eds. Handbook of operant behavior. Englewood Cliffs: Prentice-Hall, Inc., 1977.

Drenick, E.J., and Dennin, H.F. Energy expenditure in fasting men. J Lab Clin Med, 81:421-430, 1973.

Fabry, P.; Fodor, J.; Hejl, Z.; Braun, T.; and Zvolankova, K. The frequency of meals: Its relation to overweight hypercholesterolaemia and decreased glucose tolerance. Lancet, 2:614-615, 1964.

Garrow, J. Energy Balance and Obesity in Man. New York: American Elsevier, 1974.

Hamptom, M.; Huenemann, R.; Shapiro, L.; and Mitchell, B. Calorie and nutrient intakes of teen-agers. J Am Diet Ass, 50:385, 1967.

Hanley, T. The etiology of obesity. In: Baird, I.M., and Howard, A.N., eds. Obesity: Medical and Scientific Aspects. London: Livingstone, 1969.

Hejda, S., and Fabry, P. Frequency of food intake in relation to some parameters of the nutritional status. Nutrition Dieta, 6:216, 1964.

Herman, C.P., and Mack, D. Restrained and unrestrained eating. J Per, 43:646-660, 1975.

Howard, A.; Grant, A.; Challand, G.; Wraight, E.; and Fdwards, 0. Thyroid metabolism in obese subjects after a very low calorie diet. In: Bray, G.A., ed. Recent Advances in Obesity Research Vol. II. London: Newman, Ltd., 1978.

Jacobs, H.L., and Sharma, K.N. Taste versus calories: Sensory and metabolic signals in the control of food intake. Ann NY Acad Sci, 157:1084-1125, 1969.

Keesey, R.E., Boyle, P.C., Kemnitz, J.W., Mitchell, T.S. The role of the lateral hypothalamus in determining body weight set point. In: Novin, D., Wyrwicka, W., and Bray, G., eds. Hunger: Basic Mechanisms and Clinical Implications, N.Y.: Raven Press, 1976.

Keys, A., Brozek, J., Henschel, A., Mickelson, O., and Taylor, H. The Biology of Human Starvation. Minneaplois: University of Minnesota press, 1950.

Kissileff, K.; Jordan, H.; and Levitz, L. Eating habits of obese and normal weight humans. In: Bray, G.A., ed. Recent Advances in Obesity Research. Vol. II. London: Newman, Ltd., 1978.

Klieber, M. The Fire of Life: An Introduction to Animal Energetics. New York: Wiley and Sons, Inc., 1961.

Konorski, J. Integrative Activity of the Brain. Chicago: University of Chicago Press, 1967.

Leon, G.R. Current directions in the treatment of obesity. Psych Bull, 83:557-578, 1976.

Mann, G.V., Teel, K., Hayes, O., McNally, A., and Bruno, D. Exercise in the disposition of dietary calories: Regulation of serum lipoprotein and cholesterol in human subjects. New Eng J Med, 253:349, 1955.

Meyer, J., Stunkard, A.J., and Coll, M. Eating in public places: There is no “obese eating style,” it’s where you eat that matters. Paper presented at the meeting of the Association for the Advancement of Behavior Therapy, Atlanta, December, 1977.

Miller, D.S., and Mumford, P. Gluttony: An experimental study of overeating on low or high protein diets. Am J Clin Nutr, 20:1212, 1967.

Miller, D.; Mumford, P.; and Stock, M. Gluttony: Thermogenesis in overeating man. Am J Clin Nutr, 20:1223-1229, 1967.

Passmore, R.; Meiklejohn, A.P.; Dewar, A.D.; and Thow, R.K. An analysis of the gain in weight of overfed thin young men. Brit J Nutr, 9:27, 1955.

Passmore, R.; Strong, J.; Swindells, Y.E.; and El Din, N. The effect of overfeeding on two fat young women. Brit J Med, 17:373, 1963.

Powley, T. The ventromedial hypothalamic syndrome, satiety, and a cephalic phase hypothesis. Psych Rev, 84:89, 1977.

Schachter, S. Obesity and eating. Science, 161:751, 1968.

Sims, E.A.H., and Horton, E.S. Endocrine and metabolic adaptation to obesity and starvation. Am J Clin Nutr, 21:1945, 1968.

Stricker, E.M. Hyperphagia. New Engl J Med, 298:1010-1013, 1978.

Szepesi, B. A model of nutritionally induced overweight: Weight "rebound" following caloric restriction. In: Bray, G.A., ed. Recent Advances in Obesity Research. Vol. II. London: Newman, Ltd., 1978.

Tepperman, H., and Tepperman, J. Adaptive hyperlipogenesis. Fed Proc, 23:73, 1964.

Thomson, A.M.; Billewicz, W.Z.; and Passmore, R. The relation between calorie intake and body-weight in man. Lancet, 1:1027, 1961.

Wing, R.R., and Jeffrey, R.W. Comparison of methodology and results of outpatient treatments of obesity. In: Bray, G.A., ed. Recent Advances in Obesity Research. Vol. II. London: Newman, Ltd., 1978.

Wooley, S.C.; Tennenbaum, D; and Wooley, O.W. A naturalistic observation of the influence of palatability on food choices of the obese and nonobese. Int J of Obesity, in press.

Wooley, O.W.; Wooley, S.C.; and Williams, B.S. Restraint of appetite and sensitivity to calories. In: Bray, G.A., ed. Recent Advances in Obesity Research. Vol. II. London: Newman, Ltd., 1978.

Wooley, O.W.; Wooley, S.C.; and Dyrenforth, S.R. Obesity and women II: A neglected feminist topic. Paper presented at Feminist Scholarship Conference, Urbana, Illinois, February, 1977. Submitted for publication Women's Studies International Quarterly.

Wooley, S.C.; Wooley, O.W.; Dyrenforth, S. Theoretical, practical and social issues in behavior treatment of obesity. JABA, in press.

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