MEMORIES OF PHYSICAL AND EMOTIONAL SUFFERING IN ABSTAINING SUBSTANCE ABUSERS

by

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Abstract

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A major assertion of the self-medication model of addiction is that drugs are abused for their unique psychoactive consequences. Cocaine is used to reduce the depressive symptoms brought on by cocaine withdrawal. Heroin is used to relieve suffering brought on by a failure to develop appropriate coping skills.

This thesis addressed two issues. The first deals with the assertion, that heroin and cocaine are abused to relieve specific deficits within the addict. It is hypothesized that addicts regardless of their drug use will exhibit depressive symptoms during withdrawal and poor coping skills compared with a nonaddicted control group. The second issue dealt with the addict's memory of their withdrawal state. It is hypothesized that the memory of their feelings in withdrawal will be poor.

The study examined the psychological state of addicts at their peak level of withdrawal and their ability to remember this state several days later. It examined their ability to discriminate imaginary situations depicting high

and low levels of suffering. This was used as a measure of their coping ability.

The participants in the study were cocaine, heroin and both cocaine and heroin addicts as well as a control group of college students. Participants were tested twice, 5-6 days apart.

At both sessions, participants were tested for their current level of depression and other psychological variables. Memory was tested using two matched 40-word lists consisting of positive, negative and pain adjectives.

The ability to judge different levels of suffering was tested using the physical suffering questionnaire (PSQ) and the emotional suffering questionnaire (ESQ). The PSQ had situations portraying various levels of physical suffering. The ESQ had varying levels of emotional suffering. Analysis of both the memory and suffering questionnaires included the calculation of Signal Detection parameters to distinguish discrimination from response bias.

Results indicate that depression was not significantly greater for the cocaine group than for the other two addicted groups and that the discrimination of the suffering statements was equally poor for all addicted groups. Memory for withdrawal was generally poor. The speculation of how this may impact on addiction is discussed.

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years, it feels nice to finally have a couple of brothers.

Finally, to all those people in my life, over the past ten years, that have asked me:

"When are you going to finish.....?"

"I'm done!"

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Introduction

Addiction: Self-Medication and Poor Memory

Despite the large amount of research carried out over the last thirty to forty years that has attempted to explain the etiology of drug addiction, a consensus has not been achieved on the specific determinants of this baffling and devastating problem in our society. Among the most popular explanations of addiction is the "self-medication" hypothesis. This hypothesis makes two main assertions. The first is that addiction to a powerful psychoactive drug such as heroin or cocaine occurs for the purposes of reducing or controlling intense negative feelings.

The second assertion is that specific drugs are abused for their unique psychoactive consequences. The model speculates that cocaine is chronically used to relieve either a pre-existent chronic depression or to reduce the depressive symptoms brought on by cocaine withdrawal, and that heroin is chronically used to relieve suffering brought on by a failure to develop appropriate coping skills.

This thesis addressed two issues. The first deals with the self-medication model's second assertion, that heroin and cocaine are abused to relieve specific deficits within

the addict. It is hypothesized that addicted individuals regardless of their drug of addiction will exhibit depressive symptoms during withdrawal and poor coping skills. The second issue deals with the addict's memory of their withdrawal state. It is hypothesized that the memory of the psychological and physical distress of withdrawal will be poor.

The present research examined the accuracy of addicted individuals' memory of their own physical and emotional discomfort during early stages of abstinence, as well as an evaluation of their coping ability. Poor coping skills may be in part based upon an inability to discriminate between life situations that normally produce high suffering from those that produce low suffering. Therefore, their ability to judge the intensity of relative situations of suffering will be assessed. It is proposed that addicted individuals are poor discriminators of the intensity of the suffering situations and have a bias toward viewing these situations as denoting a higher level of suffering compared to non-addicted controls.

Chronic drug use may be the result of an inclination to view everyday life situations as excessively distressing. This could provide the individual with a justification to

use their drug. A poor memory of the negative impact of drug withdrawal may allow the individual to ignore the harsh implications of his drug use, and hence cause recidivism.

Explaining Addiction

What is meant when it is determined that someone has a drug addiction? Any comprehensive definition of the term should offer an explanation of the development and maintenance of uncontrollable thoughts, feelings, and actions that direct an individual toward acquiring and consuming a psychoactive substance in spite of damaging consequences. Explaining addiction has always been a difficult problem. The major conflict involves whether chronic drug abuse should be viewed as a voluntary misbehavior or a symptom of an illness. Those who contend that addiction is a willful behavior support their argument by insisting that the powerfully reinforcing effects of most psychoactive drugs can account for their chronic use. Many people enjoy the temporary changes in mood, perception and judgment that accompany an intoxicated state. Historically, clinical inquiry on the mechanism of addiction emphasized a "pleasure-seeking" interpretation undoubtedly influenced by Freud's (1905) contribution to the field. Early studies

postulated a distinctly Freudian position and typically emphasized the erotic, hedonistic aspects of drug use (Abraham, 1960; Rado, 1933).

However, accepting the notion that a person intentionally chooses to live an addictive lifestyle makes little sense in light of what is known about the significant amount of suffering that these people experience. Addiction to most psychoactive substances will produce dependence, that is, a need to continue using the drug to avoid the intense negative physiological and psychological symptoms of withdrawal.

The idea that chronic drug-taking is the manifestation of individuals seeking to medicate their negative feelings developed in the 1960's and early 1970's when clinicians began reporting findings in their work with addicts. Regardless of the psychoanalytic overtones of much of the clinical research during this time, the studies were important in redefining the theoretical position of addictive disorders. With the growing number of drug treatment programs in the mid 1960's, and the increased number of addicted individuals pursuing treatment, clinical research flourished and the concept of drug addiction changed dramatically. For example Weider and Kaplan (1969)

adopted ego theory to propose that addicted individuals select different drugs based on their personality organization and ego impairments. Their emphasis on the use of drugs as "prosthetics" and their focus on developmental considerations, adaptation, and the ego clearly established a new direction in the field. Research began focusing on explaining addiction as a symptom of a psychological disorder.

Following along similar lines, Milkman and Frosch (1973) compared amphetamine abusers to opiate addicts and suggested that addicts use drugs to bolster shaky defenses or to augment limited ego capacities to engage in one's environment. They provided evidence that stimulant abusers and narcotic addicts preferentially choose the effects of amphetamines and narcotics, respectively, to expand personality characteristics or preferred modes of psychological adaptation. An important aspect of their perspective asserts that addicted individuals will pursue and select their drug of choice from a variety of different drugs based upon their own specific personality style and whether the drug's effects temporarily aid in the reduction of their anxiety. Wurmser (1974) stressed that addicted individuals have problems in affect defense and that

narcotic addicts use opiates to counteract the painful effects of rage, shame, and loneliness.

Along with the reinforcing, mood-altering effects associated with drug use comes physiological arousal. Depressants and narcotics tend to sedate or dull arousal levels, while stimulants excite or increase them. This is particularly noteworthy because, while a unique addictive personality profile has not been found, research findings have established a link between addiction and three separate psychological disorders: depression, anxiety, and anti-social personality disorder. All three of these disorders share irregular levels of arousal. Both anti-social personality and depression are characterized by lower than normal levels of arousal (e.g., Schacter & Latane, 1964; Chesno & Kilmann, 1975; Bunney & Davis, 1965; Mass, 1975), whereas anxiety has been associated with higher then normal levels of arousal (e.g., Bertilsson, 1978; Costa & Greengard, 1975).

The proposal that individuals with chronically low or high levels of arousal may use psychoactive drugs to normalize their level of arousal and the psychological states that accompany them is referred to as the self-medication hypothesis of substance dependence (Khantzian,

1985; Meisch, 1991). Khantzian's version of the self-medication hypothesis assumes that addiction develops as a secondary condition resulting from attempts to cope with intolerable psychological symptoms. Specifically, he outlines a theoretical basis of how addiction to certain psychoactive substances can be very compelling for individuals suffering from a premorbid or coexisting psychiatric disturbance. The model is based primarily on his case studies of addicted individuals undergoing treatment (Khantzian, 1978, 1987).

Self-medication characterizes addictive illness as a secondary disorder resulting from attempts to alleviate intolerable symptoms. This argument runs counter to current clinical and neurobiological data. Khantzian (1974) maintained that addicts use drugs to overcome a range of problems including pain, stress, and dysphoria. The preference for a particular drug is, in a sense, predetermined by the personality of the individual and the dominant painful affect state with which an individual struggles. Khantzian outlined a theoretical profile of factors that predispose individuals to either cocaine or heroin abuse. Cocaine addicts, according to the model, may have preexisting chronic depression, hyperactive emotional

lability or bipolar disorder. The model also suggests that cocaine addiction may be maintained by the depressive symptom following immediate cocaine withdrawal (Khantzian & Khantzian, 1984). The psychoactive stimulant properties of cocaine alleviate the energy deficits associated with these mood disorders and helps in adaptive functioning.

On the other hand, Khantzian (1974) contends that heroin addiction develops in order to cope with emotional distress brought on by pain, loss, anxiety, and frustration. He suggests that heroin users rely upon the powerful effects of the drug to mute drastically the negative emotions brought on by suffering. These individuals find it necessary to turn to drug taking because they have failed to develop adaptive coping mechanisms.

Challenges to the Self-Medication model

Three different elements of Khantzian's model have been criticized by both researchers and clinicians in the field: first, the most important motivation in addiction is the person's need to relieve distress; second, the relief of distress is accomplished by choosing a particular drug for its particular drug effect, much the same way a physician chooses a prescription; and third, life turmoil is more the

result of the psychological deficits than drug-induced behaviors.

Relief of Distress

In assessing the first conclusion of the model, concerning drug-use as a relief of distress, the question of whether drug use actually reduces negative feelings arises. For example, Weiss, Griffen, and Mirin (1992) collected retrospective self-report data on hospitalized drug users. A majority of the subjects reported that they used their drug of choice when depressed and that it improved their mood. Finn, Zeitouni, Pihl (1990) found a link in humans between alcohol consumption and anxiety reduction. In laboratory animals, conflict and stress increased alcohol consumption and the animals came closer to a feared stimulus if they had been given alcohol (Conger, 1951; Freed, 1971)

The problem with the conclusion that addicts use drugs to reduce negative feelings is that painful emotional states may also be created through drug use. In other words, it is unclear whether negative emotional states cause an addiction to develop, or are the consequence of the addiction. Approximately 60% of both the cocaine and heroin addicts in the Weiss et al. study reported that drug use actually

increased negative mood. Also, alcohol and other central nervous system depressant drugs have been reported to induce feelings of sadness in nonalcoholic as well as alcoholic volunteers (Warren & Raynes, 1972). In addition, depression in both opiate and cocaine addicts may be drug-induced (Dackis & Gold, 1984; Dackis & Gold, 1985; Dackis, Pottash, & Gold, 1984; Gold, Esttroff & Potash, 1985; Rounsaville, Weissman, Crits-Christopher, Wilber, & Kleber, 1982).

Specific Drug Effect

The second conclusion raised by the Khantzian's (1985) model is that addicts choose their particular drug of choice for its specific effect in altering mood states. This assumption was not supported by Weiss et al. (1992). Their subjects reported that both heroin and cocaine were abused for the same reason, to produce mood elevation.

One issue addressed in this thesis concerns the second conclusion of the self-medication model. It is hypothesized that addicts regardless of their drug of choice will exhibit depressive symptoms during withdrawal. The heroin and cocaine addicted individuals should exhibit similar depressive symptoms.

Psychological Deficits

The third conclusion that life turmoil is more the result of the psychological deficits than drug-induced behaviors, can not be adequately resolved due to the different varieties of drug effects and extremes of drug use. The self-medication model suggests that treatment of addiction should center around the diagnosis and treatment of the psychological condition that led to the addiction.

Negative Emotional States and Addiction

While depression and other negative emotional states may be associated with opiate, cocaine, and alcohol addiction, it is unknown whether these negative states are symptomatic of a separate psychopathology, as the self-medication model claims, or are an epiphenomenon of the psychoactive effects of these drugs. Two deficiencies in the existing body of research makes this point hard to determine.

First, in clinical research that uses addicted individuals, emotional states are usually measured when addicts are beginning short-term treatment for their drug use. This entails a ten to fifteen day in-patient hospitalization to detoxify the individual's system. During

this stage of abstinence, toxic effects of cocaine and heroin use may develop. The prolonged use of heroin leads to a severe physical withdrawal process, which begins about eight hours after the last ingestion of the drug. The first symptom is general restlessness that can lead to severe agitation, followed by chills, hot flashes and difficulty in breathing. Over the next two days the individual experiences a loss of motor control resulting in twitches, shaking and kicking. This may be accompanied by muscle cramps, diarrhea, vomiting and extreme sweating. The withdrawal symptoms associated with cocaine are related to emotional disturbances: fatigue, depression, insomnia or hypersomnia, and psychomotor agitation. These withdrawal symptoms are usually compounded with the psychosocial stress caused by chronic drug use. Weissman, Slobetz, Prusoff, Mezritz and Howard (1976) contend that it may be diagnostically impossible to differentiate the symptoms of depression from the side effects of drug withdrawal.

One method of solving this diagnostic problem is to examine the long-term effectiveness of abstinence in reducing psychological symptoms. Unfortunately, there is a lack of research of this type. In one longitudinal study Dorus and Senay (1980), reported a significant decrease in

depressive symptoms in heroin addicts after four and eight months of abstinence. However, one methodological problem with the study, as with most longitudinal research, was subject attrition. After four months approximately 28% of the subjects left treatment. That number grew to over 50% after eight months. Those that dropped out may have done so because of increases in negative feelings, which in turn could have inflated the percentage of subjects that reported a decrease in depressive symptoms. A major problem in determining a preexisting psychopathology from the available addiction research is that most investigators have assessed depressive symptoms in their subjects from self-report inventories rather than making specific diagnoses based upon established behavioral criteria such as minimum duration of symptoms, number of different types of symptoms, or history of psychological impairment.

Investigations of cocaine abusers using clinical diagnostic interviews (such as The Structured Clinical Interview for the Diagnostic and Statistical Manual) have reported that significant proportions of cocaine abusers seeking treatment for their addiction were diagnosed as having an affective disorder of either a bipolar or unipolar variety (Gawin & Kleber, 1986; Nunes, Quitkin, & Klein,

1989; Weiss, Mirin, Michael & Sollogub, 1986).

Furthermore, there is still some question concerning the legitimacy of claims regarding the existence of an established psychopathology in addicted individuals. A specific issue is whether addicts in treatment represent the larger population of drug abusers. Patients in treatment are likely to be skewed toward more severity and chronicity of illness and more comorbidity (Cohen & Cohen, 1984). Thus, whether addicts receiving treatment are representative of addicts in general is not clear.

Neurobiology of Drug Reinforcement

Perhaps the greatest challenge to the self-medication model lies in the overwhelming body of evidence concerning the neurobiology of drug reinforcement. Heroin and cocaine produce different psychoactive effects. Cocaine is a stimulant that produces an intense high or rush characterized by feelings of exhilaration, energy, well-being and self-confidence. Heroin is an opiate and has the effect of dulling or numbing the senses and producing a sleeplike state. Both drugs can increase synaptic dopamine levels. It has been hypothesized that this chemical action accounts for heroin and cocaine's reinforcing effects

(Baxter, Gluckman, Stein & Scerni, 1974; Mathews & German, 1984; Amit & Brown, 1982).

The hypothesis that chronic drug use is precipitated by the need to self-medicate assumes that addicted individuals will select and habitually use their drug based upon its ability to neutralize different negative emotional states. Specifically, the model claims that it is cocaine's ability to produce euphoria and heroin's ability to sedate intense negative feelings that maintain the addiction. Wise (1988) suggests that it is the similar psychomotor stimulant properties of increasing dopamine levels in both drugs that make them habit forming. The neurobiological model emphasizes a two-factor reinforcement theory (Wise, 1988). Addicting substances like cocaine and heroin act on brain mechanisms to produce positive reinforcement. These substances are believed to also activate mechanisms that suppress pain and distress signals, including those associated with the drug's own withdrawal symptoms. These effects represent negative reinforcement consequences that can contribute to the habit-forming impact of the drug.

Research on the neurobiological impact of addicted substances offers a strong argument against the main point of Khantzian's model which stresses that addiction develops

and is maintained as an attempt to cope with an existing psychopathology. Compelling evidence suggests that the reinforcing properties of acute activation of dopamine systems in the brain can account for the addicted properties of both drugs without requiring an additional interpretation of the behavior (Wyatt, Karoum, Suddath & Hitri, 1988; Mathews & German, 1984). The power of cocaine reward, for example, is demonstrated by the fact that it is self-administered to the point of death and replaces survival drives involving sex, food and water (Pickens & Harris, 1968).

However, there are problems with a strictly neurobiological interpretation of addiction. The bulk of the research and many of the conclusions concerning drug abuse in humans are drawn from animal studies. Kuhar, Ritz and Boja (1991) report that the support for the dopamine depletion hypothesis in humans is not nearly as conclusive as in animal studies. While a neurobiological model illustrates the maintenance of chronic drug use, it does not adequately address possible causes for its formation in humans nor does it explain possible reasons for relapse. A self-medication hypothesis does offer a rationale for the development of an addiction by speculating that the behavior

of chronic drug use is initially driven by maladaptive thoughts and feelings.

Even though the self-medication model has been criticized on several different levels by clinicians and researchers, the model continues to be employed by Khantzian and other psychiatrists in the field. Khantzian (1986) states, "The self-medication hypothesis is advanced heuristically not as a definitive theory but as a useful hypothesis to be used with our patients as we work with them in early phases of this illness" (p. 1310).

Although intense negative emotions such as depression, rage, and anxiety may initiate drug use there is a paradoxical nature to addiction. Chronic drug use will ultimately lead to emotional suffering as well. In a reformulation of his model, Khantzian (1987) explains this inconsistency by speculating that addicts may not be seeking to reduce suffering, but may be trying only to control it. He contends that these individuals are incapable of recognizing and adapting to normal human pain and suffering. By taking drugs they initiate a lifestyle of suffering that they come to recognize, understand and control.

Addicted individuals may go through periods when they are unable to obtain their drug. If this interval lasts for

a number of days, both psychological and physical withdrawal effects occur. These are usually accompanied by an awareness of social stressors brought on by a deleterious lifestyle. Typically, these stressful events lead to the resumption of drug use. Khantzian believes this situation is preferable to struggling with normal pain and suffering, for which addicts lack appropriate coping strategies. The addict's belief that suffering can be controlled with drugs becomes a powerful motivator for continuing the behavior.

The self-medication model does not expressly argue that addicts are constantly preoccupied with negative feelings every time they use their drug of choice. Such a proposition would suggest that addicts use drugs only when they are suffering, and this simply is not so. However, most addicts will seek counseling when their lives are at an extremely low point. They may relapse weeks or months later when their psychological state shows significant signs of improvement. This indicates that the motivation to use drugs at this point may not be purely based on the need to self-medicate.

Many addicts relapse before their emotional state becomes too severe. When their negative state becomes intense due to drug use, they again seek abstinence. In my

clinical observation of over 200 addicts, only a small number claimed that their drug use was solely motivated by their need to alleviate immediate feelings of pain and suffering. This pattern would appear to support the self-medication model's main assertions. However, an overwhelming number of addicts also decide to relapse based on moderate feelings of boredom, euphoric memories of past drug experiences, and dissatisfaction with elements of their lives in abstinence. In other words, when relapse occurs it may occur at a point when addicts are feeling better than they did when they first began treatment and would, therefore, not need to self-medicate. On the other hand, Khantzian's model would predict that during abstinence an addict's inability to manage problems coupled with a propensity for negative feelings will lead an addict to relapse.

Role of Memory in Drug Addiction

Depending upon the drug of choice and the length of time of abuse, addicts may replay the scenario of attempting to refrain from drug use and eventually relapsing many times. Some addicts eventually reach the conclusion that while life during abstinence is difficult, it has improved

considerably from what it was like while they were addicted. Hence, the patient's memory of his past state may be a significant variable in determining whether or not he recovers. If the self-medication model's main conclusion is that addicts use drugs as an attempt to relieve emotional pain, do they remember that their negative feelings were indeed alleviated during abstinence? Little is known about what the addict remembers about the early recovery. After the first few days of abstinence an addict will usually begin to feel better, but may decide to relapse again after an additional few days or weeks. It is as if addicts disregard how they felt a few days earlier. This suggests that their ability to remember previous emotional states cognitively may be impaired.

A memory problem may be caused by the action of the drug on the addict's nervous system. Neuropsychological deficits due to chronic cocaine and heroin drug use have been reported in the literature. Melamed (1987) observed that chronic cocaine abuse impairs visuomotor tracking, cognitive flexibility, and speed of information processing. Deficiencies in short-term memory for cocaine-addicted individuals were reported by Menschreck, Scheneyer, Weisstein, Rosenthal, Celada, and Bemer (1990) and Herning,

Glover, Weddington and Jaffe (1990). O'Malley and Gawin (1990) found concentration, memory, non-verbal problem solving and abstraction ability to be affected. Several studies have also confirmed similar deficits in heroin-addicted individuals (Rounsaville et al., 1982; Guerra, Sole, Cami & Tobena, 1987).

While deciding whether to relapse, addicts interpret their immediate feelings, as well as memories of past emotional states. An addict's decision to abstain from drug use may be based upon the fact that the drug of choice no longer relieves suffering. The self-medication model emphasizes that the psychological motivation to relapse is based on the belief that drugs can once again successfully reduce emotional suffering. Conceivably the distress that leads to relapse may be based upon memories of the prior events that initiated abstinence, or perhaps the negative physical symptoms experienced during early withdrawal. In order to determine what role the memories of past feelings play in their decision, it is essential to understand how negative emotions and physical discomfort are remembered. This issue, which has not been studied in addicted individuals, will be explored in the present thesis.

Remembering Emotional Stimuli

A basic procedure used to study how emotional stimuli are processed has been simply to assess recall of verbal stimuli composed of either emotional or neutral words. Research in this area has demonstrated the significant effect that emotionality plays in influencing the ease in recall of verbal stimuli. Matlin and Stang (1978) determined that positive emotion words are recalled more accurately than neutral or negative emotion words in healthy volunteers. In contrast, when recall of negative emotion words is compared to neutral words there is better recall for the negative words (Craik & Tulving, 1975; Strongman, 1982; Strongman & Russell, 1986).

A number of theories have been proposed to explain the superiority of emotional words compared to neutral words. For example, according to the level-of-processing hypothesis proposed by Craik and Lockhart (1972), we analyze information, such as words, in various ways. Analysis can range from the "shallow", sensory processing of a word's physical appearance, to the "deeper", more complex kinds of encoding involved in judgments about the word's meaning. The "depth" of the processing determines the strength of the resulting memory trace. It has been observed that the

deeper the material is processed, the more permanent the retention of the material (Craik, 1979).

Craik and Lockhart (1986) hypothesized that two factors involved in deep processing, distinctiveness and elaboration, promote better recall of material. Distinctiveness is characterized by the extent to which a stimulus is different from other memory traces. Elaboration involves a richer processing procedure of the material's meaning. Consider having to remember the word "truck." If you perform deep processing of the word, you may come up with an encoding that is highly distinctive from other memory traces. For example, you may think of an image of a truck that you spent hours loading. This type of processing would also entail encoding the meaning of the word.

An interesting feature of the level-of-processing approach is the self-reference effect, an increase in recall when subjects try to relate new information to themselves. Rogers, Kuiper, and Kirker (1977) gave subjects a list of words to process with instructions corresponding to different levels of processing. The words were processed in terms of their physical, acoustic, or semantic characteristics. Other words were processed based upon whether the words referred to characteristics of the

subjects. The results indicated that the self-referenced words were better recalled.

Posner and Snyder (1975) hypothesized that emotion memory is superior to item memory. They speculated that emotion words have unique characteristics that set them apart in memory from emotionally neutral words. Emotion words may increase alertness and diligence in processing (Strongman & Russell, 1986).

Bower (1981) has proposed a semantic network model in which concepts, ideas, memories and also emotions are represented by a network of units or nodes. When a node is excited (e.g., by external stimulation), activation spreads automatically to other nodes within the network. The amount of activation depends upon the strength of the connection between nodes. From this theory, Bower outlined two influences emotion may have on cognition, mood-dependent and mood-congruent memory.

Mood-dependent memory maintains that people are better able to retrieve memories if they are experiencing the same emotional state that they did when the memories were first learned. If a person learned a list of words while in a happy emotional state, memory for the list improved during a similar emotional state. This is an aspect of the

encoding specificity principle, which says that recall is better if the retrieval context is like the encoding context (Bransford, Franks, Morris and Stein, 1979). In a recent review of the literature, Bower (1987) acknowledges there has been only equivocal support for mood-dependent memory in the literature.

The effect of mood-congruent memory is that stimuli that have a similar affective tone to the individuals' emotional state are better remembered then neutral or incongruent stimuli. Mood-congruent memory effects can be explained within the context of a semantic network model by assuming that the stimulation of an emotion node leads to a spread of activation to its interconnecting nodes. The ensuing activation of concepts and experiences related to the emotion makes it easier to recall events that are congruent with the affective state. For example, within the network of nodes, nodes that correspond to negative ideas and memories will be interconnected with negative emotion nodes. Therefore, according to the theory, a depressed individual is better able to remember words associated with negative feelings because they are more easily accessed than neutral or positive words.

Another approach to studying the influence of emotion

on memory has been to determine whether different mood states can influence memory. Memory of individuals who are naturally experiencing intense feelings such as clinical depression and anxiety is compared with that of nondepressed, nonanxious controls; or mood states that are induced in the laboratory.

Induced mood states have been shown to influence retrieval of past experiences in a mood-congruent direction. Happy past experiences are recalled more often when subject's mood are positive. Unhappy experiences are more probable in an induced negative mood (Teasdale & Fogarty, 1979; Teasdale & Taylor, 1981).

There is some agreement that depressed individuals have a strong bias to recall negative rather than positive or neutral information (Silberman, Weingartner, Laraia, Byrnes, & Post, 1983; Dunbar & Lishman, 1984; Williams, Watts, Macleod & Mathews, 1988). A similar bias has not been conclusively determined for anxiety, though Mathews, Mogg, May and Eysenck (1989) did find that anxious patients showed a bias for threat words. However, Nugent and Mineka (1991) failed to replicate this finding in a study using anxious students as subjects.

The research on the effect of mood states, either

naturally occurring or experimentally induced, suggests that the individual's affect facilitates recall of complementary material. This can be explained in terms of Posner and Snyder's theory that emotion words are more salient and hence, better remembered, or by Bower's mood-congruency effect. It could also be interpreted in terms of the self-reference effect. Depressive individuals may process negative stimuli better because they relate to aspects of their own self-concept. Teasdale and Russell (1983) noted that the depressive recall bias seemed only to appear in material that was personally relevant to the individual.

Much of the inquiry on a negative recall bias in depression has been influenced by Beck's cognitive theory of depression (Beck, 1967), which proposes that cognitive distortions lead to psychological distress. A cognitive distortion develops from a dysfunctionally formed schema. When activated, schemas are thought to guide the processing of information, including attention and the search for information in memory. It has been suggested by Beck (1976, 1985, 1988) that emotions are determined by how a person perceives, interprets, and assigns meanings to events. According to Beck and Weishaar (1989), a dysfunctional schema can contribute to cognitive distortions, bias in

information processing, and other problems associated with emotional distress. A cognitive schema biased towards negative feelings is characterized by negative thoughts concerning the self, the world, and the future.

Williams et al. (1988) concluded from a literature review that during states of depression there is a bias toward better recall of negative rather than positive stimuli. In non-depressed individuals the reverse bias is observed. An earlier review by Blaney (1986), which also reported studies confirming this bias, draws two pertinent conclusions. First, the emergence of a negative recall bias during a depressive state may be relative rather than absolute. In a number of studies, depressed people merely under-recalled positive information. Second, in most of the studies the stimuli words used for recall were descriptive of personality. This suggests that self-referent processing may have contributed toward the bias.

Signal Detection Theory and Memory

Investigators have employed Signal Detection Theory (SDT) to study memory. In a typical recognition memory test, subjects are presented with a list of words for inspection. After a time they are presented with a list

consisting of old items (items previously presented) and new items. The subject is required to examine each item and to indicate by saying "old" or "new" whether or not it was a member of the previous list. During the recognition part of the memory task there are one of four possible outcomes: (1) responding "old" to an item previously presented (hit); (2) responding "old" to an item that was not previously selected (false positive); (3) responding "new" to a previously selected item (false negative); and (4) responding "new" to an item that was not previously selected (correct rejection). The four possible outcomes are presented in a 2 x 2 decision matrix in table 1.

Table 1.
Decision outcomes in discriminability testing.

	responses to whether words were chosen or not	
Stimuli	"OLD"	"NEW"
Old Words	Hit	False Negative
New Words	False Positive	Correct Rejection

Signal Detection theory describes performance in terms

of two independent parameters, discriminability and report criterion. Discriminability or memory strength is the degree to which the subject can discriminate items that were previously presented from new items. Report criterion is the relative laxity or strictness of the criterion used in making the recognition judgment. The critical point is that two subjects who do not differ in the information contained in memory, and are thus equal in discriminability, can differ in the number of list items they appear to recognize if they differ in criterion.

Zuroff, Colussy, and Wielgus (1983) used SDT, that is, hit rate, to assess memory for positive and negative adjectives. While depressives recalled more negative words, memory was not significantly greater for this group. Instead, the depressed and non-depressed groups differed in their criterion. The depressed subjects may have been more willing to report remembering negative words when they were unsure. Zuroff et al. proposed that the difference in criterion occurred because depressed subjects were more likely to guess that they reported a negative word compared to the nondepressed group.

Similar results were observed in a study by Dunbar and Lishman (1984), who found that depressed subjects were more

likely to reporting a negative word as "old" than a positive or neutral word, that is they set a lower criterion for negative words. The use of Signal Detection analysis has brought to light the prospect that the negative recall bias during depression may be a function of a differential response bias toward negative stimuli instead of a specific memory. In other words, a depressed individual may report remembering negative words more than positive or neutral words not because these words are better retained in memory, but because their emotional state may govern the decision process in situations when they are uncertain. In essence, report criterion not memory strength may be mood-dependent.

Memory for Pain

If the way emotions are processed in memory is somewhat unclear, it is even less clear how pain or physical discomfort is remembered. The research on memory for pain began with the eminent psychoanalyst Ernest Jones' (1957) short report in which he described experiencing a painful episode and later being unable to recall its quality. He explained the difficulty in recall being due to the repression of a fearful event. In another pioneering paper

on the topic, Merskey (1975) supported Jones's description of the experience but interpreted it without a psychoanalytic explanation. He maintained that painful episodes can be stored as mnemonic traces and can be reactivated when one is emotionally distressed.

Since then, most research has concentrated on addressing the accuracy of memories of pain intensity. Pain research has explored memory for chronic pain (e.g., back pain), acute pain (e.g., myocardial infarct, childbirth), acute pain induced by clinical procedures (e.g., dentistry), and experimentally induced pain (e.g., electric shock). In a review of pain memory research, Erskine, Morley and Pearce (1993) report three main findings. First, recall of past pain experiences is generally accurate. Second, recall for acute, novel pain is more accurate than recall for chronic pain. Third, mood and affective states influence memory for pain. Erskine et al. speculated that acute pain is more accurately recalled than chronic pain because recall of chronic pain may be drawn from semantic memory, whereas recalling isolated incidents of acute pain is more likely to draw on episodic memory. Tulving (1983) described the distinction between the two types of memory. Episodic memory stores information about when events occurred and the

relationship between those events. Semantic memory involves the process of how we organize the world and includes a constant knowledge structure. Erskine et al. (1993) suggest that when asked to recall previous pain, a chronic pain subject is processing the associations involved in chronic pain, the mood and lifestyle consequences, not just the pain itself. Judgments of past pain experience may be influenced by a stable view of the problems accompanying the condition, but not necessarily influenced by their intensity. Hence, such subjects are more likely to draw upon semantic memory in making their estimation. In recalling an isolated incident of acute pain, subjects may rely more on episodic memory.

The third point raised by Erskine et al (1993), that mood and pain influences pain recall, has been well documented in the literature (Kent, 1985; Roche & Gijsbers, 1986). For example, Bryant (1993) reported that chronic pain subjects who reported increased depression overestimated their earlier pain.

It appears that pain and depression may influence the processing of affective words in a similar fashion. Seltzer and Yarczower (1991) have found that the experience of pain significantly decreased the recall of previously viewed

positive words while significantly increasing the recall of negative words.

A basic question concerning the memory for past pain and emotional states is, Precisely what is remembered? Is it the pain sensation and the emotional state that is processed into memory, or is it the cognitive labels that are attached to the experience at the time they occur? Clark and Bennett-Clark (1994) propose that previous pain and emotional states are not conjured up experientially but rather it is the semantic label that is recalled. They maintain that, "The question, "Are the words or the sensations being recalled?" might be answered by using two sets of words that have been empirically matched for meaning, one set for the measure of present pain and the other set for later recall. If words instead of sensations are being recalled, then a group of subjects presented with the new, but matched, words will do worse than another group who are asked to recognize the set of old words used initially. Conversely, if the earlier sensations themselves and not the words are being remembered than switching to a new set of matched words should have no effect on recall" (p. 196).

Suffering Bias

For an addict, drug use is a means of coping with suffering. An abstaining addict may conclude that life is too depressing, too anxiety-ridden, or simply too boring, and decide to relapse. The difficulty could be in the ability to differentiate events that bring on the state of suffering from those that may lead to mild distress. Addicts may have a bias in viewing normal suffering that leads to repeated drug use.

Both anxiety and depression are associated with biased judgments of the likelihood that negative events will happen to the individual (Butler & Mathews, 1983). Anxiety is also associated with an increased tendency to interpret ambiguous information in a threatening manner. For example, when clinically anxious subjects are read a series of homophones, each of which has a threatening and a nonthreatening meaning (e.g. dye, die), they are more likely to select the threatening meaning than are nonanxious subjects (Eysenck, Macleod, & Mathews, 1987). Similarly, when clinically anxious subjects read a series of ambiguous sentences (e.g., "the men watched as the chest was opened"), they are more likely to remember the threatening meanings of the sentences than are normals (Eysenck, Mogg, May, Richards & Mathews,

1991).

A number of psychological disorders have cognitive explanations, anxiety disorders may arise from problems in processing threat-related situations. Specifically, individuals may develop anxiety disorders when they (a) selectively attend to threats around them, (b) selectively recall past threats, (c) misinterpret neutral situations as threatening, or (d) erroneously expect something bad to happen (Butler & Mathews, 1993; Ingram & Kendall, 1987; Mathews, 1990). There are two main cognitive theories of depression. In one, it is believed that individuals become depressed because they focus on the negative aspects of life (Beck, 1967 & Teasdale, 1983). In the other theory, it is assumed that feelings of helplessness about controlling the negative outcomes of life lead to depression (Abramson et al., 1978; Blaney, 1977; Miller & Norman, 1979).

A judgment bias in addicted individuals may involve a propensity to exaggerate the amount of suffering that a particular event warrants. They may as a result view a situation in their lives as either too emotionally or physically distressing for them to deal with, and be therefore inclined to continually medicate themselves or return to medicating themselves following a period of

abstinence.

In order to determine whether addicted individuals have a suffering propensity two questionnaires were developed for this study, a physical suffering questionnaire (PSQ) and an emotional suffering questionnaire (ESQ). Each questionnaire provides a measure of the subject's pain report criterion; that is, the amount of stoicism with which he evaluates imagined suffering events. Also of interest is the subject's cognitive ability to evaluate the intensity of the imagined suffering experience. The SDT model is used since it measures the ability to discriminate between two types of events and the tendency or bias toward reporting one of the events more often than the other.

Hypotheses

Three drug-addicted groups undergoing detoxification from chronic addiction to: 1) cocaine, 2) heroin and 3) heroin and cocaine, comprised the addicted group. Healthy college students served as the control group. The study investigated two hypotheses. The first, deals with the self-medication models assertion that heroin and cocaine are abused to relieve specific deficits within the addict. It is hypothesized that addicts regardless of their drug of

choice will exhibit depressive symptoms. There should be no difference in the depressive symptoms for the specific addicted groups during withdrawal.

Memory Test

During the first test session, after the assessment of the addicts' emotional and physical state, they were asked to indicate, from a list of adjectives, the words that come closest to describing their immediate feelings. Then at the beginning of the second test session they were asked to recall how they felt during the first test session and to select from a list those words that represent those previous feelings. One group judged words from the same list they had on the previous test day or a list of matched synonym words. Signal detection indices were computed in addition to the percentages of pain, negative and positive self-relevant adjectives. Thus, it was possible to determine whether differences between the addicted group and non-addicted controls can be attributed to differences in strength of memory or to differences in response bias. It is hypothesized that addicted individuals, will have a poor memory of their withdrawal state.

Suffering Questionnaires

Another part of the study evaluated an addict's cognitive ability to evaluate imaginary situations portraying incidents of varying levels of suffering. Two types of questionnaires were used, one in which the stimuli are descriptions of imaginary situations of various amounts of pain and the other depicting imaginary situations of emotional suffering. It is hypothesized that addicts are poorer discriminators of the suffering statements compared to non-addicts for both questionnaires. Specifically, it is postulated that a major feature of addiction may be that these individuals are unable to discern circumstances that may produce high or low levels of suffering. It is also speculated that they have a bias in viewing the situations as being more distressing than they really are.

Addicts may perceive situations as being overly distressing because of their own immediate feelings. The addicted group is likely to feel better during the second testing; as a result, their response bias for the suffering situations may change from the first test session to the second. However, if a suffering judgment bias is indicative of addicted individuals and is employed as a maladaptive strategy for coping with different situations regardless of

their immediate feelings, then response bias will not change despite feeling better at the second test day.

Method

Participants

Participants in the addiction group were patients admitted to Bayley-Seton Hospital's Chemical Dependency Unit between 6/23/94 and 10/9/94 for chronic use of heroin, cocaine or both heroin and cocaine. The non-addicted control group was made up of day and evening students in the St. Francis College and St. John's University subject pool. Demographic information consisting of: age, gender and level of education was obtained for both groups.

Test Materials

Level of Addiction was assessed for subjects in the addiction group using the Addiction Severity Index (ASI) (see Appendix) (Fureman, Parikh, Bragg & McLellan, 1990). Addiction was defined by the type of drug(s) used, amount used within the month preceding admission to the hospital, number of years addicted, and route of administration of drug(s).

Self-Reports

Level of anxiety was assessed, for both groups, using

the six-item short-form of Speilberger's State Trait Anxiety Inventory (Marteau & Bekker, 1992). Subjects selected either: "Not At All", "Somewhat", "Moderately", or "Very Much" for each symptom (see Appendix).

Level of depression was determined, for both groups, using a brief screening instrument for depression (six-items) (Burnam, Wells, Leake, & Landsverk, 1988). Subjects selected either: "Less Than 1 Day", "1-3 Days", "3-5 Days", or "5-7 days" (see Appendix). The instrument is a shortened version of the Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977).

Pain level was assessed for both groups using a ten cm visual analogue scale for pain. The scale ranged from "No Pain" to "Worst Possible Pain" (see Appendix).

Withdrawal symptoms for heroin addicts were assessed using the Short Opiate Withdrawal Scale (Gossop, 1990) (see Appendix). Cocaine withdrawal symptoms were assessed using the Cocaine Withdrawal Symptom Monitoring Sheet (Teller & Devenyi, 1988). For both withdrawal scales subjects selected either: "None", "Mild", "Moderate", or "Severe" for each withdrawal symptom (see Appendix).

To examine memory, two word lists consisting of forty words were adapted from a set of 270 adjectives describing

Pain/Suffering and Health/Happiness that were empirically matched through multidimensional scaling methods. The intention of this procedure is to develop a combined affect and pain questionnaire. The words were taken from the McGill Pain Questionnaire (MPQ) and the Multiple Affective Adjective Checklist (MAACL) as well as other sources. A hierarchical clustering model, Average Linkage Between Groups, which assumes a discrete rather than a continuous spatial structure, was used to analyze similarity judgments made by seven experienced pain researchers. Analysis produced a dendogram with 50 subclusters and 18 primary clusters: Penetrating Wounds, Pains Without Wounds, Fatigue, Mechanical, Temporal, Cold Depression, Passivity, Fear/Anxiety, Hostility, Pure Sensory Pain, Suffering, Somatic/Emotional Distress, Heat, Pleasant Sensations, Affiliative Behavior, Positive Feelings, and Healthy Behaviors.

A 109 words from the dendogram were selected and piloted on ten drug addicted patients at the Hospital prior to testing to determine if they were comprehensible. From the words that were chosen as comprehensible, 40 synonym pairs were selected for the study.

To examine whether a suffering bias exists, two

situational suffering questionnaires based on SDT Theory were developed for this study, one for pain and one for emotional suffering. The questionnaires were based on principles adapted from the Situational Pain Questionnaire of Yang, Wagner, and Clark (1983). The tests were constructed as follows. First, the items in each questionnaire were rank ordered for suffering intensity by sixty-four college students. The averaged lists were split into a greater suffering half ("signals"), and a lesser suffering half ("blanks").

Each questionnaire consists of 22 statements of differing levels of suffering; subjects were instructed to rate on a zero to six point scale the level of suffering each statement would cause them to experience. A rating of "0", represented "No Suffering" , a rating of "1" represented "Slight Suffering", a rating of "2" represented "Mild Suffering", a rating of "3" represented "Moderate Suffering" , a rating of "4" represented "Intense Suffering", a rating of "5" represented "Extreme Suffering", and a rating of "6" represented "Worst Possible Suffering."

One questionnaire presented descriptions of situations that vary in the amount of physical suffering, for example,

having a broken leg (high physical suffering) and having your arm fall asleep (low physical suffering). The second questionnaire presented descriptors of situations that vary in the amount of emotional suffering, for example, discovering you have six months to live, (high emotional suffering) and forgetting where you parked your car (low emotional suffering). In my clinical work with addicted individuals I've heard a number of different excuses for their relapse. Many of the emotional suffering statements used in the questionnaire were based on these excuses.

Signal detection analysis of the physical suffering and emotional suffering questionnaires provides measures of discrimination, how well the subject distinguishes between suffering situations of different intensities, and criterion, the subject's inclination toward reporting the degree of suffering experienced in these situations. A low criterion implies that the subject has the general tendency to see situations as leading to suffering, high criterion suggests a more stoic attitude.

Procedure

At admission, patients who reported chronic addiction to cocaine and/or heroin were asked to take part in the

study and to sign a participation form (see Appendix). All signed forms were given to the investigator on the following day. The first day of testing took place two to four days following admission to the unit. Subjects were tested individually in a small office on the detox unit. Before testing began, subjects who signed the participation form were asked again whether they were willing to take part in the study and to sign a research consent form (see Appendix). It was necessary to ask patients a second time to participate to eliminate the possibility that they were under the influence of a psychoactive substance when they first agreed to take part in the study.

Subjects were tested within the second and fourth day of admission to the detoxification unit and again within the seventh and ninth day. It is believed that the peak phase of psychological and physical distress from cessation to both heroin and cocaine occurs during the second and fourth days of abstinence.

The first test session consisted of the administration of the ASI, followed by the depression and anxiety questionnaires, the heroin and cocaine withdrawal questionnaires and the Visual Analogue Scale for physical pain. Next the PSQ and ESQ questionnaires were given,

followed by the word list. To test for memory the word list was administered at the end of the first test session and at the beginning on the second test session. After.the first test session subjects were told not to discuss the experiment with anyone else. The second test session included the word list followed by a second administration of the depression and anxiety scales, the withdrawal questionnaires and the VAS for physical pain and both the PSQ and the ESQ. After the second test session, subjects were thanked for their participation, given a short debriefing and then dismissed.

Subjects in the Control group were college students participating as part of the requirements for an experimental research course on two occasions four to six days apart. They were tested as a group in the classroom prior to the beginning of the class lecture. The same procedure and materials were employed as to the addicted group except that the ASI and the withdrawal scales were not given.

Calculating SDT Parameters

The use of SDT analysis generates two independent measures, the parametric statistic d', is an estimate of the

ability to discriminate between old (previously presented) and new items and L_r, a measure of response bias. However, the assumptions of parametric SDT measures may be violated by clinical subject groups or when there are relatively few observations (Clark, 1994; Niederehe & Camp, 1985). For these reasons in the present research, the nonparametric SDT indices P(A), and B were assessed. The discriminability measure P(A), is considered preferable to d', because it represents all the observations along the ROC curve, that is the total area under the ROC curve (Pollack & Norman, 1964; Clark, 1994). The criterion B, defined as the rating scale category where the cumulated hit and false positive probabilities equal unity (P(hits) + P(false positives) = 1), equivalently, B is the median response category. One limitation of B is that it does not give a bias measure for each criterion; it provides only a single bias score (McNicol, 1972).

Table 2. presents an example of how to calculate B. Since B is equal to the response category where P(hits)+ P(false Positive) = 1, inspection of Table 2 shows that B does not lie at any category. It must lie above category 2 whose sum is less than 1, but below category 3 whose sum is greater than 1.

The procedure for calculating B is as follows: a) the categories between which B must lie are determined. b) The number of (P(hits)+P(false positives) units between the upper and lower categories is 1.26 - .71 = .55. c) As B is the point where, P(hits) + P(False Positives) = 1, then it lies 1 - .71 = .29 units above the lower category. d) Assuming that .55 units between the two categories are equally spaced, then B must occupy a position .29/.55 of the way between the lower and upper categories. e) In category units, the distance between the lower and upper categories 3 - 2 = 1 unit. As B lies .29/.55 of the way into this unit, it will be (.29/.55) x 1 category units above category 2. f) Therefore, B will be equal to the category unit value of the lower category, plus the distance (in category units) it lies above the lower category, specifically, 2 + .53 = 2.53.

Table 2.
Hypothetical example of cumulative probabilities of hits and false positives for calculating B.

	Observer's Response High certainty signal to high certainty noise			
	Certain Signal	Uncertain Signal	Uncertain Noise	Certain Noise
Response Category	1	2	3	4
P(H)	.55	.69	.89	1.0
P(FP)	.01	.02	.37	1.0
P(H)+(FP)	.56	.71	1.26	2.0

When calculating B, adopting the convention of assigning the value '1' to the strictest criteria signal category and the number 'N' to the strictest noise category, small values of B will indicate a preference for signal responses and larger values of B indicate a preference for noise responses.

The procedure for determining B for the memory task in this study is even simpler because a binary decision criteria was used. The subjects indicated either "yes" they remember the word describing how they felt, or "no" they do not remember the word describing how they felt. Since a 'yes' response represents the stricter criteria signal category it is given a value of '1', and a 'no' response is given a value of '2'. Table 3. displays how the B values

were determined.

Table 3.
Cumulative probabilities of hits and false positives for calculating B.

	Observer's Response High certainty signal to high certainty noise	
	YES	NO
Response Category	1	2
P(H) P(FP)	P(yes/yes) P(no/yes)	P(no/no) P(no/yes)
P(H) + (FP)	P(y/y) + P(n/y) = B	P(n/n) + (n/y) = B

Results

None of the subjects in the Addicted group that were asked to participate in the study declined. Of the seventy-two subjects in the Addicted group that were at the first test session, ten (fourteen percent) left the hospital against medical advice prior to completing the second test session. For the Control group, students from four experimental psychology courses were tested four to six days apart as partial fulfillment of the course requirements. Of the seventy tested during the first test session twenty-three (thirty-three percent) were not in attendance for the second test session. Subjects who did not complete the second test session were dropped from the study.

General Group Characteristics

Table 4. presents demographic information for the Control and Addicted groups, including gender, age, level of education and ethnicity. The Addicted group had an average age of thirty-three years, and an average level of education that slightly exceeded high school. The Control group consisted of college sophomores and juniors with an average

age of twenty-four years. Two separate one way ANOVAs showed that the difference in age ($F(1,108) = 33.48$, $p < .001$) and education ($F(1,108) = 20.68$, $p < .01$) were significant.

Table 4.
Demographic information for the Control group and Addicted group.

			Control Group	Addicted Group
Gender:	Male	n	12	47
	Female	n	35	15
			47	62
Age:	Years	M	24.0	33.1
		SD	09.3	07.4
Level of Education:	Years	M	13.2	12.1
		SD	00.8	01.5
Ethnicity:	White	n	36	36
	African-American	n	2	13
	Hispanic	n	7	13
	Asian	n	2	0

Psychological Measures

It was hypothesized that there would be changes in the psychological measures for the Addicted group between test sessions due to the relief in withdrawal symptoms. Separate 2 (test) x 2 (group) ANOVAs, with test as a repeated

measure, were calculated on the visual analogue scale, depression and anxiety questionnaires.

Table 5. displays the mean scores for the Control and Addicted group for the first and second test session. Analysis of the main effects for the depression questionnaire indicated that there was a significant decrease in depression scores between test sessions ($F(1,107) = 12.98$, $p < .05$). The Addicted group had greater depression scores than the Control group ($F(1,107) = 70.05$, $p < .05$). Even though the Addicted group's scores decreased between session compared with the Control group, there was no significant interaction.

Table 5.
Psychological measures for the Control and Addicted groups for both test sessions.

	Control Group Test Session			Addicted Group Test Session	
	n=47 1	2	n=62	1	2
Depression scale					
M	5.38	5.25		9.60	8.21
SE	.21	.40		.40	.34
Visual analogue scale for physical pain (cm)					
M	3.28	3.30		4.60	3.14
SE	.34	.36		.41	.35
Anxiety scale					
M	10.67	10.68		10.62	10.97
SE	.53	.45		.40	.32
Heroin Withdrawal Scale	NA				
M				7.77	5.84
SE				.80	.65
Cocaine Withdrawal Scale	NA				
M				11.94	9.30
SE				.82	.74

As can be seen in Table 5., visual analogue scale scores for pain were slightly higher for the Addicted group at the first test session and decreased at the second test session. The Control group experienced minimal to no pain

at both test sessions. Analysis of the main effects indicated a significant decrease in pain between tests ($F(1,107) = 4.98$ $p < .05$). However, there was no significant difference between groups. The Addicted group's visual analogue scale pain scores diminished between test sessions while the Control group's scores remained constant. This is indicated by the significant interaction ($F(1,107) = 8.93$ $p < .05$). There was no overall change in anxiety scores for either group or test session. Although, the Addicted group's anxiety scores at the second test session appeared to slightly increase there was no significant interaction.

Since only the Addicted group received the heroin and cocaine withdrawal scales, paired t-tests were performed to assess differences between the first and second test session for these measures. Subjects in the Addicted group who had an addiction to cocaine alone or both cocaine and heroin showed a significant decrease in the effects of cocaine withdrawal symptoms between test sessions. The mean cocaine withdrawal score was 11.7 ± 1.0, at session one and $9.5 \pm .94$ at session two ($t(43 = 2.23$ $p < .03$). Subjects who had an addiction to heroin alone or both heroin and cocaine showed a significant decrease in heroin withdrawal symptoms between

test sessions. The average heroin withdrawal score at the first test session was 9.1±1.0 and 6.96±.82 at test session two ($t(42) = 2.03$, $p < .05$).

Table 6. presents the psychological measures for the Addicted group for both test sessions collapsed by the specific drug(s) of addiction. Separate 2 (test) x 3 (drug addicted groups) ANOVAs with tests as a repeated measure were performed on each of the psychological measures for the three specific addicted groups.

All three Addicted groups showed a reduction in depression scores between the first and second test session. There was a nonsignificant group difference. There was a significant decrease in depression scores between tests ($F(1,59) = 15.50$, $p < .05$). The three specific Addicted group's depression levels decreased in a similar fashion as indicated by a nonsignificant interaction.

The visual analogue scale scores for pain also decreased between test sessions for the three specific Addicted groups ($F(1,59) = 14.27$, $p < .05$). The anxiety scores did not vary between test sessions nor between specific drug groups.

Table 6.
Psychological measures for the addicted group by drug of addiction for both test sessions.

	Cocaine		Heroin		Both Drugs	
	Test Session		Test Session		Test Session	
n=20	1	2	n=20 1	2	n=22 1	2
Depression scale						
M	9.70	7.00	8.62	7.63	10.4	9.93
SE	.73	.67	.67	.47	.68	.52
Visual analogue scale for physical pain (cm)						
M	4.26	2.89	4.45	3.28	5.04	3.22
SE	.73	.63	.66	.63	.73	.56
Anxiety scale						
M	11.7	11.8	10.6	10.2	9.47	10.6
SE	.70	.72	.71	.32	.65	.53
Heroin Withdrawal Scale						
M	4.18	2.81	9.04	6.76	9.30	7.30
SE	.92	.79	1.20	1.11	1.30	1.20
Cocaine Withdrawal Scale						
M	9.89	7.94	13.1	9.09	13.1	10.7
SE	1.29	1.26	1.40	1.10	1.40	1.30

These results indicate that all three Addicted groups were experiencing physical and psychological distress at the first test session and that they showed relief from the withdrawal symptoms at the second test session. The

Addicted group's pain scores decreased and were equivalent to the Control group. Although the addicted group's depression scores decreased they still remained moderately elevated at the second test session compared with the Control group.

Situational Suffering Questionnaires

Table 7. presents P(A) and B values for the Control and Addicted groups for the PSQ and ESQ questionnaires at both test sessions. In calculating B the response categories began with the strictest noise category ("None") and ended with the strictest signal category ("Worst Possible Suffering"), therefore low B values indicated a more liberal report criterion, that is, more suffering responses.

Table 7.
SDT Measures: P(A) and B for physical and emotional Suffering questionnaires for both test sessions.

	Test Session One				Test Session Two			
	P(A)		B		P(A)		B	
	M	SE	M	SE	M	SE	M	SE
PSQ*								
Control Group								
n 47	.84	±.01	4.17	±.13	.84	±.01	4.17	±.15
Addicted Group								
n 62	.75	±.01	3.43	±.18	.72	±.01	3.33	±.18
ESQ*								
Control Group								
n 47	.85	±.01	4.41	±.13	.84	±.01	4.42	±.15
Addicted Group								
n 62	.77	±.01	3.50	±.16	.76	±.01	3.55	±.17

*PSQ Physical Suffering Questionnaire
*ESQ Emotional Suffering Questionnaire

Separate 2 (number of tests) x 2 (group) ANOVAs, with number of tests as a repeated measure, were calculated for each of the SDT indices for both questionnaires. There were significant group differences for P(A) and B for the ESQ ($F(1,107) = 24.18$ $p < .05$ and $F(1,107) = 17.55$ $p < .05$, respectively) and the PSQ ($F(1,107) = 37.97$ $p < .05$ and $F(1,107) = 11.89$ $p < .05$, respectively). For both

questionnaires at both sessions, the Addicted group had lower values of P(A) than the control group, that is, were worse at discriminating between intense and moderate suffering situations. The results of B indicated that the Addicted group had lower B values than the control group, that is, a greater tendency to see situations as leading to suffering.

Generally, subject's scores did not vary between test sessions for either group as indicated by a nonsignificant test effect and interaction. There were no significant main effects nor interactions for the specific drug Addicted groups.

Memory test

At the first test session, the subjects were instructed to check those words from a forty word list of adjectives that corresponded to their immediate feelings. Approximately four to six days later, at the beginning of the second test session, all subjects were asked to remember how they felt during the first test session and to select words from a forty word list that corresponded to their previous feelings. Half of the subjects in the Control and Addicted groups received the same list of words they used at

the first test session the other half received a list of matched synonyms. Results of the memory task will be analyzed in two ways, standard percentage correct and SDT.

Table 8. shows the mean number of words selected at the first test session, and the mean number and percentage of words correctly selected at the second test session using the same-word list. Table 9. presents the mean number of words and percentage of words correctly selected from the synonym-word list.

A one way ANOVA was calculated for the total number of words, for the Control and Addicted groups. The Addicted group selected a significantly greater total number of words at the first test session than the Control group ($F(1,108) = 51.28$, $p < .05$). Three separate one way ANOVA's were calculated for each specific word category. The Addicted group selected more pain words than the Control group ($F(1,108) = 25.65$ $p < .05$), as well as, more negative emotion words ($F(1,108) = 49.18$, $p < .05$). The two groups selected an equivalent number of positive emotion words.

The traditional method employed in memory tasks entails assessing the number of items correctly recognized. Since the mean number of words chosen at the first test session by the Control and Addicted group was different, it

is necessary to evaluate the percentage of words correctly recognized at the second test session.

Group comparisons of the percentages were assessed using the Mann-Whitney U test. With the same-word list on test session two, the Control group was able to correctly recognize 78% of the words they previously selected, compared to 68% for the Addicted group ($p < .05$).

Table 8.
Mean number and percentage of words correctly chosen using same word list at test session one and test session two.

	n	Word Category (Emotion) (Pain)	Mean number of words chosen at session one M SE	Mean number and % of words correctly chosen at session two M SE %
Control Group	23	Positive	7.22±.62	6.39±.71 89
		Negative	2.47±.51	1.52±.41 62
		Pain	1.87±.37	1.08±.29 58
		Total	11.56±.80	8.99±.80 78
Addicted Group	31	Positive	6.20±.40	3.80±.54 61
		Negative	8.29±.49	6.13±.63 74
		Pain	4.97±.51	3.36±.44 68
		Total	19.49±.66	13.29±.72 68

For the subjects using the synonym-word list on test session two, the Control group was able to correctly identify 47% of the synonyms of the words they chose on the

first test session, compared to 59% for the Addicted group ($p < .05$, Mann-Whitney U).

Table 9.
Mean number and Percentage of words recognized using synonym word list on test session two.

	n	Word Category (Emotion) (Pain)	Mean number of words chosen at session one M SE	Mean number and % of words correctly chosen at session two M SE	%
Control Group	24	Positive	7.04±.53	3.46±.58	49
		Negative	3.79±.57	1.79±.46	47
		Pain	2.50±.55	1.04±.34	42
		Total	13.33±1.1	6.29±.93	47
Addicted Group	31	Positive	6.51±.49	3.61±.50	55
		Negative	6.52±.54	4.54±.52	70
		Pain	4.74±.62	2.25±.44	47
		Total	17.77±.92	10.40±.67	59

Table 10. displays the mean number and percentage of words correctly selected at the second test session using the same word list for each drug Addicted group.
Table 11. displays the results for the synonym word list. There were no significant differences among drug addicted groups for either mean number of words selected at the first test session nor percentage of words correctly chosen at the

second test session.

Table 10.
Mean number of words correctly chosen using same-word list on test session one and test session two for Addicted groups by addicted drug.

	n	Word Category (Emotion) (Pain)	Mean number of of words chosen at session one M SE	Mean number and % of words correctly chosen at session two M SE %
Cocaine Addicted	10	Positive	6.60±.96	5.40±.83 82
		Negative	7.80±.70	5.50±1.0 70
		Pain	4.50±.95	2.90±.52 64
		Total	18.90±1.3	13.80±.98 73
Heroin Addicted	10	Positive	5.90±.93	3.45±1.0 58
		Negative	8.18±.83	5.63±1.1 69
		Pain	4.72±1.0	3.63±1.0 77
		Total	18.81±.88	12.71±1.3 68
Heroin & Cocaine Addicted	11	Positive	6.10±.44	2.60±.79 43
		Negative	8.90±.76	6.90±1.1 77
		Pain	5.70±.63	3.60±.74 63
		Total	20.70±1.0	13.10±1.4 63
Total	31		19.50±.66	13.30±.72 68

Table 11.
Mean number of words recognized using synonym-word list on test session two for Addicted group by addicted drug.

	n	Word Category (Emotion) (Pain)	Mean number of of words chosen at session one M SE	Mean number and % of words correctly chosen at session two M SE %
Cocaine Addicted	10	Positive	6.90±.37	3.00±.74 43
		Negative	6.50±1.0	4.60±1.0 81
		Pain	5.00±1.2	2.00±.90 40
		Total	17.70±1.6	9.60±1.3 54
Heroin Addicted	10	Positive	7.12±1.1	3.00±1.1 51
		Negative	7.12±1.1	4.87±1.0 91
		Pain	5.12±1.1	2.87±1.0 56
		Total	16.39±1.7	10.74±1.3 66
Cocaine & Heroin Addicted	11	Positive	6.25±.88	3.58±.76 57
		Negative	6.00±.75	4.08±.73 83
		Pain	4.00±.94	11.91±.55 48
		Total	15.16±1.3	9.57±1.0 63
Total	31		17.77±.92	10.40±.67 59

Signal Detection Analysis of Memory Test

Table 12. presents P(A) and B for the same-word list and the synonym word list for both the Control and Addicted groups. A 2 (group) x 2 (word list) ANOVA was calculated for P(A). Since P(A) is not normally distributed, 2 arcsin square root transformations were calculated for statistical

analysis. Overall, the Control group's recognition accuracy was significantly better, as indicated by the significant difference between groups (F (1,108) = 4.61 p < .05). Recognition accuracy for subjects that had the synonym-word list was worse than the subjects that had the same-word list (F (1,108) = 36.20 p < .001). The Control and Addicted groups did not differ in recognition accuracy on the synonym-word list, however they did significantly differ on the same-word list (group x test interaction: F (1,108) = 7.98 p < .05). Analysis of the simple main effects show the Control group's recognition accuracy was significantly better than the Addicted group with the same-word list, (F (1,53) = 12.49 p < .05). The Addicted group demonstrated a nonsignificant proficiency in recognition over the Control group with the synonym-word list. The mean P(A) score was .64$\pm$.02 for the Addicted group and .61$\pm$.02 for the Control group.

Comparing the percent correct (see tables 5 and 6) with the SDT index P(A), both are in accord that the same-word list at the second test session led to a significantly greater recognition for the Control group than did the synonym-word list. However, the percent correct for the synonym-word list data indicated a superiority in

recognition for the Addicted group that was not statistically reliable for the analysis of P(A). This discrepancy may be explained by examining the response criterion.

A 2 (group) x 2 (word list) ANOVA was calculated for B. There was no overall difference between the groups. However, there was a significant difference in response criterion depending upon which of the word-lists were employed ($F(1,108) = 7.95$, $p < .05$). Significant group differences for B were observed only when the synonym-word list was used. The response criterion for the synonym-word list was $1.22 \pm .02$ for the Control group and $1.11 \pm .02$ for the Addicted group. This suggests that there may have been a "criterion shift" when the synonym-word list was presented. The B values for the Addicted group were lower than the Control group, suggesting that the Addicted group appeared more willing to venture "yes" responses because they showed higher false positive and hit rates and lower false negative rates than the Control group. It was this response bias toward make positive responses that may have characterized the recognition memory scores of the Addicted group, rather than any difference in their memory accuracy.

Table 12.
SDT Measures: P(A) and B for both same word list and the synonym word list

	Same words				Synonym words			
		P(A)		B		P(A)		B
	n	M	SE	M SE	n	M	SE	M SE
Control Group	23	.83	±.02	1.09±.04	24	.61	±.02	1.22±.03
Addicted Group	31	.72	±.02	1.06±.02	31	.64	±.02	1.11±.02

Table 13. presents P(A) and B for the same-word list and the synonym-word list for the specific Addicted groups. The separate analyses of P(A) and B for the same-word list and the synonym-word list indicated no significant differences among the drug groups.

Table 13.
SDT Measures: P(A) and B for both same word group and the synonym word group

	Same words				Synonym words			
		P(A)		B		P(A)		B
	n	M	SE	M	SE	M	SE	M	SE
Cocaine Addicted Group	10	.78	±.03	1.05	±.03	.62	±.04	1.13	±.05
Heroin Addicted Group	10	.72	±.03	1.07	±.05	.69	±.04	1.09	±.05
Heroin & Cocaine Addicted Group	11	.64	±.04	1.06	±.04	.61	±.02	1.11	±.04
Total	31	.72	±.03	1.06	±.04	31	.64	±.03	1.11	±.05

Correlation Between Memory Performance and Psychological Measures

At the second test session the Addicted group demonstrated considerable relief from the psychological discomfort they were experiencing at the first test session. In order to determine the possible relationship of the emotional and physical state to the performance on the memory task, correlational analyses were performed. Since there was a decrease in the physical and psychological distress Since no significant differences were found among

the specific Addicted groups on the indices for the questionnaires, the three Addicted groups were combined. Two separate matrices of Pearson product-moment correlations between SDT indices of discriminability and response criterion for the recognition tasks for the synonym and same-word lists are presented in tables 14 and 15.

Table 14
Correlation matrix: Discriminability P(A) and response criterion (B) of synonym-word list recognition and psychological measures for the Addicted group.

	Test Session I		Test Session II	
	P(A)	B	P(A)	B
Depression Scores	-.31*	-.24	-.21	-.22
Visual analogue scale for pain	-.31*	-.25	.26	-.40*
Heroin Withdrawal Scores	-.39*	-.03	-.45*	.10
Cocaine Withdrawal Scores	.06	-.14	-.52*	-.28

* p< .05

For the synonym-word list, there were significant negative correlations for the depression questionnaire

scores, the visual analogue scale pain scores, and heroin withdrawal questionnaire scores at the first test session and a decreased recognition ability for the synonym-words at the second test session. This means that if depression, pain and heroin withdrawal symptoms were high at the first session, P(A) was lower, that is, memory performance was poorer with the synonym-words at the second session. Conversely, P(A) was higher if these symptoms were less severe at the first session.

There were significant negative correlations for heroin and cocaine withdrawal at the second test session and discriminability. Addicts experiencing high levels of physical suffering and depression had a memory deficit for synonym-words. For low levels of pain and depression, their recognition was better. There was also a significant negative correlation for pain and response criterion. High levels of pain produced greater hits and false positive rates.

Table 15
Correlation matrix: Discriminability P(A) and response criterion (B) of same-word list recognition and psychological measures for the Addicted group.

	Test Session I		Test Session II	
	P(A)	B	P(A)	B
Depression Scale	.14	-.36*	-.15	-.31*
Visual analogue scale for pain	-.04	-.30*	.00	-.16
Heroin Withdrawal Scale	.00	-.49*	-.23	-.40*
Cocaine Withdrawal Scale	-.39*	-.42*	-.27	-.13

* $p < .05$

For the same-word list, there were significant negative correlation for depression, pain, and withdrawal at the first test session and response bias of the same-word list. High levels of depression, pain and withdrawal at the first test session were associated with higher hit and false positive rates. The response criterion became stricter for lower levels of depression, pain and withdrawal. There were significant negative correlations for heroin withdrawal and depression at the second test

session and response bias. There was also a significant negative correlation for cocaine withdrawal and recognition accuracy for the same-word list.

These results suggest significant negative relationships between depression and physical distress associated with withdrawal and the ability to recognize previously chosen words. They were also associated with response bias for the synonym words.

Discussion

Major findings

This study assessed individuals going through drug withdrawal for cocaine, heroin and both drugs. The main purpose of this study was to determine whether there are behaviors at this stage of the addiction process. These differences may explain subsequent relapse; although there was no opportunity for follow-up in this study. The establishment of differences would serve as a guide for further research.

There were two hypotheses studied, one concerned the assertion made by the self-medication model, that specific drugs are abused to relieve specific symptoms and the other hypothesis which proposed that addicts do not remember the emotional and physical distress during withdrawal.

Psychological Measures: The Alleviation of Withdrawal

As was expected for the Addicted group, withdrawal symptoms appeared to diminish from the first session to the second. Scores for the depression questionnaire and visual analogue pain reports also decreased between tests. Slightly increased anxiety scores at the second test session

could have resulted from some patients' growing awareness of the immediate circumstances of their lives. The majority of the patients were leaving the hospital a few days after the second test session and were unsure of were they would be living. At the second test session, many patients conveyed that they were fearful of relapsing once they were released.

Memory Test

By giving either the same-word or the synonym-word list at the second test session it was possible to determine whether subjects could recognize the words they selected to describe their feelings at the first test session, or if they could recognize their previous feelings from a choice of matched words.

Analysis of the percentage of words correctly recognized demonstrated that the same-word list at the second test session yielded a higher recognition performance for both groups compared to the synonym-word list. This means that memory was better for the words checked rather than the emotional or physical experience itself. Another way of explaining this is that recognition memory for the same-word list was superior to synonym-word recall memory for the emotional or physical state.

Examination of both the percentage of words correctly chosen and the SDT index, P(A) showed that the Control group was more accurate than the Addicted group at recognizing specific words they chose to describe their previous feelings. An interpretation of the superior recognition performance of the Control group with the same-word list, may be due to the effects of mood-dependent memory. The Control group did not experience significant differences in their emotional state between test sessions. As a result, they may have been better able to retrieve the words they selected than to label their previous feelings due to the similarity in mood at both test sessions. However, recognition performance sharply declined for the Control group that used the synonym-word list at the second test session. Presumably, the Control group focused on processing the specific words they selected into memory, rather than the emotional state.

The Addicted group had a significantly higher percentage of correct responses with the synonym-word list than the Control group. However, group comparisons of P(A) for the synonym-word list indicated no difference in memory. The Addicted group's smaller B values indicated that they selected a response criterion of responding "yes" more often

than "no". This led to higher false positives and higher hit rates. It could explain the higher percentage of correct responses for the Addicted group.

It was hypothesized that the Addicted group would have a poor memory of their withdrawal. However, based on the percentage of words correctly chosen, the addicts were better at recognizing the negative words they selected. This was the case for both word lists.

Correlational Analyses of Memory Task

The correlational analysis of the memory task indicated a significant negative relationship between P(A) for the synonym words and pain report and depression scores at the first session. The higher the level of pain and depression at the first session the less able they were at recognizing their previous feelings using the synonym-word list. It would seem that the greater the severity of withdrawal symptoms, the less accurate they were in remembering the symptoms.

Significant negative correlations between B values and VAS scores for pain, and depression scores for the same-word list indicated that the greater the pain and depression the higher the false positive rates.

PSQ and ESQ Analysis

Despite considerable relief from the effects of withdrawal at the second test session, the addicted groups' responses on the PSQ and ESQ were similar to their responses when they were experiencing significant withdrawal symptoms. Regardless of their immediate emotional and physical condition, they had (a) difficulty in discriminating between low and high suffering situations (low P(A)) and b) tended to view all the statements as depicting distressing circumstances (low B).

Self-Medication Assertion: Rejected

The self-medication hypothesis implies that the type of drug one becomes addicted to, is associated with the chronic psychological state of the individual. Neurologically underaroused individuals would be attracted to the stimulant properties of cocaine. While neurologically overaroused individuals would be attracted to the dulling properties of heroin. Overall the Addicted group, despite differences in the drug(s) of abuse were quite similar on the psychological measures.

Reassessing the Self-Medication Model

Based upon the depression scores and the PSQ and ESQ, the different drug addicted groups responded in a similar fashion. This suggests that during the first few days of abstinence addicted individuals will display a common pattern of psychological symptoms. This rejects a part of the self-medication model, namely that addicted individuals choose their drug on the basis of it's ability to diminish specific symptoms.

In evaluating this part of the model, it seems that it places too much emphasis on the different effects of these drugs. While cocaine and heroin are psychoactively distinct, the pattern of use, abstinence, and relapse with these drugs is very similar. The unmanageability and loss of control develops suddenly with both drugs. The intense pleasure associated with these drugs and the negative feelings and desire to relapse while in withdrawal drives the person to use, despite the fears and anxieties of losing control.

The words for this study were composed of positive and negative emotional adjectives and pain adjectives. At the first test session, the Control group selected fewer words overall than the Addicted group. The words they selected to characterize their feelings were predominantly positive.

The collection of words chosen by the Addicted group during the height of withdrawal suggested a more complex psychological state. The majority of the selected words were negative adjectives and almost an equal amount of positive and pain adjectives. Certainly not a stable set of internal cues.

The negative and pain words obviously conveyed the internal state associated with withdrawal symptoms. The selection of positive words may have been the feelings related to being off the street and in a secure environment, or they could have been feeling good about their decision to seek treatment and abstain from further drug use.

Based upon Khantzian's model the heroin-addicted group should have had lower P(A) values and different B values than the two other addicted groups and the controls. Instead, all three of the addicted groups responded in a similar fashion.

As indicated by the addicted group's false positive responses, they incorrectly identified feeling more positive at the first test session than they actually were. One possible explanation for this could be due to their emotional state at the second test session. Since they felt better at the second test session, it could have influenced

their judgment about their previous emotional state. Snyder and White (1982) observed that current mood influenced the reporting of past personal events. When participants reported past events, if they were in a state of elation they recalled predominantly positive events likewise, if they were in a depressed state they recalled negative events.

Similar relationships between depression and decisional criteria in memory performance have been previously reported. In one study which used the Sternberg recognition memory task with the elderly, Hilbert, Niederhe & Kahn (1976) found that depressives made more false positive errors and showed less conservative criteria than a control group.

Overall, the Addicted group's performance on the memory task was poorer than the Control group. They appeared to have greater difficulty remembering the emotional events of there peak withdrawal period. It has been theorized that the emotional events in one's life tend to be remembered with significant clarity (Brown & Kulik, 1977; Christianson & Loftus, 1990; White, 1989). The question arises, just how accurate are these memories? Research has shown that despite the vividness of detail and high confidence attached

to recall of emotional events, conspicuous errors have been documented (Neisser & Harsch, 1990, Wagenaar & Groeneweg, 1990). In fact, there is reason to speculate that emotional events may be remembered less thoroughly than neutral events. Easterbrook (1959) hypothesized that physiological arousal may lead to a narrowing of attention. It has also been suggested that the poor memory associated with depression could be attributed to the inefficient use of organizational processes in memory (Tyler, Hertel, McCallum & Ellis, 1979; Hasher & Zacks, 1979).

A recent theoretical model of the effects of emotion has been offered by Ellis and Ashbrook (1988). They proposed a resource allocation model of the effects of depression on memory. Central to the theory is the notion that only a limited amount of cognitive effort is available for a specific task. Emotions of sufficient intensity occupy some amount of cognitive capacity, and may therefore reduce the amount of effort available for task processing. Based upon the results of the Seltzer and Yarczower (1991) study, suggesting that the effect of pain on memory is similar to that of depression, the resource allocation model could also be an explanation for the effects of pain on memory.

Another interpretation of the memory results is based on the nature of the self-reference effect, which implies that it is more helpful to process a word in terms of whether it applies to a person's concept of themselves. Bellezza (1984) suggested that the primary explanation for the self-reference effect is that the concept of "self" is treated as a rich and organized set of stable internal cues. Words that describe or label these internal cues are more efficiently processed than other words. Assuming that an individual's self concept remains consistent over time the self-reference effect will enhance memory performance.

Implications of a Poor Memory for Withdrawal

The difficulty in remembering the distress of withdrawal is crucial to understanding the addict and important to incorporate into the treatment process. Withdrawal is a frightening and traumatic experience. It highlights the loss of control that is characteristic of the addiction process. The realization and acceptance of the unmanageability of their lives is frequently so painful that defenses ward off the full impact.

It is the acceptance of the pain and suffering of withdrawal that becomes the focus of self-help programs such

as, Alcoholics Anonymous, and recovery-oriented treatment programs. The psychological defense of not retaining the memory of their withdrawal state allows the addict the capacity to deny the implications of his own behaviors and to further prolong the condition.

Conclusion

One of the puzzling features of addiction concerns why these individuals are unable to see the connection that addiction will eventually lead to misery and hardship. The negative aspects of their condition are highlighted whenever they experience the physical and psychological state of withdrawal. Withdrawal is a central element of addiction and occurs more frequently as the condition develops. Yet their seems to be very little insight and acceptance that by continual drug use they are creating their own torment.

Analysis of the suffering questionnaires indicates that addicts may be inclined to generally perceive life to be filled with suffering. It was theorized that addict's would have difficulty remembering the peak phase of withdrawal.

Addicts may interpret the withdrawal state as the normal consequence of using drugs to cope with distress. It may become a customary, and accepted condition of their

lives. Similar in principle to a hypochondriac going through the expense and pain of needless exploratory procedures to uncover a nonexistent illness, an agoraphobic's self-imprisonment, or a bulemic's binge and purge existence. These behaviors are all guided by faulty belief systems and on the surface appear maladaptive and destructive, but for the individual they may provide the most appropriate means for coping with the uncontrollable torment that accompanies these beliefs. Khantzian (1987) speculated that addicted individuals may not be seeking to reduce suffering, but may only be attempting to control it. The cycle of chronic drug-use and periods of abstinence and withdrawal may guide their comprehension of the world. The addict perceive's the world as a miserable place without the drug. With the drug, it may still appear miserable but it becomes more manageable.

Future Investigation

This study dealt exclusively with addicted individuals who were in early recovery. To an addict going through the first few days of withdrawal, the world may seem quite threatening. Future inquiry should look toward examining whether this perspective changes as addicted individuals'

accumulate a greater period of abstinence. Also research should determine whether the psychological symptoms specified in the self-medication become differentiated over a longer period of abstinence.

Appendix A

PARTICIPATION IN RESEARCH PROJECT

(FORM FOR INTAKE)

TO: New CDU patient

We are involved in a Research Study regarding "Feelings and Moods during Withdrawal". Phil Drucker from Columbia University is leading this research, and if you think you might be interested in participating in this research, please indicate your interest by signing below.

NAME: _____ ADMISSION DATE _____

INTAKE:

Please return this form to Dr. Dwenger at the end of each day.

Appendix B

Bayley Seton Hospital

RESEARCH PROJECT CONSENT FORM

I have been asked to participate in a research study in which I respond to certain questions about my thoughts and feelings today and in the past. I will be given questionnaires about withdrawal symptoms, cravings, feelings, and memories of feelings.

I will meet with the researcher on two (2) occasions during my detox stay. I will be asked to complete questionnaires about my feelings and experiences. There are no "right" or "wrong" answers to the questions.

My participation in the study is voluntary and I may refuse to participate or withdraw from this study at any time without any consequence to my continued detox treatment. I understand that this study will not benefit me directly, but it may lead to a better understanding of addiction, in general.

Bayley Seton Hospital's Institutional Review Board has approved the recruitment of subjects for this study.

I understand that my identity will not be disclosed and my confidentiality will be maintained in accord with State and Federal laws governing Confidentiality of Substance Abusers.

I have read this form and all of my questions have been addressed satisfactorily. If I wish additional information concerning my rights as a research subject I may call the Institutional Review Board Coordinator Dr. Vesoniarakis at 190-5811.

I have been given a copy of this consent form.

By signing this consent form, I agree to participate in this study.

Name: _____
print

Signature: _____

Date: _____ Witness: _____

Appendix C

INSTRUCTIONS

ADDICTION SEVERITY INDEX

SEVERITY RATINGS

Fifth Edition

SUMMARY OF PATIENTS RATING SCALE

0 - Not at all
1 - Slightly
2 - Moderately
3 - Considerably
4 - Extremely

GENERAL INFORMATION

NAME

CURRENT ADDRESS

GEOGRAPHIC CODE

1. How long have you lived at this address? YRS. MOS.

2. Is this residence owned by you or your family?

0 - No 1 - Yes

3. DATE OF BIRTH

4. RACE

1 - White (Not of Hispanic Origin)
2 - Black (Not of Hispanic Origin)
3 - American Indian
4 - Alaskan Native
5 - Asian or Pacific Islander
6 - Hispanic - Mexican
7 - Hispanic - Puerto Rican
8 - Hispanic - Cuban
9 - Other Hispanic

5. RELIGIOUS PREFERENCE

1 - Protestant 4 - Islamic
2 - Catholic 5 - Other
3 - Jewish 6 - None

6. Have you been in a residential environment in the past 30 days?

1 - No
2 - Jail
3 - Alcohol or Drug Treatment
4 - Medical Treatment
5 - Psychiatric Treatment
6 - Other

7. How many days?

ID NUMBER

LAST 4 DIGITS OF SSN

DATE OF ADMISSION

DATE OF INTERVIEW

TIME BEGUN

TIME ENDED

CLASS:
1 - Intake
2 - Follow-up

CONTACT CODE:
1 - In Person
2 - Phone

GENDER:
1 - Male
2 - Female

INTERVIEWER CODE NUMBER

SPECIAL:
1 - Patient unresponsive
2 - Patient refused
3 - Patient unable to respond

ADDITIONAL TEST RESULTS

Survey I.Q.

Survey I.Q.

Base Total Score

SCL-90 Total

MAST

SEVERITY PROFILE

PROBLEMS MEDICAL EMPLOYMENT ALCOHOL DRUGS LEGAL FAM/SOC PSYCH

FAMILY SOCIAL RELATIONSHIPS

1. Marital Status

1 - Married 4 - Separated
2 - Remarried 5 - Divorced
3 - Widowed 6 - Never Married

2. How long have you been in this marital status? ___ YRS. ___ MOS.
(If never married, since age 18)

3. Are you satisfied with this situation?
0 - No
1 - Indifferent
2 - Yes

4. Usual living arrangements (past 3 yr.)
1 - With sexual partner and children
2 - With sexual partner alone
3 - With children alone
4 - With parents
5 - With family
6 - With friends
7 - Alone
8 - Controlled environment
9 - No stable arrangements

5. How long have you lived in these arrangements. ___ YRS. ___ MOS.
(If with parents or family, since age 18)

6. Are you satisfied with these living arrangements?
0 - No
1 - Indifferent
2 - Yes

Do you live with anyone who:
0 = No 1 = Yes

6A. Has a current alcohol problem?

6B. Uses non-prescribed drugs?

7. With whom do you spend most of your free time:
1 - Family 3 - Alone
2 - Friends

8. Are you satisfied with spending your free time this way?
0 - No 1 - Indifferent 2 - Yes

9. How many close friends do you have?

Direction for 9A-18: Place "0" in relevant category where the answer is clearly no for all relatives in the category; "1" where the answer is clearly yes for any relative within the category; "X" where the answer is uncertain or "I don't know", and "N" where there never was a relative from that category.

9A. Would you say you have had close, long lasting, personal relationships with any of the following people in your life:

Mother	
Father	
Brothers/Sisters	
Sexual Partner/Spouse	
Children	
Friends	

Have you had significant periods in which you have experienced serious problems getting along with:

0 - No 1 - Yes

	PAST 30 DAYS	IN YOUR LIFE
10. Mother		
11. Father		
12. Brothers/Sisters		
13. Sexual partner/spouse		
14. Children		
15. Other significant family ___		
16. Close friends		
17. Neighbors		
18. Co-Workers		

Did any of these people (10-18) abuse you: 0 = No; 1 = Yes

	PAST 30 DAYS	IN YOUR LIFE
18A. Emotionally (make you feel bad through harsh words)?		
18B. Physically (cause you physical harm)?		
18C. Sexually (force sexual advances or sexual acts)?		

19. How many days in the past 30 have you had serious conflicts:

A with your family?
B with other people? (excluding family)

FOR QUESTIONS 20-23 PLEASE ASK PATIENT TO USE THE PATIENT'S RATING SCALE

How troubled or bothered have you been in the past 30 days by these:

20. Family problems
21. Social problems

How important to you now is treatment or counseling for these:

22. Family problems
23. Social problems

INTERVIEWER SEVERITY RATING

24. How would you rate the patient's need for family and/or social counseling?

CONFIDENCE RATINGS

Is the above information significantly distorted by:

25. Patient's misrepresentation?
0 - No 1 - Yes

26. Patient's inability to understand?
0 - No 1 - Yes

Comments

PSYCHIATRIC STATUS

1. How many times have you been treated for any psychological or emotional problems?

   In a hospital ____

   As an Outpatient or Private patient ____

2. Do you receive a pension for a psychiatric disability?

   0 - No 1 - Yes

Have you had a significant period, (that was not a direct result of drug/alcohol use), in which you have:

0 - No 1 - Yes

	PAST 30 DAYS	IN YOUR LIFE
3. Experienced [illegible]		
4. Experienced [illegible]		
5. Experienced hallucinations		
6. Experienced [illegible]		
7. Experienced [illegible]		
8. Experienced [illegible]		
9. Attempted suicide		
10. Been prescribed [illegible]		

11. How many days in the past 30 have you experienced these psychological or emotional problems? ____

FOR QUESTIONS 12 & 13 PLEASE ASK PATIENT TO USE THE PATIENT'S RATING SCALE

12. How much have you been troubled or bothered by these psychological or emotional problems in the past 30 days? ____

13. How important to you now is [illegible] problems? ____

THE FOLLOWING ITEMS ARE TO BE COMPLETED BY THE INTERVIEWER

At the time of the interview, is patient:

0 - No 1 - Yes

14. Obviously [illegible] ____
15. Obviously [illegible] ____
16. Obviously [illegible] ____
17. Having [illegible] ____
18. Having [illegible] ____
19. Having [illegible] ____

Comments

INTERVIEWER SEVERITY RATING

20. How would you rate the patient's need for [illegible] treatment? ____

CONFIDENCE RATINGS

Is the above information significantly distorted by:

21. Patient's misrepresentation? 0 - No 1 - Yes ____

22. Patient's inability to understand? 0 - No 1 - Yes ____

LEGAL STATUS

Was this admission prompted or suggested by the criminal justice system (judge, probation/parole officer, etc.)

0 - No 1 - Yes

(2) Are you on probation or parole?

0 - No 1 - Yes

How many times in your life have you been arrested and charged with the following:

* (03) - shoplifting/vandalism
* (04) - parole/probation violations
* (05) - drug charges
* (06) - forgery
* (07) - weapons offense
* (08) - burglary, larceny, B & E
* (09) - robbery
* (10) - assault
* (11) - arson
* (12) - rape
* (13) - homicide, manslaughter
* (14A) - prostitution
* (14B) - contempt of court
* (14C) - other

(15) How many of these charges resulted in convictions?

How many times in your life have you been charged with the following:

* (16) Disorderly conduct, vagrancy, public intoxication
* (17) Driving while intoxicated
* (18) Major driving violations (reckless driving, speeding, no license, etc.)
* (19) How many months were you incarcerated in your life? MOS.

(20) How long was your last incarceration? MOS.

(21) What was it for? (Use code 3-14, 16-18. If multiple charges, code most severe)

(22) Are you presently awaiting charges, trial or sentence?
0 - No 1 - Yes

(23) What for? (If multiple charges, use most severe)

(24) How many days in the past 30 were you detained or incarcerated?

Comments

(25) How many days in the past 30 have you engaged in illegal activities for profit?

FOR QUESTIONS 26 & 27 PLEASE ASK PATIENT TO USE THE PATIENT'S RATING SCALE

(26) How serious do you feel your present legal problems are? (Exclude civil problems)

(27) How important to you now is counseling or referral for these legal problems?

INTERVIEWER SEVERITY RATING

(28) How would you rate the patient's need for legal services or counseling?

CONFIDENCE RATINGS

Is the above information significantly distorted by:

(29) Patient's misrepresentation?
0 - No 1 - Yes

(30) Patient's inability to understand?
0 - No 1 - Yes

FAMILY HISTORY

Have any of your relatives had what you would call a significant drinking, drug use or psych problem - one that did or should have led to treatment?

Mother's Side	Alc	Drug	Psych	Father's Side	Alc	Drug	Psych	Siblings	Alc	Drug	Psych
Grandmother				Grandmother				Brother #1			
Grandfather				Grandfather				Brother #2			
Mother				Father				Sister #1			
Aunt				Aunt				Sister #2			
Uncle				Uncle							

Directions: Place "0" in relative category where the answer is clearly [illegible]; "1" where the answer is clearly [illegible]; "X" where the answer is uncertain or "I don't know" and "N" where there [illegible].
Code most problematic relative in cases of multiple members per category.

LEGAL STATUS

[illegible] [illegible] prompted or suggested by the criminal justice system (judge, probation/parole officer, etc.)

[illegible] No [illegible] Yes

[illegible] Are you on probation or parole?

[illegible] No [illegible] Yes

How many times in your life have you been arrested and charged with the following:

- [illegible] - shoplifting/vandalism
- [illegible] - parole/probation violations
- [illegible] - drug charges
- [illegible] - forgery
- [illegible] - weapons offense
- [illegible] - burglary, larceny, B & E
- [illegible] - robbery
- [illegible] - assault
- [illegible] - arson
- [illegible] - rape
- [illegible] - homicide, manslaughter
- (14A) - prostitution
- (14B) - contempt of court
- (14C) - other

[illegible] How many of these charges resulted in convictions?

How many times in your life have you been charged with the following:

- [illegible] Disorderly conduct, vagrancy, public intoxication
- [illegible] Driving while intoxicated
- [illegible] Major driving violations (reckless driving, speeding, no license, etc.)

[illegible] How many months were you incarcerated in your life? ____ Mos.

[illegible] How long was your last incarceration? ____ Mos.

[illegible] What was it for? Use code 3-14, 16-18. If multiple charges, code most severe.

[illegible] Are you presently awaiting charges, trial or sentence?
[illegible] No [illegible] Yes

[illegible] What for? (If multiple charges, use most severe.)

[illegible] How many days in the past 30 were you detained or incarcerated?

Comments

[illegible] How many days in the past 30 have you engaged in illegal activities for profit?

FOR QUESTIONS 26 & 27 PLEASE ASK PATIENT TO USE THE PATIENT'S RATING SCALE

[illegible] How serious do you feel your present legal problems are? Exclude civil problems

[illegible] How important to you now is counseling or referral for these legal problems?

INTERVIEWER SEVERITY RATING

[illegible] How would you rate the patient's need for legal services or counseling?

CONFIDENCE RATINGS

Is the above information significantly distorted by:

(29) Patient's misrepresentation?
[illegible] No [illegible] Yes

(30) Patient's inability to understand?
[illegible] No [illegible] Yes

FAMILY HISTORY

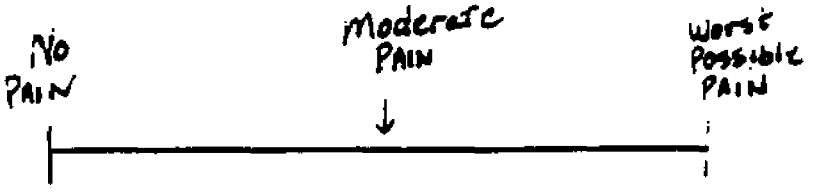
Have any of your relatives had what you would call a significant drinking, drug use or psych problem - one that did or should have led to treatment?

Mother's Side	Alc	Drug	Psych	Father's Side	Alc	Drug	Psych	Siblings	Alc	Drug	Psych
Grandmother				Grandmother				Brother #1			
Grandfather				Grandfather				Brother #2			
Mother				Father				Sister #1			
Aunt				Aunt				Sister #2			
Uncle				Uncle							

Directions: Place "0" in relative category where the answer is clearly no for all relatives in the category; "1" where the answer is clearly yes for any relative within the category; "X" where the answer is uncertain or "I don't know"; and "N" where there never was a relative from that category. Code most problematic relative in cases of multiple members per category.

Appendix D

Place a line straight down through the horizontal line to indicate your current level of pain.



Appendix E, F

How often in the past week have you experienced the following symptoms ? Place a check in the appropriate box.

	Less than 1 day	1-1 days	1-5 days	5-7 days
I felt depressed				
My sleep was restless				
I enjoyed life				
I had crying spells				
I felt sad.				
I felt that people disliked me.				

In the past year, have you had 2 weeks or more during which you felt sad, blue, or depressed, or lost pleasure in things that you usually cared about or enjoyed?

Circle one NO 0 YES 1

Have you had 2 years or more in your life when you felt depressed or sad most days, even if you felt okay sometimes?

Circle one NO 0 YES 1

If yes, have you felt depressed or sad much of the time in the past year?

Circle one NO 0 YES 1

Score_____

Place a check in the appropriate box to the right of the statement to indicate how you feel right now.

	Not At All	Somewhat	Moderately	Very Much
I feel calm.				
I feel tense.				
I feel upset.				
I am relaxed.				
I feel content.				
I am worried.				

Score_____

Appendix G

Place a line straight down through the horizontal line to indicate your current level of pain.

Appendix H

Rate how much suffering each situation would cause you to experience.

0 None	1 Slight Suffering	2 Mild Suffering	3 Moderate Suffering	4 Intense Suffering	5 Extreme Suffering	6 Worst Possible Suffering

1. Forgetting where you parked your car. _____
2. Visiting someone in a hospital. _____
3. Seeing your friends getting high and you can't. _____
4. Being alone with yourself for an hour. _____
5. Discovering you have six months to live. _____
6. Misplacing $500 dollars. _____
7. Seeing a commercial for starving children. _____
8. Accidentally causing someone to die in an automobile accident. _____
9. Seeing a stray dog get hit by a car. _____
10. Finding out a close friend has been lying to you. _____
11. Waiting on line at the movies. _____
12. Being unable to find work. _____
13. Waiting in a long traffic jam. _____
14. feeling that people are laughing at you behind your back. _____
15. Going to a parent's funeral. _____
16. Being put on hold while on the telephone. _____
17. Crying while watching a sad movie. _____
18. Getting a speeding ticket. _____
19. Being awakened in the middle of the night by a loud noise. _____
20. Feeling restless, like you can't sit still. _____
21. Being around loud, obnoxious people. _____
22. Feeling bored no matter what you are doing. _____

Appendix E

Rate how much suffering each situation would cause you to experience.

0 None	1 Slight Suffering	2 Mild Suffering	3 Moderate Suffering	4 Intense Suffering	5 Extreme Suffering	6 Worst Possible Suffering

1. Accidentally biting your tongue. _____
2. Having a very high fever, and feeling achy. _____
3. Getting stung by a bee. _____
4. Getting an inoculation in your arm. _____
5. Having a broken leg. _____
6. Your shower suddenly turns icy cold. _____
7. Tossing and turning all night, unable to sleep. _____
8. Stubbing your toe on a chair leg. _____
9. Taking off in a plane and having your ears pop. _____
10. Getting a speck of dust in your eye. _____
11. Having an intense craving to get high. _____
12. Being paralyzed from the waist down. _____
13. Having your arm fall asleep. _____
14. Having a nauseous feeling from something you ate. _____
15. Smelling a foul odor from a garbage dump. _____
16. Walking down the street and hearing a car backfire. _____
17. Spilling some boiling water on yourself. _____
18. Having to go a whole day without eating. _____
19. Lifting a heavy object and injuring your back. _____
20. Having a severe hangover from drinking all night. _____
21. Getting a tooth drilled without novocaine. _____
22. Driving a long distance and feeling so tired you can't keep your eyes open. _____

Appendix J

I would like you to indicate how you are feeling by circling either 'YES' or 'NO' for each of the following words.

1. ITCHY (PAIN) ---------- YES ---------- NO
2. MILD (PAIN) ---------- YES ---------- NO
3. STIFF (PAIN) ---------- YES ---------- NO
4. THROBBING (PAIN) ---------- YES ---------- NO
5. DEEP (PAIN) ---------- YES ---------- NO
6. GUILTY ---------- YES ---------- NO
7. ANGRY ---------- YES ---------- NO
8. UPSET ---------- YES ---------- NO
9. STRESSED ---------- YES ---------- NO
10. ANXIOUS ---------- YES ---------- NO
11. FRIGHTENED ---------- YES ---------- NO
12. EXCRUCIATING (PAIN) ---------- YES ---------- NO
13. DULL (PAIN) ---------- YES ---------- NO
14. COLD ---------- YES ---------- NO
15. BORED ---------- YES ---------- NO
16. EXHAUSTED ---------- YES ---------- NO
17. SLEEPY ---------- YES ---------- NO
18. ACHING (PAIN) ---------- YES ---------- NO
19. DISGUSTING ---------- YES ---------- NO
20. BOTHERED ---------- YES ---------- NO
21. HOT ---------- YES ---------- NO
22. CRUEL ---------- YES ---------- NO
23. HEALTHY ---------- YES ---------- NO
24. INTERESTED ---------- YES ---------- NO
25. ENERGETIC ---------- YES ---------- NO
26. ALERT ---------- YES ---------- NO
27. LOVED ---------- YES ---------- NO
28. CHOKING ---------- YES ---------- NO
29. LOUSY ---------- YES ---------- NO
30. LONELY ---------- YES ---------- NO
31. DEPRESSED ---------- YES ---------- NO
32. DISCOURAGED ---------- YES ---------- NO
33. FRIENDLY ---------- YES ---------- NO
34. HOPEFUL ---------- YES ---------- NO
35. HAPPY ---------- YES ---------- NO
36. FINE ---------- YES ---------- NO
37. CALM ---------- YES ---------- NO
38. CONTINUOUS (PAIN) ---------- YES ---------- NO
39. SPREADING (PAIN) ---------- YES ---------- NO
40. FORGIVING ---------- YES ---------- NO

Last four digits of your social security number ( ) _____

A few days ago you were asked to indicate how you were feeling. I would like you to try and reconstruct how you felt when you were last tested and circle either 'YES' or 'NO' for the following word list to indicate how you felt a few days ago.

1. ANNOYED----------YES----------NO
2. TENSE----------YES----------NO
3. VAGUE(PAIN)----------YES----------NO
4. SUPERFICIAL(PAIN)----------YES----------NO
5. TIGHT(PAIN)----------YES----------NO
6. SORE(PAIN)----------YES----------NO
7. REJECTED----------YES----------NO
8. NAUSEATED----------YES----------NO
9. SCRATCHY(PAIN)----------YES----------NO
10. OVERWHELMED(PAIN)----------YES----------NO
11. TROUBLED----------YES----------NO
12. BURNING----------YES----------NO
13. VIGOROUS----------YES----------NO
14. VICIOUS----------YES----------NO
15. SUFFOCATING----------YES----------NO
16. MISERABLE----------YES----------NO
17. SAD----------YES----------NO
18. FURIOUS----------YES----------NO
19. SLUGGISH----------YES----------NO
20. PAINFREE----------YES----------NO
21. INVOLVED----------YES----------NO
22. ALIVE----------YES----------NO
23. NEEDED----------YES----------NO
24. AGREEABLE----------YES----------NO
25. POUNDING(PAIN)----------YES----------NO
26. RESTLESS----------YES----------NO
27. AFRAID----------YES----------NO
28. COOL----------YES----------NO
29. PASSIVE----------YES----------NO
30. TIRED----------YES----------NO
31. PENETRATING(PAIN)----------YES----------NO
32. OPTIMISTIC----------YES----------NO
33. CHEERFUL----------YES----------NO
34. SECURE----------YES----------NO
35. RELAXED----------YES----------NO
36. HOPELESS----------YES----------NO
37. NEGLIGENT----------YES----------NO
38. PERSISTENT(PAIN)----------YES----------NO
39. WORSENING(PAIN)----------YES----------NO
40. SYMPATHETIC----------YES----------NO

References

Abraham, K. (1960). The psychological relation between sexuality and alcoholism. Selected Papers of Karl Abraham. New York: Basic Books.

Amit, Z. & Brown, Z. W. (1982). Actions of drugs of abuse on brain reward systems: a reconsideration with specific attention to alcohol. Pharmacology, Biochemistry and Behavior, 17, 233-238.

Baxter, B.L., Gluckman, M.I. Stein,L., & Scerni, R.A. (1974). Self-injection of apomorphine in the rat: positive reinforcement by a dopamine receptor stimulant. Pharmacology, Biochemistry, and Behavior, 2, 387-391.

Beck, A.T. (1967). Depression: clinical, experimental, and theoretical aspects. New York: HarperCollins.

Beck, A.T. (1976). Cognitive therapy and the emotional disorders. New York: international University press.

Beck, A.T. & Clark, D.A., (1988). Anxiety and depression: an information processing perspective. Anxiety Research, 1, 23-36.

Beck, A.T. & Emery, G., (1985). Anxiety disorders and phobias: a cognitive perspective. New York: Basic Books.

Beck, A.T. & Weishaar, M. E. (1989). Cognitive therapy. In R. J. Corsini (Ed.), Current Psychotherapies. New York: Grove Press.

Bertilsson,L. (1978) Mechanism of action of benzodiazepines: The GABA hypothesis. Acta Psychiatrica Scandinavica, 274, 19-26.

Blaney, P.H. (1986). Affect and Memory: A review. Psychological Bulletin, 99, 229-246.

Bower, G.H. (1981). Mood and memory. American Psychologist, 36, 129-148.

Bower, G.H., (1987). Commentary on mood and memory. Behavior Research Therapies, 25, 6, 443-445.

Brandsford, J.D., Franks, J.J., Morris, C.D. & Stein, B.S. (1979). Some general constraints on learning and memory research. In L.S. Cermack & F.I.M. Craik (Eds.), Levels of processing in human memory. (pp. 331-354). Hillsdale, NJ: Earlbaum.

Bryant, R. A. (1993). Memory for pain and affect in chronic pain patients. Pain, 54, 347-351.

Bunney, W.E.,Jr., & Davis, J.M. (1965). Norepinephrine in depressive reactions. Archives of General Psychiatry, 13, 483-494.

Butler, G., & Mathews, A. (1983). Cognitive process in anxiety. Advances in Behaviour Research and Therapy, 5, 51-62.

Burnam, M.A., Wells, K.B, Leake, B., Landsverk, J., (1988). Development of a brief screening instrument for detecting depressive disorders. Medical Care, 26, 8, 775-789.

Chesno, F. & Kilmann, P. (1975). Effects of stimulation intensity on sociopathic avoidance learning. Journal of Abnormal Psychology, 84, 144-150.

Clark, W.C., (1994). The psyche in the psychophysics of pain: an introduction to sensory decision theory. In Boivie, J., Hansson, P. & Lindblom, U. (Eds.) in Touch, Temperature, and Pain in Health and Disease, Progress in Pain Research and Management. Vol 3. Seattle: IASP Press.

Clark, W.C. & Bennet-Clark, S. (1993). Rememberence of pains past? American Pain Society Journal, 2 (3) 195-200.

Clark, W.C., Fletcher, J.D., Janal, M.N. & Carroll, J.D.(1994). Hierarchical clustering of 270 pain/emotion descriptors: toward a revision of the McGill pain questionnaire. In Bromm, B. & Desmedt, J., Pain and the Brain: From Nociception to Sensation (In press).

Cohen, P. & Cohen, J. (1984). The clinician's illusions. Archives of General Psychiatry, 41, 1178-1182.

Conger, J.J. (1951). The effects of alcohol on conflict between behavior in the albino rat. Quarterly Journal of

Studies on Alcohol, 12, 1-29.

Costa,E. & Greegard, P. (1975). Mechanisms of action of benzodiazepines. New York: Raven Press.

Craik, F.I.M. (1979). Levels of processing: Overview and closing comments. In L.S. Cermack & F.I.M. Craik (Eds) Levels of Processing in Human Memory (pp.447-461). Hillsdale, N.J.: Erlbaum.

Craik, F.I.M. & Lockhart, R.S. (1972). Levels of processing: a framework for memory research. Journal of Verbal Learning and Verbal Behavior, 11, 671-684.

Craik, F.I.M. & Lockhart, R.S. (1986). CHARM is not enough: comments on Eich's model of cued recall. Psychological Review, 93, 360-364.

Craik, F.I.M. & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. Journal of Experimental Psychology: General, 104, 268-294.

Dackis, C.A., & Gold, M.S. (1984). Depression in opiate addicts. In S.M. Mirin (Ed.) Substance Abuse and Psychopathology. Washington D.C.: American Psychiatric Press.

Dackis, C.A., & Gold, M.S. (1986). More on self-medication and drug abuse. American Journal of Psychiatry, 143, 10, 1309-1310.

Dackis, C.,A. & Gold, M.S. (1988). Psychopharmacology of cocaine. Psychiatric Annals, 9, 528-530.

Dorus W. & Senay, E.C. (1980). Depression, demographic dimension and drug abuse. American Journal of Psychiatry, 137, 6, 690-704.

Dunbar, G.C. & Lishman, W.A. (1984). Depression, recognition-memory and hedonic tone, a signal detection analysis. British Journal of Psychiatry, 144, 376-382.

Erskine, A., Morley, S. & Pearce, S., (1990). Memory for pain: a review. Pain, 41, 255-265.

Eysenck, M.W., Macleod, C., & Mathews, A. (1987).

Cognitive functioning in anxiety. Psychological Research, 49, 189-195.

Eysenck, M.W., Mogg, K., May, J., Richards, A. & Mathews, A. (1991). Bias in interpreted and ambiguous sentences related to trait anxiety. Journal of abnormal Psychology, 100, 144-150.

Finn, P.R., Zeitouni, N.C., & Pihl, R.O. (1990). Effects of alcohol on physiological hyperactivity to nonaversive and aversive stimuli in men at high risk for alcoholism. Journal of Abnormal Psychology, 99, 79-85.

Freed, E.X. (1971). Anxiety and conflict: role of drug-dependent learning in the rat. Quarterly Journal of Studies on Alcohol, 12, 1-29.

Freud, S. (1905). Three essays on the theory of sexuality. London: Hogarth press.

Fureman, B., Parikh, G., Bragg, A. & Mclellan, A.T. (1990). Addiction Severity Index, 5th ed. University of Pennsylvania, Veterans Administration Center for Studies of Addiction.

Gawin, F.H. & Kleber, H.D., (1986). Abstinence symptomology and psychiatric diagnosis in cocaine abusers: clinical observations. Archives of General Psychiatry, 41, 903-903.

Gossop, M., (1990). The development of a short opiate withdrawal scale (SOWS). Addictive Behaviors, 15, 487-490.

Guerra, D., Sole, A., & Cami, J., Tobena, A., (1987). Neuropsychological performance in opiate addicts after rapid detoxification. Drug and Alcohol Dependence, 20, 261-270.

Gold, M.S., Estroff, T.W., Pottash, A.L.C.,(1985). Substance induced organic mental disorders, in Psychiatric Update: The American Psychiatric Association Annual Review, Vol IV, (Ed) Hales, R.E., Frances, A.J. Washington, D.C.: American Psychiatric Press.

Herning, R.I., Glover, B.J., Koeppl, B., Weddington, W. & Jaffe, J.H. (1990). Cognitive deficits in abstaining cocaine usrs. NIDA reseach Monogaphs, 101, 167-178.

Ingram, R.E. & Kendall, P.C. (1987). The cognitive side of anxiety. Cognitive Therapy and Research, 11, 523-536.

Jones, E. (1957). Pain. International Journal of Psychoanalysis, 38, 255-257.

Kent, G. (1985). Memory for dental pain. Pain, 21, 187-194.

Khantzian, E.J. (1978). The ego, the self and opiate addiction: theoretical and treatment considerations. International Review of Psychoanalysis, 5, 189-198.

Khantzian, E.J. (1985). The self-medication hypothesis of ddictive disorders: focus on heroin and cocaine dependence. American Journal of Psychiatry, 142, 11, 1259-1264.

Khantzian, E.J. (1986) a reply to, more on the self-medication and drug use. American Journal of Psychiatry, 143, 10, 1309-1311.

Khantzian, J.E., (1987). A clinical perspective of the cause-consequence controversy in alcoholic and addictive suffering. Journal of the American Academy of Psychoanalysis, 15, 4, 521-537.

Khantzian, E.J. & Khantzian, N.J. (1984). Cocaine addiction: is there psychological predisposition? Psychiatric Annals, 14, 10, 753-759.

Khantzian, E.J., Mack, J.E. & Schatzberg, A.F. (1974). Heroin use as an attempt to cope: clinical observation. American Journal of Psychiatry, 131, 160-164.

Kuhar, M.J., Ritz, M.C., & Boja, J.W. (1991). The dopamine hypothesis of the reinforcing properties of cocaine. TINS, 14, 7, 299-232.

Manschreck, T.C., Schneyer, M.L., Weisstein, C.C., Laughery, J., Rosenthal, J., Celada, T. & Bemer, J. (1990). Freebase cocaine and memory compromise. Psychiatry, 4, 369-375.

Marteau, T.M., & Bekker, H., (1992). The Development of a six-item short-form of the state scale of the

Spielberger State-Trait Anxiety Inventory (STAI). British Journal of Clinical Psychology, 31, 301-306.

Mass, J.W. (1975). Catecholamine and depression: a further specification of the catecholamine hypothesis of the affective disorders. In A.J. Friedhoff (Ed.), Catecholamine and Behavior, (pp.119-133).

Matlin, M.W., & Stang, D.J. (1978). The pollyanna principle: selectivity in language, memory and thought. Cambridge, M.A.: Schenkman.

Mathews, A., Mogg, K., May, J., & Eysenck, M. W., (1989). Implicit and explicit memory bias in anxiety. Journal of Abnormal Psychology, 98, 236-240.

Mathews, A., & German, J. (1984). Neural mechanisms of the reinforcing action of cocaine. In Grabowski, J. (Ed.), Cocaine: Pharmacology, Effects and Treatment of Abuse. Rockville, MD: NIDA, pp.15-33.

McNicol, D. (1972). A primer of signal detection theory. Allen and Unwin, London.

Meisch, R.A. (1991). Studies of drug self-administration. Psychiatric Annals, 21, 196-205.

Merskey, H. (1975). Pain, learning and memory. Journal of Psychosomatic Research, 19, 319-324.

Milkman, H. & Frosch, W.A.,(1973). On the preferential abuse of heroin and amphetamine. Journal of Nervous and Mental Disease, 156, 242-248.

Niederehe, G., & Camp, C.J., (1985). Signal detection analysis of recognition memory in depressed elderly. Experimental Aging Research, 11, 4, 207-213.

Nugent, K., & Mineka, S. (1991). The effects of high and low trait anxiety on implicit and explicit memory tasks. Unpublished manuscript.

Nunes, E.V., Quitkin, F.M., & Klein, D.F., (1989). Psychiatric diagnosis in cocaine abuse. Psychiatry Research, 28, 105-114.

O'Malley, S.S., & Gawin, F.H. (1990). Abstinence symptomology and neuropsychological impairment in chronic cocaine abusers. NIDA Research Monographs, 101, 179-190.

Pickens, R., & Harris, W.C. (1985). Self-administration of d-amphetamine by rats. Psychopharmacologia, 12, 158-163.

Pollack, I., & Norman, D. A. (1964). A non-parametric analysis of recognition experiments. Psychonomic Science, 1, 125-126.

Posner, M.I. & Snyder, C.R.R. (1975). Attention and cognitive control. In R.L. Solso(Ed.), Information Processing and Cognition: The Loyola Symposium. Hillsdale, NJ: Erlbaum.

Rado, S. (1933). The Psychoanalysis of Pharmacothymia. Psychoanalytic Quarterly, 2, 1-23.

Radloff, L.S., (1977). The CES-D Scale: a self-report depression scale for research in the general population. Applied Psychological Measurement, 1, 3, 385-401.

Roche, P.A. & Gijsbers, K. (1986). A comparison of memory for induced ischemic pain and chronic rheumatoid pain. Pain, 25, 337-343.

Rogers, T.B., Kuiper, N.A., & Kirker, W.S. (1977). Self-reference and the encoding of personal information. Journal of Personality and Social Psychology, 35, 677-688.

Rounsaville, B.J., & Weissman, M.M., Crits-Christopher, K., Wilber,C., Kleber, H., (1982). Diagnosis and symptoms of depression in opiate addicts. Archives General Psychiatry, 39, 151-156.

Schacter, S. & Latane, B. (1964). Crime, cognition, and the autonomic nervous system. In M.R. Jones (Ed.), Nebraska Symposium on motivation (pp.221-275). Lincoln: Nebraska University Press.

Seltzer, S.F., & Yarczower, M., (1991). Selective encoding and Retrieval of affective words during exposure to aversive stimulation. Pain, 47, 47-51.

Silberman, E.K., Weingartner, H., Laraia, M., Byrnes,

S., & Post, R.M., (1983). Processing of emotional properties of stimuli by depressed and normal subjects. The Journal of Nervous and Mental Disease, 171, 1, 10-14.

Strongman, K.T., (1982). Emotional influences on memory. Current Psychological Research, 2, 69-74.

Strongman, K.T., & Russell, P.N., (1986). Salience of emotion on recall. Bulletin of the Psychonomic Society, 24, 1, 25-27.

Teasdale, J.D., & Fogarty, S.J., (1979). Differential effects of Induced mood on retrieval of pleasant and unpleasant events from episodic memory. Journal of Abnormal Psychology, 88, 248-257.

Teasdale, J.D., & Russell, M.L. (1981). Differential effects of induced mood on the recall of positive, negative and neutral words. British Journal of Clinical Psychology, 22, 163-171.

Teasdale, J.D., & Taylor, R., (1981). Induced mood and accessibility of memories: An effect of mood and state or of induction procedure? British Journal of Clinical Psychology, 20, 39-48.

Teller, D.W., & Devenyi, P., (1988). Bromocriptine in cocaine withdrawal- does it work? The International Journal of the Addiction, 23, 11, 1197-1205.

Thomas, D.L., & Diener, E., (1990). Memory accuracy in the recall of emotions. Journal of Personality and Social Psychology, 59, 2, 291-297.

Tulving, E. (1983). Elements of episodic memory. New York: Oxford University Press.

Warren, G.H., & Raynes, A.E. Mood changes during three conditions of alcohol intake. Quarterly Journal of Studies of Alcoholism, 3, 979-989.

Weider, H. & Kaplan, E.H., (1969). Drug use in adolescents: psychodynamic meaning and pharmacological effect. Psychoanalytic Study of Children, 24, 399-431.

Weiss, R.D., Griffin, M.L., Mirin, S.M., (1992). Drug Abuse As Self-Medication for Depression: An Empirical Study.

American Journal Drug Alcohol Abuse, 18, 2, 121-129.

Weiss, R.D., Mirin, S.M., Michael, J.L. & Sollogub, A.C. (1986) Psychopathology in chronic cocaine abusers. American Journal of Drug and Alcohol Abuse, 12, 17-29.

Weissman, M.M., Slobetz, F., Prusoff, B., Mezritz, M., & Howard, P. (1976). Clinical depression among narcotic addicts maintained on methadone in the community. American Journal of Psychiatry, 133, 12, 1434-1438.

Williams, J.M.G., Watts, F.N., Macleod, F., & Mathews, A. (1988) Cognitive psychology and emotional disorders. Chichester, England: Wiley.

Wise, R.A., (1988). The neurobiology of craving: implications for the understanding and treatment of addictions. Journal of Abnormal Psychology, 97, 2, 118-132.

Wurmser, L., (1972). Psychoanalytic considerations of the etiology of compulsive drug use. Journal of the American Psychoanalytic Association, 22, 820-843.

Wyatt, R.J., Karoum, F., Suddath, R., & Hitri, A., (1988). The role of dopamine in cocaine use and abuse. Psychiatric Annals, 18, 9, 531-534.

Velten, E.C. (1968). A laboratory task for induction of mood states. Behavior Research and Therapy, 6, 473-482.

Yang, J.C., Wagner, J.M. & Clark, W.C. (1983). Psychological distress and mood in chronic pain and surgical patients: A sensory decision theory analysis. In Bonica, J.J. et al. (Eds.) Advances in Pain Research and Therapy, Vol 5. New York: Raven Press.

Zucker, R. & Gomberg, E. (1986). Etiology of alcoholism reconsidered: the case for abiopsychological process. American Psychologist, 41, 783-793.

Zuroff, D.C., Colussy, S.A., & Wielgus, M.S., (1983). Selective memory and depression: a cautionary note concerning response bias. Cognitive Therapy and Research, 7, 3, 223-232.