

D378
C551a
1978

THE AVERSION THERAPY TREATMENT OF NARCOTICS
ADDICTS MAINTAINED ON METHADONE

by
CHARLOTTE CLARKE

A DISSERTATION

Submitted in partial fulfillment of the
Graduate School requirements for the
degree of Doctor of Philosophy in
the Department of Psychology at
the University of Alabama

University, Alabama

1978

ACKNOWLEDGEMENTS

The writer expresses sincere appreciation to those whose contributions were invaluable to this study.

The committee chairman, Dr. Kenneth B. Melvin, is especially recognized for his wide range of expertise, his interest and guidance, patience and accessibility.

This special thanks is extended to other members of the committee for the excellent assistance they provided during the many phases of this research: Dr. Henry C. Rickard, whose teaching excellence aided this research throughout, as well as its inception; Dr. Annette Brodsky, whose encouragement and practical advice was very basic to the evolutionary and execution processes; and Dr. William Janzen, whose insights and technical advice helped mold the feasibility of the design.

The acquisition of many otherwise unavailable training experiences, that proved fundamental to this research in many ways, was provided by Dr. Jesse B. Milby over many years, as mentor and friend. Simple words cannot express the deep-felt gratitude for his unmatched acceptance, empathy and continual capacity for trust and confidence. The execution of this research would have not been realized

without his direct aid and support in providing equipment, subjects and supervision.

Thanks is extended also to the University of Alabama in Birmingham School of Medicine, Department of Psychiatry, and the counselors and staff of the Methadone Maintenance Program, whose cooperation with this project was a definite contribution.

My family is singularly honored for their early fostering of the confidence and values necessary to the undertaking of this goal, and their never-ceasing love, understanding and assistance.

This volume is dedicated to John, my best friend, whose love and moral support has been reliable, sustaining and inspiring, through even the most frustrating of periods.

C.J.C.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	ix
REVIEW OF THE LITERATURE	1
Theoretical Views of Narcotic Addiction	1
History of the Aversion Technique	3
Aversion Therapy Treatment of Narcotic Addiction	4
Chemical versus Electrical Aversion	6
Electric Shock Administration	7
Measurable Correlates of Conditioning	8
Two-factor Theory Interpretation	9
An Alternative Cognitive Interpretation	10
Cognition and Behavior Therapy Techniques	11
Affect and Cognition	12
Influence of Cognition in Aversion Therapy	13
The Use of Imagery as Stimuli	14
Imagery and Experimental Limitations	15
Imagery and Improved Stimulus Generalization	19

Punishment versus Avoidance Training	20
Personality Factors	21
STATEMENT OF THE PROBLEM	24
Hypotheses	25
METHOD	27
Subjects	27
Apparatus	28
Measures	28
Procedure	30
Confidentiality	33
RESULTS	34
DISCUSSION	40
Limitations of the Study	40
Population Characteristics and General Treatment Resistance	41
Ethical Considerations	42
Motivational Factors and Selection for Treatment	43
The Need for a Classification of Addictive Behaviors	45
Conditioning and Related Studies of Psychopathy	48
Advantages of the Procedure	50
Complexity of Drug-seeking Behavior Change	53
Cognition and the Application of Learning Principles to Humans	54
Considerations for Further Research	56
Recommendations	57
SUMMARY	59

BIBLIOGRAPHY	61
------------------------	----

APPENDIX

A	69
B	71
C	73
D	75
E	77
F	81

LIST OF TABLES

Table

1.	Learning Components on an Aversion Therapy Trial	32
2.	Mean Per Cent "Dirty" Urines for Experimental Subjects	38
3.	Mean Scores on the Semantic Differential for Experimental and Control Subjects	39
4.	A Summary of Experimental Subject Personal Data	47

LIST OF FIGURES

Figure

1. Mean per cent "dirty" urines
for experimental and
control subjects 35
2. Mean per cent "dirty" urines
for volunteer subjects and
non-volunteers 36

Public concern and collective effort in devising effective treatment of drug addiction has begun only within the last decade, prompted by a national policy set by the government to curtail the abuse of drugs. Treatment approaches are varied but controlled studies are few (Connell, 1970). Overall success rates are extremely low, with only 20-36% of addicts treated showing substantial improvement (Miller, 1973). It has been suggested that this poor outcome is rooted in inadequate conceptualizations of the addictive process itself, as well as a paucity of related research efforts (Copemann, 1975).

Theoretical Views of Narcotic Addiction

Until recently, the focus of a few interested clinicians has been largely centered upon drug-induced euphoria as the critical precipitant, and physical distress as a logical deterrent (Connell, 1970). Other early theories have evoked personality traits, i.e., anxiety and sociopathic tendencies, as major factors predisposing an individual to addiction (Kolb, 1925, 1968). Furthermore, these factors were regarded as relatively fixed, and contributed to a pessimistic view of existing traditional treatment processes. Alternatively, drug-related behaviors were regarded as physiologically-based, "special instances" of behavior to which traditional behavioral learning principles did not readily apply (Copemann, 1975).

In more recent years, animal addiction investigations have advanced more sophisticated learning theory interpretations of addictive behaviors. Such interpretations have revived treatment interest and optimism. According to the two-factor conditioning theory proposed by Wikler (1965), drug intake is viewed as an instrumental response that results initially in a highly positive reinforcing state, with environmental, cognitive and physiological cues becoming classically conditioned to stimuli eliciting drug-taking behavior. Since euphoric effects disappear after prolonged periods of heavy drug use, the later persistence of the drug-taking response is attributable to these maintaining, conditioned stimuli. This basic learning principle has been useful in developing theories of withdrawal and relapse, as well as theories of physical dependency (Copemann, 1975).

Furthermore, the range of stimuli susceptible to this conditioning effect is progressively extended over the length of time addicted, and complex socio-cultural behavior patterns are generated through secondary reinforcement and generalization. Highly ritualized behavioral repertoires and rigid belief systems emerge and influence the perception of almost "magical" drug effects (Wikler, 1971). Additionally, interruption of the abstinence syndrome by drug intake is negatively reinforcing and is regarded as a potent motivational factor influencing relapse.

Copemann (1975), in his recent survey of the addiction literature, concludes that both physiological and learning factors interact to influence relapse. He has proposed that the extinction of classically conditioned stimulus cues exerting control over drug-taking be a necessary adjunct to treatment procedures. He specifies Behavior Therapy then, as a reasonable treatment approach in view of a few successful outcomes obtained through limited observations.

History of the Aversion Technique

Aversion therapy, a direct outgrowth of the Pavlovian tradition within the "Zeitegeist" of Behavior Therapy, consists of numerous pairings of an undesirable behavior pattern with noxious stimulation. Most studies of aversion therapy reported during the late thirties and forties have employed chemical aversion in the treatment of alcoholics. Many of these studies are of poor quality, demonstrating little experimental control of relevant variables (Voegtlin & Lemere, 1942). In contrast to the popularity of chemical aversion during that time period, as early as 1935, Max presented a novel, yet than largely ignored account of electrical aversion treatment of homosexuality (Rachman & Teasdale, 1969). He suggested several critical phenomena: shock intensity, devaluation of the conditioned stimulus, punishment recovery and cumulative buildup (Max, 1935). Over the years, however, many variations of the electrical

aversion technique have been used, reflecting much confusion and uncertainty as to which specific methods are most effective (Rachman & Teasdale, 1969).

Aversion Therapy Treatment of Narcotic Addiction

Aversion techniques have been associated with induced abstinence in a few isolated cases of drug addiction. Raymond (1964) reported sustained abstinence in the treatment of a methadone addict after a series of apomorphine injections and induced nausea. The patient was reported abstinent two and a half years later. However, since supportive therapy was continued for six months on an outpatient basis, the effectiveness of the aversion procedure itself could not be determined.

Liberman (1968) similarly used apomorphine to condition aversion in two morphine addicts. Only one of the two patients treated remained abstinent after one year.

Wolpe (1965) used self-administration of electric shock paired with drug craving to produce conditioned aversion in a demerol addict. In addition, assertive training was employed to reduce social anxiety while building new interpersonal responses. The patient remained abstinent for a three-month period, relapsing after a change in therapist and abandonment of the technique.

Lesser (1967) reports more permanent abstinence with an aversion technique combining shock, imagery as stimuli, relaxation training and self-assertion in the treatment of

a previously addicted morphine user. After sixteen sessions with a partial reinforcement schedule, the patient was abstinent at a ten-month followup with reported improvement in many areas.

Spevack, Pihl and Rowan (1973), in a more detailed account, utilized an aversive treatment procedure to suppress ritual-related imaginal stimuli in three amphetamine users (two hospitalized and one outpatient). Faradic shock was paired with both imaginal and verbal stimuli. Assessment consisted of subjects' recordings of drug-related thoughts and difference scores on pre- and post-treatment administrations of the Semantic Differential. There were substantial reductions in the frequencies of drug thoughts, as well as changes in affective strength as measured by the Semantic Differential.

Teasdale (1973) evaluated conditioned arousal to slides depicting drug stimuli in six opiate-dependent patients. All had been withdrawn through the administration of methadone for one week prior to aversion therapy treatment. All subjects reported heightened arousal on two measures pre-treatment, and the three subjects remaining at the end of treatment reported decreased responsivity to the slides. Two of these three subjects relapsed fairly quickly after treatment. Teasdale (1973) suggests that these results are consistent with theories of conditioned abstinence, and that perhaps aversion therapy at least has a generalized effect.

These studies lack sufficient controls and are thus little more than heuristic. However, they at least partially demonstrate the feasibility of aversion therapy in the treatment of narcotic addiction. Aversion therapy seems to offer promise of a cogent treatment for a plaguing social problem of national concern.

Chemical versus Electrical Aversion

Recent theoretical formulations of the mechanics of aversion therapy consistently point to a preference for the use of electrical stimulation as the noxious stimulus. The disadvantages of pharmacological agents are numerous, though their use was favored in the early literature. Rachman and Teasdale (1969) point out several considerations which support a case against the use of chemical aversion.

The most serious disadvantage appears to be the lack of temporal control which is critical to any traditionally-derived conditioning paradigm. Difficulty specifying optimal inter-stimulus intervals, frequency of pairings, intensity and duration of the unconditioned stimulus itself, i.e., nausea versus vomiting, is certain to result in empirical limitations. Additionally, Eysenck and Rachman (1965) have suggested that chemicals may act as nervous system depressants, retarding the development of conditioned responses. Electric shock, in the absence of these complex physiological interactions, allows better control over the onset, intensity and duration of the aversive stimulus.

Wilson and Davison (1969), in view of the foregoing points, extend the issue to a consideration of the modality-based correspondence between cue and reinforcer, i.e., CS and UCS. They suggest that chemical aversion as the UCS might be more effective in conditioning cues of taste and smell, whereas shock may condition only non-gustatory attributes such as sight and tactile stimulation. This modality effect has been demonstrated in some mammals, e.g., rats and coyotes, but empirical evidence of this effect in humans is lacking (Garcia, McGowan, Ervin & Koelling, 1968).

Individual differences in reactivity to both chemical aversion and electrical stimulation are important empirical considerations. However, the range of individual differences in the speed and quality of reactions to various drugs ingested, by far outweighs differences in sensitivity and tolerance levels for faradic electrical stimulation. These considerations, which have strong empirical implications, dictate a preference for electrical stimulation.

Electric Shock Administration

In aversion therapy, electric shock is generally administered through electrodes attached with protective paste to the forearm, calf or fingers (Rachman & Teasdale, 1969). Shock is commonly generated for a specified duration through a battery-operated device. Since most patients adapt fairly quickly to shock intensity, it usually becomes necessary to adjust the shock level from session to session

(Kushner, 1970). Also, since very little is known about the range of individual differences, it seems advisable to include subjective reports of painfulness. A behavioral index of the intensity range may be derived from observable withdrawal or flinch reactions.

Electric shock shares with chemical aversion, although probably to a lesser degree, properties of extreme unpleasantness that may result in refusal or premature termination of treatment (Kushner, 1970).

Measurable Correlates of Conditioning

Generally, recent theoretical analyses of aversion therapy have largely adhered to a basic conditioning paradigm although clinical observations have yielded less than firm support. In a traditional classical conditioning paradigm, the CS precedes the UCS by some specified and regular interval. The conditioned response, the nature of which is usually uncertain in aversion therapy, then becomes prominent (although often subject to rapid extinction). In order that the appropriateness of a conditioning model for aversion therapy might be convincingly demonstrated, it becomes necessary to show a reliable correspondence between the obtained therapeutic changes and the specified repeated pairings of the CS and UCS. Immediately, issues of resistance to extinction and the generalization of these response changes come into focus. It seems reasonable to expect that these changes be demonstrated specifiable and measurable.

Yet rapid extinction of a variety of autonomic responses established through aversive conditioning has been observed generally in human subjects, especially after having informed them of the discontinuance of the UCS. These responses include conditioned galvanic skin responses, eye-blink and cardiac responses (Hallam, Rachman & Falkowski, 1972). Hallem et al. (1972), however, maintain that laboratory studies of aversive conditioning utilizing neutral stimuli may be irrelevant to aversion therapy within a psychiatric context. However, an experiment conducted by these authors failed to show specific and substantial increases in autonomic reactivity to alcohol-drinking stimuli in aversion therapy with alcoholics. But some slight evidence of heightened cardiac response to deviant sexual fantasies after aversion therapy was found in patients treated for deviant sexual behavior, suggesting a need for further investigation (Hallam & Rachman, 1972). The possibility that the measures chosen by Hallam et al. (1972) may have been too insensitive remains. Thus the lack of physiological correlates, while failing to neatly confirm the progression of conditioning in aversion therapy, does not render a conditioning theory interpretation inappropriate.

Two-factor Theory Interpretation

An extension of the conditioning model to include avoidance learning in aversion therapy has resulted in a two-factor interpretation to which the role of anxiety is central. A failure to confirm the presence of anxiety as a

critical factor, in the absence of psychophysiological indices, has seriously jeopardized the explanatory power of two-factor theory. Nevertheless, there is laboratory evidence suggesting that anxiety and avoidance behavior can develop along independent courses. Rescorla and Solomon (1967) found a persistence of avoidance behavior after physiological correlates had extinguished. Bandura (1969), in a similar vein, noted that autonomic responses and avoidance behavior seem partially correlated but not causally related, and asserted that autonomic arousal probably has only a facilitative role. He states further that an anxiety-based theory will likely be poorly validated if anxiety is equated with autonomic reactivity. More convincing support for this notion may be derived from laboratory investigations of avoidance responses maintained in sympathectomized (surgical removal of the sympathetic segment of the autonomic nervous system) dogs (Wynne & Solomon, 1955).

An Alternative Cognitive Interpretation

Aversion therapy, then, with its current status represents a complex set of learning theory issues. Its effects might be classified according to differences observed in actual responding, changes in the subjective valuation of the stimulus object, or some still less specified change in central state such as mood or cardiac reactivity, that presumably mediates attitudinal and overt behavior changes. The complexity of reactions that interact,

compounded with individual differences, makes likely the emergence of a "central" or "cognitively-based" theory as a supplementary explanation. Rachman and Teasdale (1969) have concluded that no adequate explanation of aversion therapy can exclude either conditioning principles or cognitive influences. And the role of cognition as a powerful mediator in producing behavior change has become increasingly recognized in the literature (Mahoney, 1974; Procter & Malloy, 1971; Johnson & Matross, 1975).

Perhaps the main reason that past cognitive-based interpretations have traditionally fallen short of true experimental contribution, is that Behaviorists find "mentalistic" concepts too difficult to speculate about experimentally, while reluctantly recognizing their influences (Horowitz, 1970; Segal, 1971). References that have been made to concepts such as "mediation", "coding" and "information processing" in the face of little empirical evidence, suggest that such is the case (Mahoney, 1974).

However, Psychology is showing growing concern for the experimental study of covert processes. This trend has been prompted by an ever increasing awareness that the study of human behavior is quite far removed from the notion of "pure S-R", or simple stimulus-response, connections (Bugelski, 1971; Kimble, 1973).

Cognition and Behavior Therapy Techniques

Several authors have recognized a need for Behavior Therapy to deal more directly with cognitive influences.

Mahoney (1974) states that Behavior Therapy is too narrowly restricted to overt events, and advises more "mediational" research that utilizes self-report and other subjective performance variables. He maintains that overt events are continuous with covert behaviors, e.g., "self-talk". Johnson and Matross (1975) agree that existing treatment methods are generally oversimplified, and should include recognition of the client's need for evaluative consistency, i.e., the client's own judgements about his behavior and the progression of treatment. They reaffirm that attitude and behavior change are related, with attitude based on both affective and cognitive components.

Affect and Cognition

Other authors have suggested also that a direct link exists between the affective or emotional components of a subject's treatment experience, and the cognition or meaning he ascribes to it (Tomkins & Izard, 1965; Das, 1969). Das (1969) has specifically discussed the persistence of affective or emotive meaning, and has suggested that its resistance to extinction increases as a function of the "primacy" of the experience. Though his observations lack a firm theoretical context, he has observed that acquired affective characteristics of nonsense syllables, as measured on the Semantic Differential, persist even after a subject learns to associate words conveying the opposite effect. Das (1969) recommends that the Semantic Differential be used

more to quantify qualitative experience. Qualitative measures of subjective emotional reactions may prove especially useful with punishment techniques.

Influence of Cognition in Aversion Therapy

In aversion therapy, cognitive dissonance is produced when a previously valued stimulus is associated with the unpleasantness of a noxious stimulus (Hallam & Rachman, 1972). An attitude change must then evolve to accomodate the new association, thereby achieving cognitive consistency. Discussion of relevant findings suggests relevance to an attitude-change component in aversion therapy.

Although little is known as to specific consequences that may result from cognitive dissonance, Hallam and Rachman (1972) summarize the variables that contribute to the greatest amount of dissonance in a typical aversion therapy situation: voluntary referral, a belief in the therapy method, and a high cost of social failure combining with highly noxious stimulation. They state further that these variables, though largely ignored in past investigations, are not incompatible with adherence to conditioning principles. Experimental literature on the influence of facilitory and inhibitory attitudes on classical conditioning implies that the conditioned response is a joint product of both cognitive and reflexive mechanisms (Hallam & Rachman, 1972).

Rachman and Teasdale (1969) have consistently observed a high degree of cognitive control in their aversion

therapy subjects. They conceptualize aversion therapy treatment as basically a manipulation of symbolic connections, recognizing that most behavioral disorders presented for treatment result largely from failures in cognitive control. They feel that covert changes that occur may be even causally related to overt behavior changes.

An example of subjects' use of cognitive control in conditioning is provided by Cook and Harris (1937) in an early study of verbal conditioning. They observed an increase in galvanic skin responses when subjects were warned of shock delivery, and a decrease when they received the opposite communication.

Other studies of the threat of electric shock have shown it often as effective as actual shock administration, with the response extinguishing immediately after removal of the threat (Hodges & Spielberger, 1966; Bridger & Mandel, 1964). Since covert processes appear to have an important role in the treatment process, some utilization of them in the actual treatment procedure may well constitute an advantage.

The Use of Imagery as Stimuli

The inclusion of symbolic events in aversion therapy methodology initially only took the form of symbolically-induced aversion, in preference to actual noxious stimulation, for humanitarian reasons. But more recent developments have used symbolic events as stimuli with aversive shock as well. Marks and Gelder (1967) administered electric shocks

to a group of transvestites and fetishists while they imagined themselves engaged in deviant sexual activity. Penile erections were measured and appeared strong just prior to treatment, but decreased while latency of deviant imagery increased. These effects were specific, with subjects being able to conjure up non-deviant imagery with relative ease. Attitudinal changes assessed also corresponded and were specific to treated stimuli.

Bandura (1969) sees much value in using imagery in aversion therapy with those behavior disorders in which symbolic events have high arousal potential. If covert processes are themselves drive-producing, then the behavioral chain is disrupted much earlier. Furthermore, he considers aversion therapy research as an opportunity to clarify the much disputed issue of the conditionability of thought processes. Additionally, a more inclusive "real life" representation of a stimulus should enhance the power of the treatment itself. On a more practical level, the use of imagery-produced stimuli would allow the representation of any stimulus event with minimal cost and effort.

Imagery and Experimental Limitations

Yet attempts to arrive at a satisfactory definition of imagery have been conceptually murky, with most criticized on the basis of circularity (Richardson, 1969; Segal, 1971). And strictly neurophysiological interpretations are generally too unsophisticated to be adequate (Bugelski, 1971).

The major disadvantage in experimentally investigating imagery processes is difficulty controlling relevant parameters. Paivio (1969, 1971) has probably done most to place imagery within the realm of empirical study, while demonstrating the significance of imagery processes in meaning, language and memory. He asserts that the term "meaning" embraces different levels of covert activity or processing. He explains further that while verbal language requires a sequential processing, imagery processing is parallel, and that they represent differing dimensions of stimulus material. Saltz (1971) has further suggested that the use of a stimulus compound (word plus image) may produce an increase in dimensionality that may correspond with increased stimulus distinctiveness.

Paivio (1969) further states that latency is the most appropriate measure for the study of imagery. And usually the subject's own verbal report of conscious experience remains still the basic measure upon which latency of imagery is based.

A less serious disadvantage is the apparently wide range of individual differences in imagery production, and the necessity of adding a limiting criterion to the subject selection procedures, i.e., demonstrated ability to produce images.

Betts (1909), in an early investigation of individual differences in imagery production in a large sample of college students, found a large variance in content and

function, and reported a 5-10% rate of subjects unable to produce imagery. He failed to find evidence that imagery is related to educational performance or intelligence. Perhaps this no-imagery percentage approaches a representative percentage in the more general population.

Horowitz (1970), in a more recent discussion, elaborates on variables affecting imagery within an experimental context. He sees the vast range of individual differences as reflecting differences in ordinary thought styles, but cites negative evidence of personality correlates with the use of an extensive battery (Goldberger & Holt, 1961). He further states that imagery appears facilitated when external signals or stimulation are absent, a notion consistent with signal detection investigations of imagery phenomena (Segal, 1971) and sensory deprivation experiments in which increased imagery resulted (Bexton, Heron & Scott, 1954; Freedman and Greenblatt, 1960). He notes further that volitional control of images diminishes as imagery progressively emerges, with imagery resembling an altered state of consciousness. This altered state presumably allows an increase in primitive, uncensored thought patterns.

Other evidence cited by Horowitz (1970) suggests that drugs may enhance image formation (Freedman, 1968). Variables that accompany drug use, and appear related to increase imagery ability, include a loss of concentration and short-term memory, and impaired ability to sequence thoughts via meaningful associations (Paul, 1964). Also,

increased passivity with intermittent elation, as well as body-image changes may act to influence a more primitive thought organization (Linton & Langs, 1962). Thus it might be expected that drug users will have more frequently occurring imagery, with its content being more internally derived and more readily influenced by primitive wishes and fears, than by reality-based volitional control.

However, the experimental study of imagery will not likely escape its experimental limitations. Subjects experiencing imagery are likely to label their experiences differently (Horowitz, 1970). Additionally, demand characteristics of the experiment itself, which are vicariously conveyed, are likely to generate false positives (Orne, 1962). Likewise, false negatives may result from the fleeting quality of some images, or a lack of attention and memory, as well as from individualized subjective criteria of vividness and durability (Horowitz, 1970).

However, Bakan (1967) and Maher (1966) attempt to relieve this experimental dilemma by asserting that the experimenter's knowledge of the individual meanings of subjects' reports should be sufficient and acceptable within the framework of Clinical Psychology. It appears that scientific methodology is somewhat pressed to accommodate such observations (Holt, 1964).

Imagery and Improved Stimulus Generalization

Droppa (1973) recommends specifically the symbolic representation of stimuli in the aversion therapy treatment of narcotic addiction. He contends that the use of stimulus imagery should allow the representation of a wider range of stimulus cues, that approaches more the natural environment, thus allowing for more stimulus generalization. Gibson (1969) has discussed and distinguished between two types of stimulus generalization: (a) a simple and concrete phenomenon in which a subject learns to make a specific response to a conditioned stimulus, and responds similarly to a non-conditioned but generalized stimulus; and (b) a more abstract, covert process that determines the overt response transference described in "a".

Additionally, in the absence of demonstrable physiological reactivity, it can scarcely be assumed that an overt approach response to visual drug stimuli, e.g., slides, will occur. This particularly applies to the methadone-maintained population of drug users to be employed in the present investigation. The pharmacological properties of methadone, i.e., the elimination of physiological craving and the blocking of euphoric effects, make it more probable that the persistence of drug use is cognitively based and under the control of conditioned stimulus cues. The use of imagery-produced stimuli then, would insure subject responsiveness as well as allow for increased stimulus generalization.

Punishment versus Avoidance Training

Most accounts of aversion therapy have not explicitly employed the punishment paradigm. This hesitancy has probably been generated by the "myth" of temporary response suppression in spite of numerous examples to the contrary (Rachman & Teasdale, 1969; Solomon, 1963). Azrin and Holz (1964) see the permanence of punishment effects as a function of the intensity of the punishing stimulus. But with human subjects, there is most probably a low ceiling for punishment intensity. Additionally, Melvin (1971) has observed that punishment sometimes results in response facilitation. Church (1963) provides a list of response-topographical conditions that may precipitate such results. Still another disadvantage that is very serious from a therapeutic standpoint, is the failure of the punishment paradigm to provide for the establishment of a satisfying response alternative. Furthermore, since the essence of punishment procedures is the reduction or elimination of the positively reinforcing properties of a given behavioral response, it follows that punishment may be somewhat inappropriate for this methadone maintenance population, in the absence of clearly euphoria-producing or craving-eliminating properties of drug consumption while on methadone.

Seligman and Johnston (1973) have suggested that avoidance learning utilizes the more cognitive functions of expectancy and preference, as well as the classical

conditioning of emotion or fear. And since the threat of shock is sometimes as effective as actual shock administration (Hodges & Speilberger, 1966; Bridger & Mandel, 1964), the use of an avoidance paradigm appears desirable since optimally it would involve fewer shocks. However, Rachman and Teasdale (1969) have observed that in the successful employment of the avoidance paradigm by Feldman and MacCulloch (1965, 1966) with sexually deviant behavior, the obtained decrease in the target behavior may have been an artifact of the nature of the response under study, i.e., penile erections to deviant sexual stimuli. Since anxiety has pronounced inhibiting effects on sexual responses, the generalization of their technique's effectiveness to the treatment of other responses is questionable.

Since the avoidance paradigm involves the classical conditioning of anxiety to the conditioned stimulus, it is also important that the target behavior not be motivated and maintained by anxiety and reinforced by anxiety reduction. Again, the pharmacological properties of methadone, and the nature of the target behavior with this population seemingly eliminates this problem as a major consideration. Conditioned anxiety, resulting from counter-conditioning, would not be expected to show a motivating effect on drug-seeking behavior.

Personality Factors

Many characteristics manifest by addicts suggest the label "sociopathic". Addicts oftentimes demonstrate periodic

thought disorder, antisocial attitudes, depression and suicidal tendencies (Vaillant, 1966). Vaillant (1966) suggests that the addicts' sometimes severe, yet transitory psychopathological behavior is due to the precipitating turmoil, immaturity and emotional lability characteristic of urban addicts.

Discussions that may relate here to the peculiarity of the subject population under present study, suggest that sociopaths have characteristically lower levels of anxiety, and are less amenable to conditioning procedures (Hare, 1970; Lykken, 1957; Quay, 1965). Additionally, sociopaths show tendencies to attenuate stimuli, and demonstrate restricted ranges of autonomic reactivity, as well as limited emotional arousal.

However, Hare and Thorvaldson (1970) suggest that the presence of incentives may be a critical factor in the sociopaths' responsivity. They found no differences in detection thresholds and tolerance for shock without incentives, a finding contradictory to earlier findings. When incentives were introduced, however, a clear difference emerged. Sociopaths were able to tolerate significantly higher levels of shock than normals. Schmauk (1970) also found that with the use of an avoidance procedure, sociopaths were significantly lower than normals in anticipatory arousal, under conditions of both physical punishment and social punishment. However, when a tangible response cost (loss of money) was introduced, the sociopaths performed at

a level very close to that of normals. Thus the inclusion of incentive may be critical in the conditioning of a subject population with sociopathic tendencies.¹

¹This study does not control for the therapeutic effects of incentive with this population. Methadone maintenance guidelines provide that clients earn take-home dosages of methadone through sustained abstinence from illicit drugs. Another study is being conducted simultaneously to evaluate the program's "take-home policy", based on the frequency of drugs detected by urine surveillance.

Statement of the Problem

Aversion therapy techniques have appeared effective in the modification of a number of behavioral disorders. Yet observations of the aversion therapy treatment of narcotic addicts have been limited to case studies. Covert processes appear to have an important role in treatment, and there is some indication that covert imagery may provide better stimulus cue representation, and therefore improved generalization and more permanent therapeutic effects. This variation in technique, as well as the effectiveness of aversion therapy itself, has yet to be empirically demonstrated in a controlled study.

The population of interest is composed of opiate addicts whose physiological addiction to illicit drugs has been eliminated through daily administration of methadone. Thus the focus is drug-seeking behavior under the control of conditioned stimuli, since methadone also blocks euphoric effects. If this behavior is reduced by means of aversion therapy procedures, the rehabilitative effects of methadone will be enhanced, and may encourage increased community interest and support for a nationwide network of methadone maintenance programs.

This investigation compared the effectiveness of:

(a) methadone maintenance plus aversion therapy, and (b) methadone maintenance without aversion therapy. The control group (b) consisted of volunteers for aversion therapy who were placed on a waiting list for aversion therapy treatment.

Treatment effects were studied both between and within experimental groups. Drug usage, measured by urinalyses performed on random urine samples, was compared for the two groups pre- and post-treatment. Pre- and post-treatment scores on the Semantic Differential were compared between groups to assess attitudinal change. The long-term effect of the treatment was studied by a comparison of urine samples across a six months period immediately following treatment. Also, during the treatment process, latency of the production of drug stimulus imagery, and the latency of avoidance response imagery was measured for each subject receiving aversion therapy.

Hypotheses

The following predictions were made:

1. The aversion therapy treatment group (Group 1) will show more decreased drug-seeking behavior relative to the control group (Group 2) at six months followup, as measured by the frequency of drugs detected by urinalyses performed on random urine samples.
2. Group 1 will show less positive affective arousal to drug stimuli, as measured by ratings on the Semantic

Differential, indicating positive feelings about drugs, relative to Group 2 immediately after treatment.

Within-treatment process variables were predicted to show the following changes:

3. For Group 1 subjects, latency of drug imagery production will increase across trials.
4. For Group 1 subjects, latency of production of the avoidance response will decrease across trials.

Method

Subjects

The subjects were 18 opiate-addicted clients at the University of Alabama in Birmingham Methadone Maintenance Program who, in addition to Federal Guideline requirements for methadone treatment,² met the following criteria:

1. The patient had been maintained on methadone for a minimum of three months prior to the experimental treatment phase.
2. Based on urine surveillance data, the patient demonstrated a high frequency of drug seeking behavior, i.e., at least a 25% rate of drugs detected in urine samples over a three month period just prior to treatment.
3. The patient demonstrated the ability to produce imagery by means of a neutral sample and self-report (see appendix A).
4. After having been informed of the general nature of the study, the patient agreed to participate and signed a consent form (see appendix B).

²Eligibility for methadone maintenance is established through documentation of a two-year period of addiction to an opiate drug. Prospective clients are required to provide supporting statements signed by two persons, and present medical evidence of physiological withdrawal.

Apparatus

The major experimental apparatus was a Farral six-volt shock delivery unit. A stopwatch and recliner were also used.

Measures

Urinalyses

Urine samples were collected on randomly determined days once weekly, as part of the program's standard operating procedure. Urinalyses were done by thin-layer chromatography at Medical Laboratory Associates.³ Urine was initially screened for the presence of opiates, barbiturates, methadone and amphetamines. If a positive reaction occurred in a category other than methadone, further screening procedures were then employed. Reliability of this procedure is .98.

Semantic Differential

The Semantic Differential was used as a self-report technique (Snider & Osgood, 1969), and was administered within two days pre- and post-treatment phase for all subjects.

³This agency is licensed under government control by the Center for Disease Control, Atlanta, Georgia.

Ten pairs of adjectives, considered by the experimenter to have high face validity, were used to assess meanings of drug stimuli along dimensions representing three main factors, i.e., evaluation, potency and activity (Snider & Osgood, 1969). Appendix C contains the list and instructions.

According to Snider and Osgood (1969), any semantic concept can be adequately described using bipolar word-adjective pairs representing these three dimensions. Factor analytic research has determined that exhaustive lists of descriptive adjectives generally cluster around these three main factors.

These authors repeated 40 out of 1000 bipolar adjective pairs in a procedure used to assess reliability of the Semantic Differential technique. Reliability was determined to be .85.

Latency

Latency of response was measured in seconds for the experimental group during trials. These were measured as the number of seconds elapsing between the beginning of instructions, or the occurrence of the signal to begin imagery, and the beginning of the subject's verbalization (see appendix D).

Procedure

The patient's eligibility for serving as a subject was determined and the consent form signed during the initial interview. At that time, the subject was randomly assigned to one of the two experimental conditions. Subjects in both groups were administered the Semantic Differential pre- and post-treatment. Subjects assigned to either of the two experimental groups were familiarized with the shock delivery apparatus, and a pre-session trial was conducted to individually calibrate shock level between 1 and 4 milliamperes.

Subjects in the aversion therapy group (Group 1) were asked to describe their personal repertoire of drug-seeking behaviors in as much detail as possible, leading up to the actual ingestion of drugs. After a much detailed account had been given, specifying all potential cues, an imagery sequence was decided upon with the patient and listed. During the same interview, alternate and desirable goal-related activities were discussed and decided upon with the subject. Group 1 subjects were then instructed to imagine the sequence of drug-seeking behaviors beginning with step one, as the experimenter described the to-be-imagined scene. "Clear imagery" was defined to the subject as that point at which colors and objects are vividly perceived. Subjects began verbalizing their descriptions of their perceptions as soon as imagery was clear. A 1-sec. shock occurred 5 sec. after the subject had signaled clear imagery by verbalizing.

The subject was then instructed to imagine the next step in drug-seeking. A bell signaled a 30-sec. avoidance interval 5 sec. after the subject had signaled clear imagery of that step. A 1-sec. shock was avoided if the subject switched drug imagery to goal-related imagery within the 30-sec. interval. Clear imagery of the goal-related behavior was also signaled by the subject's immediate verbalization of his perception. The inter-trial interval was 60 sec. The ordering of drug stimuli was randomly determined every five trials. Latency of the production of drug stimuli is defined as the amount of time between the beginning of instruction to begin imagining a step, and the beginning of the subject's verbalization. The latency of the avoidance response is defined as the amount of time between the occurrence of the bell signal, and the beginning of verbalization of the goal imagery. Latencies were measured with a stopwatch.

Subjects received ten trials with randomly ordered components (see Table 1). A coin toss determined which component was first on each trial, classical or avoidance, before treatment began. There were 7-10 treatment sessions.

Subjects in the methadone maintenance only group (Group 2) did not receive aversion therapy during the experimental treatment phase, but were offered treatment at the experiment's completion. Group 2 subjects constituted a waiting-list control while they continued in methadone maintenance treatment.

Table 1.

Learning Components on an Aversion Therapy Trial

Classical Conditioning-Punishment Training		
S produces drug imagery and verbalizes when clear	5-sec.	1-sec. shock

Discriminated Avoidance Training		
S produces drug imagery and verbalizes when clear	5-sec.	bell
	S produces goal imagery	avoids shock
30-sec. avoidance interval	S fails to produce goal imagery	receives 1-sec. shock

Confidentiality

Urine surveillance data from patients' records was examined pre- and post-treatment, altogether for a period of nine months. Latency of response measures were taken during trials. The Semantic Differential was the only written scale employed.

All measures are under the protection of Section 408 Drug Abuse Office and Treatment Act, 1972, as amended by Pub. L. No. 92-282, 21 U.S.C. 11-75, for the maintenance of confidentiality of clinical records of drug abuse patients. Current record assembly, storage and access procedures conform to this law.

When data were analyzed, all identifying information was removed to protect the identification of the client.

Results

An analysis of variance for simple randomized groups was performed on drug-seeking behavior frequencies, measured by urinalyses conducted on random urine samples, for Group 1 and Group 2, immediately after treatment, and at three and six months followup.

Differences between the groups immediately after treatment were nonsignificant, $F(11)=.53$, $p > .05$. Differences between the groups were nonsignificant also at three months followup, $F(11)=.49$, $p > .05$. Differences between the groups remained nonsignificant at six months followup, $F(11)=.016$, $p > .05$. Mean per cent "dirty" urines for Group 1 and Group 2 during baseline and at the end of followup are shown in Figure 1.

An additional control consisted of a self-selected, non-random group of eligible non-volunteers, and was included in post-hoc comparisons of drug-seeking behavior frequencies. The comparison of frequencies for the three groups (Group 1, Group 2 and the non-volunteer group) employed the Kruskal-Wallis Analysis of Variance by Ranks. Overall differences were significant, $H(15)=57.5$, $p < .01$. A Mann-Whitney U test further compared frequencies between volunteers and non-volunteers for the experiment (see Figure 2). The obtained

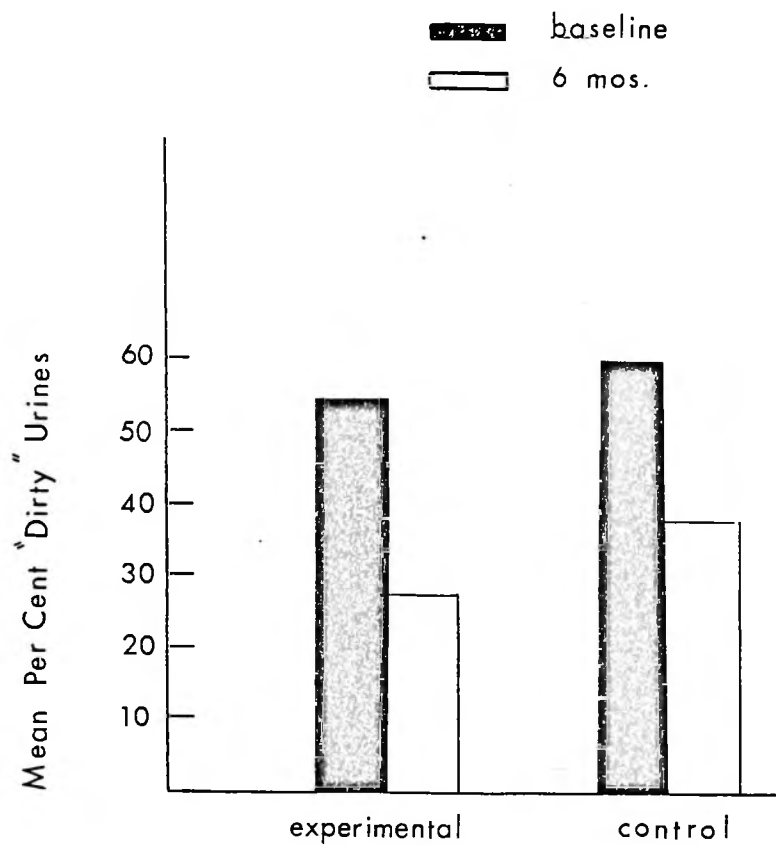


Figure 1. Mean per cent "dirty" urines for experimental and control subjects.

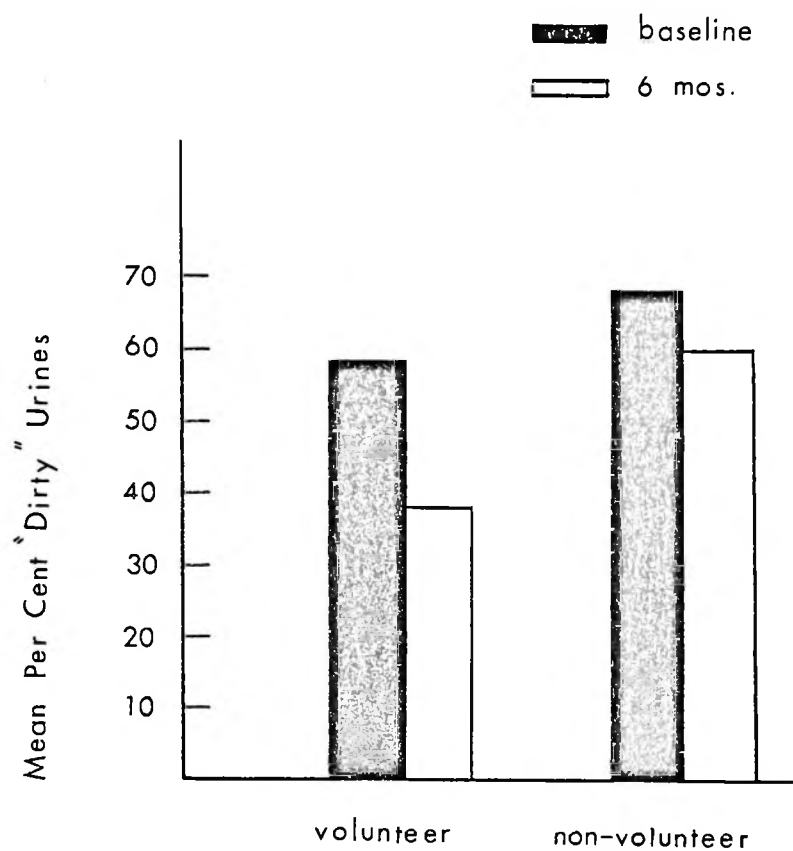


Figure 2. Mean per cent "dirty" urines for volunteer subjects and non-volunteers.

\underline{U} was significant, $\underline{U}(15)=11.5$, $p < .05$. A \underline{t} test of these differences between means for volunteers and non-volunteers was also significant, $\underline{t}(16)=2.43$, $p < .05$.

Three of the six subjects in Group 1 that received aversion therapy, showed a decrease in mean drug seeking to a level below 25% "dirty" urines. Two subjects in Group 1 had rates equal to or higher than baseline rates. These data are shown in Table 2.

An analysis of variance for repeated measures was performed on pre- and post-treatment Semantic Differential scores for Groups 1 and 2 (see Table 3). Post-treatment decreases were significantly greater for Group 1 than for Group 2, $\underline{F}(11, 12)=47.14$, $p < .01$.

For Group 1 subjects, mean latency for drug imagery production increased from 16.96 on the first trial to 17.09 on the last trial. A \underline{t} test of the difference between these means was nonsignificant, $\underline{t}(11)=.06$, $p > .05$. Mean latency of the avoidance response, however, decreased from 18.7 on the first trial to 12.06 on the last trial. A \underline{t} test of the differences between these means was significant, $\underline{t}(11)=2.12$, $p < .05$, indicating that an avoidance response was conditioned.

Table 2.

Mean Per Cent "Dirty" Urines for Experimental Subjects

Subject	Baseline	6-mos. Post-treatment
S-1	.72	.60
S-2	.50	.85
S-3	.40	.22
S-4	.45	.74
S-5	.50	.00
S-6	.55	.00

Table 3.

Mean Scores on the Semantic Differential
for Experimental and Control Subjects

Experimental (Group 1)		Control (Group 2)	
pre-treatment	post-treatment	pre-treatment	post-treatment
32.16	41.5	31.66	30.5

Discussion

Limitations of the Study

These results do not show evidence of overt behavior change through observation of the main dependent variable, per cent "dirty" urines accumulated over a six month period following treatment. Hypothesis 1, which predicted more decreased drug-seeking for Group 1 subjects, is not supported by these data. However, hypothesis 2, which predicted less positive affective arousal to drug stimuli for Group 1 subjects, is supported by decreases in scores on the Semantic Differential that represent the positive valence of drug stimuli. This administration of aversion therapy then, may have produced a cognitive or attitudinal change in the absence of sustained drug-seeking behavior change.

Conclusions should be guarded, however, since the experimental portion of this study employed a small N, i.e., the comparison between the aversion therapy and control groups. The additional comparison between volunteer and non-volunteer clients was necessarily based on a non-random selection and is therefore quasi-experimental. Obviously, the non-volunteer group may have differed in their motivation to reduce drug-seeking, however Figure 2 reveals little difference in mean per cent "dirty" urines during the

baseline period. Observed differences in reduced drug-seeking between these subjects and those that volunteered for the experiment, at six months post-treatment, suggest that motivational factors may have interacted systematically with the treatment.

This study may be regarded as a preliminary step to further investigation of the effectiveness of aversion therapy with this specific population of addicts, who continue their use of illegal drugs while receiving methadone treatment, and who are in violation of program guidelines. While the need for controlled study of treatment for this highly persistent "problem" behavior has become particularly acute, the set of characteristics that typifies this population has led to much concern and difficulty with experimental rigor.

Population Characteristics and General Treatment Resistance

Traditionally, narcotics addicts have been characterized as "treatment resistant", and several discussions of high drop-out and recidivism rates have appeared in the literature (Vaillant, 1966; Connell, 1970). Apparently, this problem has been the source of much discouragement for interested clinicians, and the result has been the accumulation of descriptive, case-study observations of a particular approach (American Medical Association, 1969) and very few empirically controlled and comparative studies (Glaser, 1966).

Therapist-client interaction in this study was of paramount importance to client cooperation. High levels of rapport were necessary to encourage and maintain client interest and motivation for treatment. Since monetary incentives were deemed inappropriate and could have been the source of interfering, defeating attitudes toward treatment, they were not included. Ethically, the use of aversion therapy should, under most circumstances, be predicated on internally-derived motivation for behavioral change.

Ethical Considerations

Other ethical issues arose and were dealt with uncompromisingly. The requirement of full disclosure of experimental purpose in procuring consent, made it necessary that a concrete conceptualization of the addiction process be integrated with a thorough explanation to subjects of the mechanics of aversion therapy, i.e., shock administration (see appendix E). With the population in focus here, educational levels and verbal skills were generally low. The communication of basic learning principles, as they relate to the addiction process, became fundamental to the client's thinking about his drug-seeking problem and his volition to undergo aversion therapy treatment.

Motivational Factors and Selection for Treatment

The thought pattern and life style of the addict have been frequently characterized by impulsivity and short-range foresight (Cockett, 1971). Vaillant (1966), in an intensive twelve-year survey of New York addicts, has observed several traits almost invariably associated with character disorders: anti-social attitudes, periodic thought disorder, underachievement, immaturity and an inwardly-directed aggressiveness. He has concluded that many urban addicts manifest a sometimes severe, yet transitory, psychopathological behavior that is due to precipitating stress and emotional lability. In this study, the capacity of a potential subject for serious commitment to a series of regularly scheduled treatment sessions was often dubious. Aside from the eligibility criteria outlined in the procedure section, other subject selection criteria were vague and subjective. These were based largely upon the inquiry of potential subjects regarding treatment. The development of improved assessment during this selection phase, for prognostic use, would be an important contribution to further study. Since many personality variables seem relevant, it may be highly useful to predict success with aversion therapy through more specific selection criteria.

Of 32 eligible clients, only 15 volunteered for participation in the experiment. Three of these 15 (20%)

were drop-outs before the study began. Before random assignment and written consent, all subjects were given the rationale for aversion therapy treatment, using everyday examples of habit formation and conditioning. They were then shown the experimental apparatus and experienced shock delivery. These events were combined with a discussion of drug abuse type and frequency, and subjects' level of commitment to meeting scheduled sessions. Subjects then completed rating forms and were told to "wait" for treatment. This "waiting list" control was a group assignment control. Control subjects did not know they were controls per se, and were expecting treatment. On the other hand, non-volunteers were exposed only to highly visible placards placed in the corridor to suggest treatment, and at no time made contact with the experimenter. It might be assumed that these non-volunteers made a passive rejection of treatment.

A comparison of drug-seeking behavior frequencies between these non-volunteers and volunteer subjects (experimental and control groups combined) revealed significant differences. Volunteer subjects improved relative to the group of eligible non-volunteers. This difference is probably partially due to nonspecific expectancy and treatment variables that resulted from the use of the waiting list control. Nevertheless, these data combined with some naturalistic observations, suggest that personality, values and motivational levels differ in important ways among addicts with similar abuse patterns.

The Need for a Classification of Addictive Behaviors

Lykken (1957), has discussed the inadequacy of the concept of psychopathy to designate at large the group of behavior disorders characterized by impulsiveness, anti-social tendencies and self-destructive behavior patterns. He has observed that clinical assessment in this area is highly subjective and unreliable, with only limited practical utility.

Jaffe (1970) has more specifically discussed the heterogeneity of the drug abuse population, and has recommended the development of a "typology" of drug abuse, in order that the treatment best suited to a "type" of abuser be identified.

The comparison made between non-volunteers and volunteers has extended implications for methadone maintenance program management. Besides providing some indication of overall effectiveness of methadone administration, these data suggest that perhaps the mere prospect of involvement in aversion therapy treatment produces some improvement in program-delinquent behavior for some clients, who have at least marginal levels of motivation. Behavioral commitment itself, to a treatment regime as highly structured and conceptualized as aversion therapy, may be an important prognostic indicator, providing clinicians with a meaningful sub-classification of addictive behavior.

Jaffe (1970) has further recommended that a "typology" be accomplished through increased focus on the social conditions surrounding individual cases of abuse. In this study, adequate control of outside influences was difficult to achieve despite the fact that many situational variables appeared relevant, e.g., employment (legal versus illegal), number of addicted friends and number of arrests. Although no firm statement can be made regarding the weight of these variables, it is plausible that they may have interacted systematically with the treatment administered here. A summary of individual situational variables for those subjects who received aversion therapy is given in Table 4.

Only three (S_3 , S_5 , S_6) out of six experimental subjects showed a decrease in the frequency of drug-seeking to a level below 25% "dirty" urines. Of these three, two (S_5 , S_6) had had up to two years of college, and were gainfully employed, using earned income to buy drugs. Both of these subjects showed drug-seeking behavior reduced to zero at the end of the follow-up period (see Table 4).

Of the other three (S_1 , S_2 , S_4) less successful experimental subjects, two (S_2 , S_4) had follow-up rates equal to or higher than baseline rates (see Table 4). These two subjects intermittently received money from illegal activities as income during the course of the experiment. It appears very likely that strong environmental contingencies were counteracting treatment effects for these subjects, e.g., money and social approval are powerful reinforcers of

Table 4.

A Summary of Experimental Subject Personal Data

- S - 1. 33 year-old; divorced; children; 10th Grade education; several arrests; a conviction; previous detoxification attempt; unemployed.
- S - 2. 24 year-old; unmarried; GED; conviction; previous detoxification attempt; unemployed-gambler.
- S - 3. 23 year-old; married; expelled from elementary school GED; conviction; no previous detoxification attempt; unemployed.
- S - 4. 28 year-old; unmarried; high school education; barber's college (18 mos.); previous attempt at detoxification; unemployed-gambler.
- S - 5. 26 year-old; divorced; 2 years junior college; previous arrest; conviction; employed (railroad); no previous detoxification attempt.
- S - 6. 27 year-old; 2 years college; no arrests; previous detoxification attempt; employed (government).

drug-procuring behaviors. Although measures of possible treatment variables such as these were not included, naturalistic observations suggest that those addicts who tolerate at least moderate levels of structure in their lifestyles, e.g., employment and education, may have regarded treatment more seriously than their counterparts (S_1 , S_2 , S_4), who showed a higher incidence of interfering behaviors. For example, these latter subjects sometimes were late or absent from sessions. These variables may be strong predictors of success in aversion therapy and need to be measured in further investigation.

Conditioning and Related Studies of Psychopathy

Many of the characteristics of addicts noted by Vaillant (1966) and Cockett (1971) appear characteristic of psychopaths in general (Brodsky, 1977). It is plausible that psychopathic tendencies may have retarded the conditioning process in this study, i.e., more trials may have been needed to establish the degree of conditioned emotional response necessary to affect actual behavioral suppression. For subjects S_2 and S_4 in particular, ten treatment sessions may have been too few to counter-condition well-learned positive responses to drug stimuli. Hypothesis 3, which predicted increases in latency for drug stimuli across trials, was not supported. Increases were small and nonsignificant.

Hare (1970) has observed slower rates of conditioning among psychopaths. This phenomenon appears specific to

learning tasks that involve the avoidance of punishment, since they do perform well in a variety of other learning situations (Hare, 1968). He has associated the psychopath's relative difficulty in avoidance learning with an observed lack of autonomic arousal, as measured by GSR reactivity, and a consequent failure to adequately condition an anticipatory anxiety response to punishment. Hare (1965) has further observed that for psychopaths, the temporal gradient of fear arousal and response inhibition is steeper than for normals. Fear elicited by cues associated with punishment decreases as punishment becomes more temporally remote. And since fear mediates response inhibition, the psychopath is expected to have more difficulty inhibiting responses when electric shock is not imminent.

Additionally, psychopaths have demonstrated higher detection thresholds for electric shock (Hare, 1968). Although specific reasons for this difference have been left to speculation, there is agreement that psychopaths suffer from sensory deprivation and a tendency to attenuate stimuli (Hare, 1970; Quay, 1965). Although shock levels were individually calibrated for subjects in this study, important differences may exist in the course of habituation to shock as suggested by Hare's (1968) study.

Other studies have suggested that psychopaths are amenable to avoidance conditioning when incentives are used (Hare & Thorvaldson, 1970; Schmauk, 1970). This present study was concurrent with the use of a methadone "take home"

policy, provided by program guidelines as an incentive for abstinence. The therapeutic value of this privilege with this population is being investigated in another study, and was not controlled for in this study.

Hare's (1970, 1968, 1965) observations were made with a select population of inmates who had been incarcerated. Thus the generality of his findings to the population of addicts under study here needs further substantiation.

Advantages of the Procedure

In addition to a counter-conditioning objective, the procedure used here had the added objective of enhancing the client's ability to discriminate, monitor and change responses to drug stimuli. Besides the subject's perception of painful stimulation in close temporal sequence with highly personalized drug imagery, subjects also received alternating experiences with images of positive goal-related activities. For most subjects, discussing and imagining these goals were altogether new behaviors. And Hare (1970) has suggested that novel stimuli are attended to better by psychopathic personality types. These subjects at least may have benefitted from being presented with an occasion to think about, formulate and express goals.

It is noteworthy that volunteer subjects employed in this study displayed generally cooperative behaviors and were quite receptive to treatment by aversion therapy. For

example, subjects made efforts to adhere to regular scheduling, and were generally accountable for missed appointments or tardiness.

Most of the experimental subjects verbally expressed enthusiasm about the technique during the course of treatment, and spontaneously gave positive progress reports relating changes in their self-control responses to drug-taking urges. These more covert behaviors and self-reports were not recorded and quantified, but nevertheless seem to support the feasibility of the technique among the population of addicts employed.

The utilization of such self-reports from subjects might constitute an additional advantage, and might be best achieved through structured self-monitoring by the addict of the frequency of drug urges and drug-taking variations during the course of treatment. Such a technique might enhance the generalization of the treatment to the addict's environment, as well as provide more refined measurement of the relevant dependent variable, i.e., drug-taking behavior.

Also based on within-treatment observations, the use of imagery appears to be a desirable means of representing stimuli. Effectively produced imagery was accompanied by observable motoric activity, e.g., flinching, smiling, and nervous movements. The use of videotape equipment, galvanic skin response recordings, or muscle activity recording devices, e.g., EMG myotrainer or biofeedback apparatus,

might be very helpful in the quantification of such observations.

Subjects had some difficulty giving detailed, objective and narrative descriptions of their images as requested and outlined in the procedure. Most often they resorted to conversant monologues appropriate to the imagined scene. However, this mode of responding appeared to have reflected an extremely high level of personal involvement in the imagined scene.

The use of an alternating sequence of drug and non-drug imagery appears to have facilitated stimulus discrimination, thereby producing the cognitive or attitudinal change reflected by decreased scores on the Semantic Differential (Hypothesis 2). Also, Hypothesis 4 is supported by latency data. Decreases in latency for the production of the avoidance response were statistically significant across trials.

These latency data suggest that the avoidance component was the more effective one. At least it appears that avoidance learning may have more consistently affected the observed cognitive change. Since some authors have criticized the frequent use of Pavlovian procedure in Behavior Therapy as a tenuous form of learning, this observation may yield support for the preferential use of an avoidance paradigm.

Subject responsivity was enhanced by the procedure used here, in that the avoidance response required was an

active one. Consistent with Hare's (1970) theory regarding psychopathic learning tendencies, it might be expected that psychopaths would be more apt to emit new, active responses than they would be to inhibit old, well-learned responses. Furthermore, these avoidance responses were intimately connected with personal experiences and goals. Verbalization of them should have had a therapeutic impact (Mahoney, 1974). Mahoney (1974) has discussed the role of "private monologues" in emotional experience regulation and the development of self-control.

Complexity of Drug-seeking Behavior Change

Perhaps a more realistic goal for this study would have been the production of certain changes in cognition related to drugs. With this particular population, aversion therapy might be better understood in terms of its capacity for generating cognitive change as a step preliminary to overt behavior change.

Moreover, drug-seeking behavior change may be considerably more complex than was anticipated, and might occur on many levels. For example, changes in social-verbalization rate about drugs (bragging drug talk), the frequency of fantasy thoughts about drugs, and the number of drug-using friends need to be studied as dependent variables.

Additional measures might include the assessment of vocational maturity, through a detailed survey of work-related interests and attitudes, and other attitude measures.

Subjective ratings of treatment progress specific to individually defined goals and habit structures, may add also to within-treatment observations of the conditioning process.

Cognition and the Application of Learning Principles to Humans

Cognitive changes have generally received increasingly more attention in the literature (Kimble, 1973; Mahoney, 1974; Johnson & Matross, 1975). Traditionally strict Behaviorism has shifted to include mentalistic concepts related to behavior change (Kimble, 1973). Historical emphases on operationism, simplicity, lawfulness of behavior and generalization has led to a neglect of individual differences. First compromised by recognition of the "intervening variable", more recent developments in the sciences, e.g., neurophysiology and biogenetics, make this past trend even more untenable.

Many complexities are involved in the clinical application of laboratory-derived learning principles. Several writers have expressed concern that many variables are important to the Behavior Therapy application of learning principles, which often seem too simplistic to explain human behavior change.

Staats (1970) has formulated a recent approach to human problems of adjustment. His "social behaviorism" emphasizes that principles of learning should be incorporated

into a more general theory of personality that takes into account various motivational aspects of human behavior.

Saltz (1973) has also discussed the application of laboratory-derived learning principles to complex human behavior. He has observed that marked differences exist between rates of discrimination learning for rats and for humans, with children performing at rates in between. He considers a stage theory interpretation, suggesting that the degree of fragmentation of cognitive representation decreases with age. Although there appears to be one set of processes across organisms, qualitative differences do seem to exist and may reflect developmental changes (Saltz, 1973).

In a related discussion, Maher (1972) states that the purpose of animal laboratory experimentation is the generation of suggestions for generalization to human behavior. He sees the relevant issue for behavior therapists as one of "therapeutic economics", or the continued development of practical treatment schemas.

Other authors have pointed out the dissimilarity between the treatment setting and the learning laboratory as a serious shortcoming of Behavior Therapy techniques in general (Bregar & McGaugh, 1966). "Behavior Therapists do many things extraneous to 'conditioning'" (Bregar & McGaugh, 1966). Rachman and Eysenck (1966), in defense of Behavior Therapy, have acclaimed it as useful, and an encouraging development in generating more specific learning hypotheses.

Although they recognize a pressing need for more developmental work and study, they proclaim optimism nevertheless.

Considerations for Further Research

It follows that in a developmental process, much useful information can be gained from therapeutic failures as well as from successes. In this study, hypothesis 1 was not supported and aversion therapy did not produce a change in the main dependent variable, mean per cent "dirty" urines. "Though the analysis of failure is not a happy occupation, it may be most instructive, particularly in those instances where a broad category of behavior has withstood methods that ought to work," (Hunt & Dyrud, 1968, p. 145).

Some authors have specified "resistance to direction" as a relevant and potent factor, reducing overall effectiveness of Behavior Therapy techniques. They suggest extended quantification of the resistance phenomenon, i.e., more detailed measurement of patient-therapist interaction.

Weinberg and Zaslove (1963) have discussed their observation of "types" of resistance that occur within the psychotherapeutic setting:

1. Direct - resulting from a variation in alertness (particularly with imaginal states) and cooperation;
2. Indirect - reporting late or failing to report for sessions;
3. Related to the Laboratory Setting - intrusion of outside events and preoccupation.

D'Alessio (1968), in a more comprehensive discussion of the resistance phenomenon, lists several examples of situations likely to produce resistance:

1. The patient may have difficulty complying with the direction of authority figures;
2. The patient may expect a more personal interaction with the therapist and may see the technique as a barrier;
3. The patient may seek the therapist's sympathy for symptoms and may be less motivated to alleviate them;
4. The patient may want to verbalize and impress the therapist with intellect, insights and capabilities.

D'Alessio (1968) recommends the concurrent use of Behavior Therapy and more traditional psychotherapeutic methods.

In this study, the use of imagery with this population may have resulted in these types of interferences. More refined measurement of the patient-therapist interaction in treatment should further elucidate the role of these variables.

Recommendations

It appears that only a comprehensive and liberalized treatment approach to the use of aversion therapy with this type population will yield promising results. Where numerically feasible, further study of aversion therapy with this population should derive predictor variables for success.

It is further recommended that:

1. Subjects be more carefully selected according to situational variables favorable to drug-seeking behavior change;
2. The treatment phase be extended to include 5-10 more sessions, to insure a maximal degree of conditioning with this population;
3. The follow-up period include "booster" sessions administered at progressively extended intervals to help sustain the effects of conditioning (Maletsky, 1977);
4. "Fading" procedures be used to facilitate the generalization of conditioning as used in other conditioning therapies, e.g., biofeedback.

Summary

The effectiveness of aversion therapy was studied using covert imagery as stimuli combined with electric shock, in the modification of continued drug-seeking by methadone-maintained addicts.

Drug-seeking was measured as the frequency of drugs detected by urinalyses of randomly collected urine samples. Twelve subjects volunteered for the experiment and were randomly assigned to one of two experimental groups. Six subjects received aversion therapy and six controls were placed on a waiting list for treatment. Semantic Differential ratings of positive affectivity of drugs were taken for all subjects pre- and post-treatment.

The treatment procedure was a combined classical and avoidance learning model, and consisted of an alternating stimulus imagery sequence combined with electric shock. The course of treatment was 7-10 sessions, ten trials each.

There was no significant difference found in mean per cent "dirty" urines between experimental and control groups immediately after treatment, and at three and six months followup. However, the treated group did show significantly more decreased positive ratings of feelings toward drug stimuli, as measured on the Semantic Differential, immediately after treatment.

Drug-seeking rates for eligible non-volunteers over the course of the experiment were included as an additional comparison. Overall, volunteers improved in their drug-seeking relative to the group of non-volunteers.

These latter results were interpreted as reflecting motivational variations, largely dependent on situational factors, which may be predictors of success with aversion therapy. It was suggested that further research attempt to evaluate the role of both volunteer and situational variables in treatment.

Further recommendations were that the number of trials be increased to insure an adequate degree of conditioning, and that "booster" sessions be administered at progressively extended intervals during follow-up in order that generalization of treatment be facilitated in the absence of favorable environmental changes.

BIBLIOGRAPHY

- American Medical Association. Drug dependence: A guide for physicians. Chicago, Ill.: A M A, 1969.
- Azrin, N.H. & Holz, W.C. Punishment. In W.K. Honig (Ed.), Operant behavior: Areas of research and application. New York: Appleton, 1966.
- Bakan, D. On method. San Francisco: Jossey-Bass, Inc., 1967.
- Bandura, A. Principles of behavior modification. New York: Holt, 1969.
- Betts, G.H. The distribution and function of mental imagery. New York: Columbia University Teachers' College Press, 1909.
- Bexton, W.H., Heron, W., & Scott, T.H. Effects of decreased variation in sensory environment. Canadian Journal of Psychology, 1954, 8, 70-76.
- Bregar, L. & McGaugh, J.L. Learning theory and behavior therapy: A reply to Rachman and Eysenck. Psychological Bulletin, 1966, 65, 170-173.
- Bridger, W. & Mandel, I. A comparison of GSR fear responses produced by threat and electric shock. Journal of Psychiatric Research, 1964, 2, 31-40.
- Brodsky, S.L. Criminal and dangerous behavior. In D.C. Rimm and J.W. Somerville, Abnormal psychology. New York: Academic Press, 1977.
- Bugelski, B.R. The definition of the image. In S.J. Segal (Ed.), Imagery: Current cognitive approaches. New York: Academic Press, 1971.
- Campbell, D.T. & Stanley, J.C. Experimental and quasi-experimental designs for research. Chicago: Rand-McNally and Co., 1963.
- Carlin, A.S. & Armstrong, H.E. Aversive conditioning: Learning or dissonance reduction? Journal of Consulting and Clinical Psychology, 1968, 32, 674-678.

- Church, R.M. The varied effect of punishment on behavior. Psychological Review, 1963, 70, 369-402.
- Cockett, R. Drug abuse and personality in young offenders. New York: Appleton-Century-Crofts, 1971.
- Connell, P. Treatment of narcotic and non-narcotic drug dependence: The need for research. In R.V. Phillipson (Ed.), Modern trends in drug dependence and alcoholism. New York: Appleton, 1970.
- Cook, S.W. & Harris, P.E. The verbal conditioning of the GSR. Journal of Experimental Psychology, 1937, 21, 202-210.
- Copemann, C.D. Drug addiction: A theoretical framework for behavior therapy. Psychological Reports, 1975, 37, 947-958.
- D'Alessio, G. Resistance in psychotherapy. Psychotherapy: Theory, Research and Practice, 1968, 5, 1954-1959.
- Das, J.P. Verbal conditioning and behavior. New York: Pergamon Press, 1969.
- Dropa, D.C. Behavioral treatment of drug addiction: A view and analysis. International Journal of Addictions, 1973, 8, 143-161.
- Eysenck, H.J. & Rachman, S. The causes and cures of neurosis. London: Routledge and Kegan Paul, 1965.
- Feldman, M.P. Aversion therapy for sexual deviations: A critical review. Psychological Bulletin, 1966, 65, 65-79.
- Feldman, M.P. & MacCulloch, M.J. The application of anticipatory avoidance learning to the treatment of homosexuality-I. Theory techniques and preliminary results. Behavior Research & Therapy, 1965, 2, 165-183.
- Feldman, M.P. & MacCulloch, M.J. Anticipatory avoidance response in the aversive conditioning treatment of alcoholics. Behavior Research & Therapy, 1966, 4, 187-196.
- Festinger, L. A theory of cognitive dissonance. Evanston, Ill.: Row-Peterson, 1957.
- Franks, C.M. Behavior therapy: The principles of conditioning and the treatment of the alcoholic. Quarterly Journal of Studies on Alcohol, 1963, 24, 511-529.

- Freedman, D.X. On the use and abuse of LSD. Archives of General Psychiatry, 1968, 18, 330-347.
- Freedman, S.J. & Greenblatt, M. Studies in human isolation: Hallucination and other cognitive findings. U.S. Armed Forces Medical Journal, 1960, 2, 1479-1497.
- Garcia, J., McGowan, B.K. Ervin, F.R., & Koelling, R.A. Cues: Their relative effectiveness as a function of the reinforcer. Science, 1968, 160, 794-795.
- Gibson, E.J. Principles of perceptual learning and development. New York: Appleton-Century-Crofts, 1969.
- Glaser, D. Problems in the evaluation of treatment and rehabilitation programs. In Rehabilitating the narcotic addict. Wash. D.C.: U.S. Government Printing Office, 1966.
- Goldberger, L. & Holt, R. Homogeneous visual stimulation and imagery. Perceptual & Motor Skills, 1961, 12, 91-93.
- Hallam, R. & Rachman, S. Theoretical problems of aversion therapy. Behavior Research & Therapy, 1972, 10, 341-353.
- Hallam, R., Rachman, S., & Falkowski, W. Selective attitudinal and physiological effects of electrical aversion therapy. Behavior Research & Therapy, 1972, 10, 1-13.
- Hare, R.D. Temporal gradient of fear arousal in psychopaths. Journal of Abnormal Psychology, 1965, 70, 442-445.
- Hare, R.D. Detection threshold for electric shock in psychopaths. Journal of Abnormal Psychology, 1968, 73, 268-272.
- Hare, R.D. Psychopathy: Theory and research. New York: John Wiley and Sons, 1970.
- Hare, R.D. & Thorvaldson, D.A. Psychopathy and response to electrical stimulation. Journal of Abnormal Psychology, 1970, 76, 370-374.
- Hodges, W. & Spielberger, C. The effects of threat of shock on heart rate. Psychophysiology, 1966, 2, 287-294.
- Holt, R.R. Imagery: Return of the ostracized. American Psychologist, 1964, 19, 254-264.
- Horowitz, M.J. Image formation and cognition. New York: Meredith Corp., 1970.

- Hunt, H.F. & Dyrud, J.E. Current trends in behavior therapy. In J.M. Schlien (Ed.), Research in psychotherapy, Vol. III, Washington, D.C.: American Psychological Association, 1968.
- Jaffe, J.H. The implementation and evaluation of new treatments for compulsive drug users. In R.T. Harris, W.M. McIsaac, & C.R. Schuster (Eds.), Drug dependence. Austin, Texas: The University of Texas Press, 1970.
- Johnson, D.W. & Matross, R.P. Attitude modification methods. In F.M. Kanfer & A.P. Goldstein (Eds.), Helping people change. New York: Pergamon Press, 1975.
- Kimble, G. Scientific psychology in transition. In F.J. McGuigan and D.B. Lumsden, (Eds.), Contemporary approaches to conditioning and learning. New York: John Wiley and Sons, 1973.
- Kolb, L. Pleasure and deterioration from narcotic addiction. Mental Hygiene, 1925, 9, 699-742.
- Kolb, L. Noyes' modern clinical psychiatry. (7th Ed.), Philadelphia: Saunders, 1968.
- Kushner, M. Faradic aversive controls in clinical practice. In C. Neuringer & J.L. Michael (Eds.), Behavior modification in clinical psychology. New York: Appleton-Century-Crofts, 1970.
- Kushner, M. & Sandler, J. Aversion therapy and the concept of punishment. Behavior Research & Therapy, 1966, 4, 179-186.
- Lesser, E. Behavior therapy with a narcotics user: a case report. Behavior Research & Therapy, 1967, 5, 251-252.
- Liberman, R. Aversive conditioning of drug addicts: a pilot study. Behavior Research & Therapy, 1968, 6, 229-231.
- Linton, H. & Langs, R. Subjective reactions to LSD. Archives of General Psychiatry, 1962, 6, 352-368.
- Lykken, D.T. A study of anxiety in the sociopathic personality. Journal of Abnormal and Social Psychology, 1957, 55, 6-10.
- Maher, B.A. Principles of psychopathology. New York: McGraw-Hill, 1966.
- Maher, B.A. Scientific aspects of behavior therapy. Seminars in Psychiatry, 1972, 4, 146-149.

- Mahoney, M.J. Cognition and behavior modification. Cambridge, Mass.: Ballinger Pub. Co., 1974.
- Maletsky, B.M. "Booster" sessions in aversion therapy: The permanency of treatment. Behavior Therapy, 1977, 8, 460.
- Marks, I. & Gelder, M. Transvestism and fetishism: Clinical and psychological changes during faradic aversion. British Journal of Psychiatry, 1967, 119, 711-730.
- Max, L. Breaking a homosexual fixation by the conditioned reaction technique. Psychological Bulletin, 1935, 32, 734.
- McGuigan, F.J. & Lumsden, D.B. (Eds.), Contemporary approaches to conditioning and learning. New York: Wiley and Sons, 1973.
- Melvin, K.B. Vicious circle behavior. In H.D. Kimmel, (Ed.), Experimental psychopathology: Recent research and theory. New York: Academic Press, 1971.
- Miller, P.M. Behavioral treatment of drug addiction: A review. The International Journal of the Addictions, 1973, 8, 511-519.
- Mowrer, D.H. Learning therapy and behavior. New York: Wiley, 1960.
- Orne, M.T. On the social psychology of the psychological experiment with particular reference to demand characteristics and their implications. American Psychologist, 1962, 17, 776-783.
- Paivio, A. Mental imagery in associative learning and memory. Psychological Review, 1969, 76, 241-260.
- Paivio, A. Imagery and verbal processes. New York: Holt, Rinehart and Winston, 1971.
- Paul, I.H. The effect of drug-induced alteration in state of consciousness on retention of drive-related verbal material. Journal of Nervous Mental Disorders, 1964, 138, 367-374.
- Procter, S. & Malloy, T.E. Cognitive control of conditioned emotional responses: An extension of behavior therapy to include the experimental psychology of cognition. Behavior Therapy, 1971, 2, 294-306.

- Quay, H.C. Psychopathic personality as pathological stimulation seeking. American Journal of Psychiatry, 1965, 122, 180-183.
- Rachman, S. The current status of behavior therapy. Archives of General Psychiatry, 1965, 13, 418-423.
- Rachman, S. & Eysenck, H.J. Reply to a "critique and reformulation" of behavior therapy. Psychological Bulletin, 1966, 65, 165-169.
- Rachman, S. & Teasdale, J. Aversion therapy and behavior disorders: An analysis. Coral Gables: The University of Miami Press, 1969.
- Raymond, M. The treatment of addiction by aversion conditioning with apomorphine. Behavior Research & Therapy, 1964, 1, 287-291.
- Rescorla, R.H. & Solomon, R.L. Two-process learning theory: Relationships between Pavlovian conditioning and instrumental learning. Psychological Review, 1967, 74, 151-182.
- Richardson, A.R. Mental imagery. New York: Springer, 1969.
- Saltz, E. The cognitive bases of human learning. Springfield, Illinois: Dorsey Press, 1971.
- Saltz, E. Higher mental processes as bases for laws of conditioning. In F.J. McGuigan and D.B. Lumsden (Eds.), Contemporary approaches to conditioning and learning. New York: John Wiley and Sons, 1973.
- Schmauck, F.J. Punishment, arousal and avoidance learning in sociopaths. Journal of Abnormal Psychology, 1970, 76, 325-335.
- Segal, S.J. Imagery: Current cognitive approaches. New York: Academic Press, 1971.
- Seligman, M.E.P. & Johnston, J.C. A cognitive theory of avoidance learning. In F.J. McGuigan & D.B. Lumsden (Eds.), Contemporary approaches to conditioning and learning. New York: John Wiley and Sons, 1973.
- Snider, J.G. & Osgood, C.E. Semantic differential technique: A sourcebook. Chicago: Aldine Co., 1969.
- Solomon, R.L. Punishment. American Psychologist, 1964, 19, 239-253.

- Spevack, M., Pihl, R., & Rowan, T. Behavior therapies in the treatment of drug abuse: Some case studies. Psychological Record, 1973, 23, 179-184.
- Staats, A.W. Social behaviorism and human motivation: Principles of the attitude-reinforcer-discriminative system. In A.G. Greenwald, T.C. Brock, & T.M. Ostrom (Eds.), Psychological foundations of attitudes. New York: Academic Press, 1968.
- Staats, A.W. Social behaviorism, human motivation and the conditioning therapies. In B. Maher (Ed.), Progress in experimental personality research. New York: Academic Press, 1970.
- Teasdale, J.D. Conditioned abstinence in narcotic addicts. International Journal of the Addictions, 1973, 8,
- Tedeschi, J.T., Schlenker, B.R., & Bonoma, T.V. Cognitive dissonance: Private rationalization or public spectacle? American Psychologist, 1971, 26, 685-695.
- Tomkins, S.S. & Izard, C.E. (Eds.), Affect, cognition and personality. New York: Springer Pub. Co., 1965.
- Vaillant, G.E. A twelve-year follow-up of New York addicts III. Some social and psychiatric characteristics. Archives of General Psychiatry, 1966, 15, 134-141.
- Voegtlin, W.L. & Lemere, F. The treatment of alcohol and addiction: A review of the literature. Quarterly Journal of the Studies of Alcohol, 1942, 2, 717-803.
- Weinberg, N.H. & Zaslove, M. Resistance in psychotherapy. Journal of Clinical Psychology, 1963, 19, 179-181.
- Wikler, A. Conditioning factors in opiate addiction and relapse. In D.M. Wilner and G.G. Kassenbaum (Eds.), Narcotics. New York: McGraw-Hill, 1965.
- Wikler, A. Some implications of conditioning theory for problems of drug abuse. Behavioral Science, 1971, 16, 92-97.
- Wikler, A. Dynamics of drug dependence. Archives of General Psychiatry, 1973, 28, 611-616.
- Wilson, G.T. & Davison, G.C. Aversion techniques in behavior therapy: Some theoretical and metatheoretical considerations. Journal Consulting and Clinical Psychology, 1969, 33, 327-329.

- Wolpe, J. Conditioned inhibition of craving in drug addiction. Behavior Research & Therapy, 1965, 2, 285-287.
- Wynne, L.C. & Solomon, R.L. Traumatic avoidance learning: Acquisition and extinction in dogs deprived of normal peripheral autonomic function. Genetic Psychology Monographs, 1955, 52, 241-284.

APPENDIX A
Imagery Check Form

IMAGERY CHECK

My Imagery during this session was:

Very Clear	Somewhat Clear	Moderately Clear	Somewhat Unclear	Very Unclear
---------------	-------------------	---------------------	---------------------	-----------------

APPENDIX B
Consent Form

CONSENT FORM FOR AVERSION THERAPY

I, _____, volunteer to participate in a study evaluating a new treatment procedure for drug addiction. I fully understand that though the treatment appears promising, it in no way guarantees me benefit and that I may discontinue it at any time during its administration.

I understand fully that the treatment will involve the use of electric shock to be administered as follows:

1. Shock level (1-4 milliamperes) will be set according to individual tolerance levels;
2. Shock will be delivered through small electrodes attached to the surface of the hand;
3. A paste will be used to attach the electrodes;
4. Shock may result in redness or slight burning though precautions and safety mechanisms should effectively minimize side effects.

I agree to cooperate with efforts to check on my progress through followup, and I understand that full confidentiality rights, in keeping with Methadone Maintenance Guidelines, will apply to this research.

Signed: _____

Date: _____

Witness: _____

APPENDIX C
Semantic Differential Rating Form

SEMANTIC DIFFERENTIAL

Instructions:

Rate your personal feelings about drugs in terms of the following word pairs:

ATTRACTIVE — 1 — 2 — 3 — 4 — 5 — UNATTRACTIVE

VALUABLE — 1 — 2 — 3 — 4 — 5 — WORTHLESS

PLEASANT — 1 — 2 — 3 — 4 — 5 — UNPLEASANT

EXCITING — 1 — 2 — 3 — 4 — 5 — UNSTIMULATING

GOOD — 1 — 2 — 3 — 4 — 5 — BAD

EFFECTIVE — 1 — 2 — 3 — 4 — 5 — INEFFECTIVE

HEALTHY — 1 — 2 — 3 — 4 — 5 — UNHEALTHY

PHYSICAL — 1 — 2 — 3 — 4 — 5 — MENTAL

SOCIAL — 1 — 2 — 3 — 4 — 5 — ANTI-SOCIAL

ENERGY — 1 — 2 — 3 — 4 — 5 — LAZINESS

APPENDIX D

Trial Observation Recording Sheet

LATENCY

Subject: _____

Trial	Type	Verbalization (S)	Avoidance R
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Notes:

APPENDIX E

Application for Human Use Approval

TITLE OF PROJECT:

The Effectiveness of Aversion Therapy in the
Treatment of Narcotic Addicts Maintained on Methadone

INVESTIGATORS:

Jesse B. Milby, Ph.D., and
Charlotte Clarke, M.A.

STATEMENT OF OBJECTIVE, PROCEDURE SUMMARY, and POTENTIAL
BENEFITS AND RISKS:

The purpose of this study is to evaluate a treatment designed to help narcotic addicts who are being treated with methadone maintenance to control their illicit drug-seeking behavior. The treatment utilizes a classical conditioning procedure employing aversive electric shock. The classical conditioning model is a scientifically derived framework that explains the acquisition and perpetuation of behavior by the recurring association of events. According to this model, drug-seeking behavior is conceptualized as triggered by numerous objects, places, situations, etc., in the addict's environment that have become strongly associated through conditioning with the pleasurable act of drug consumption. Thus the purpose of the shock is to produce a negative conditioned emotional response to drug stimuli which have been the occasion for illicit drug-seeking behavior at the point where it usually begins, i.e., when they first begin to think about and produce mental imagery of the pleasurable feelings drugs produce. Thus the focus is upon urges for drug consumption that are not prompted by the physiological

cravings which have been alleviated through methadone administration, but produced psychologically through the conditioned association of various stimuli and events in the addict's environment.

If drug-related imagery is inhibited through the negative conditioned emotional response produced by shock delivery and a reduction in drug-seeking behavior is obtained, then a corresponding decrease in the attendant risks of illegal activities accompanying drug consumption might also be expected.

To summarize risks and benefits, we think the following analysis represents a good risks to benefits ratio for the subjects in this experiment. The risks would be: (1) the possibility treatment may not help the subject's drug-seeking behavior as explained in the consent form, (2) the very remote possibility of electric shock hazard despite the manufacturer's design to prevent them, a thorough checkout of equipment by UAB electrical equipment maintenance personnel and experimenter precautions against them, (We do not feel this risk is any greater than with any piece of electrical equipment used for patient diagnosis or treatment.) and, (3) the small possibility of skin surface redness or minor burns of the skin surface despite the use of low shock levels, equipment designed to eliminate such burns, and the use of electrode paste. The benefits would be: (1) special individualized evaluation necessary before treatment begins and at followup, the results of which would be available to

each subject, (2) the possible reduction in drug-seeking behavior with consequent benefits due to: (3) reduced risk of arrest and incarceration, (4) reduced risk of drug overdose, a common occurrence among illicit drug users, (5) reduced risk of the transmission and incubation of disease associated with intravenous injection, (6) enhancement of the rehabilitative effects of methadone by relieving preoccupation with drug culture and life style, and (7) allowing the patient eventual access to a take-home privilege that will lessen interference with adaptive functioning consequent to currently required daily attendance at the clinic.

In 10 to 12, forty-five minute sessions, a relatively mild 2 to 4 milliamperes shock will be associated with subject-selected pleasurable 35 mm slides of drug-seeking, preparation and consumption scenes or experimenter-induced imagery of such subject reported scenes.

Effects of the treatment will be measured by an analysis of randomly scheduled urine tests for the presence of illicit drugs over a six-month follow-up period. Changes in attitudes and feelings about drug use and drug effects will be measured by a pre- and post-treatment administered Semantic Differential Rating Scale of drug words. Changes in the amount of time required to produce and verbalize the imagery will also be recorded.

APPENDIX F

Raw Data

Mean Per Cent "Dirty" Urines

Experimental Subjects	Baseline	Treatment	3 mo.	6 mo.
1.	.50	.69	.73	.85
2.	.50	.08	.15	.00
3.	.45	.75	.74	.74
4.	.40	.35	.23	.21
5.	.55	.08	.08	.00
6.	.72	.60	.72	.72
Control Subjects				
1.	.71	.91	.68	.38
2.	.90	.25	.56	.10
3.	.33	.31	.21	.09
4.	.50	.62	.62	.10
5.	.78	.42	.33	.86
6.	.45	.70	.40	.18
Non-volunteer Subjects				
1.	.42	.75		.38
2.	.72	.50		.75
3.	.57	1.0		.80
4.	.67	.75		.56
5.	.75	.80		.43
6.	.83	.70		.85

Mean Per Cent "Dirty" Urines

Experimental Subjects	Baseline	Treatment	3 mo.	6 mo.
1.	.50	.69	.73	.85
2.	.50	.08	.15	.00
3.	.45	.75	.74	.74
4.	.40	.35	.23	.21
5.	.55	.08	.08	.00
6.	.72	.60	.72	.72
Control Subjects				
1.	.71	.91	.68	.38
2.	.90	.25	.56	.10
3.	.33	.31	.21	.09
4.	.50	.62	.62	.10
5.	.78	.42	.33	.86
6.	.45	.70	.40	.18
Non-volunteer Subjects				
1.	.42	.75		.38
2.	.72	.50		.75
3.	.57	1.0		.80
4.	.67	.75		.56
5.	.75	.80		.43
6.	.83	.70		.85

Control Group Scores on the Semantic Differential

[illegible]