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Chapter 2

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

METHOD

Subjects

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

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

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

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

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

Procedures

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

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

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

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

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

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

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

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

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

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

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

RESULTS

Personality Test

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

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

TABLE 1

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

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

Table 1. Continued

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

a= significant difference between addicts and nonaddict non-delinquents

b= significant difference between addicts and nonaddict delinquents

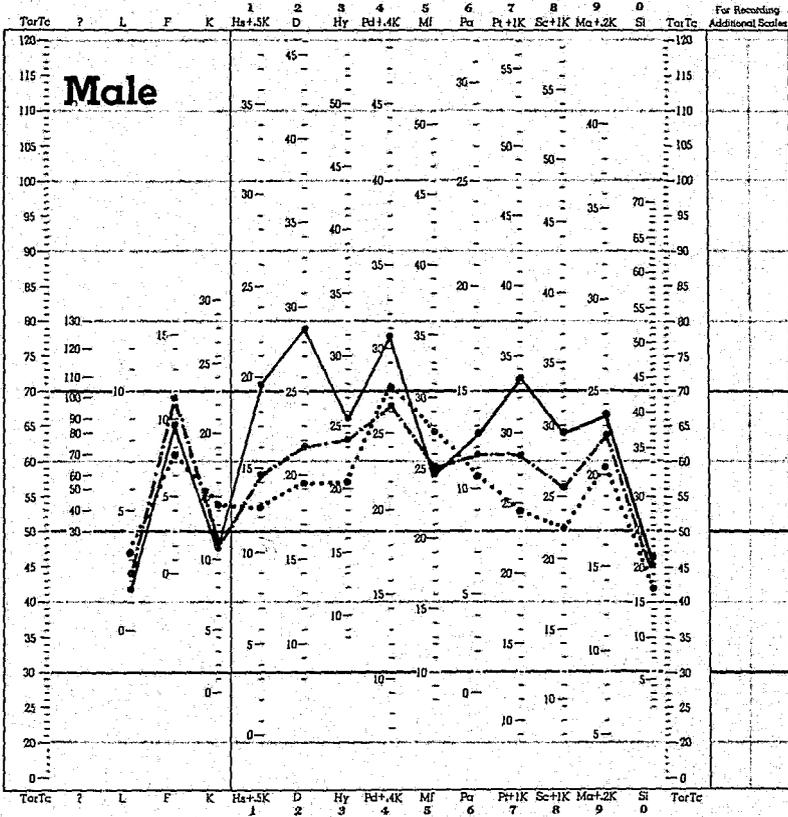
c= significant difference between nonaddict delinquents and nonaddict nondelinquents

Figure 1 depicts the MMPI profiles for the three groups. The differences between the addicts and nonaddict nondelinquents were generally in accord with the differences found in other studies. However, the only significant differences between the nonaddict delinquents and the nonaddict nondelinquents were that the latter group scored lower on the Pt and Sc scales and higher on the L scale² of the MMPI-168. These results are similar to those reported by Hill et al. (1962) and Sutker and Allain (1973) for prisoners who had been incarcerated for at least two years.

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

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

FIGURE 1



— ADDICT
 - - - NON-ADDICT/NON-DELINQUENT
 NON-ADDICT/DELINQUENT

There was only one significant interaction. For the Anglo subjects on the Ma scale² of the MMPI-168, nonaddict delinquents scored significantly lower than either the addicts or the nonaddict nondelinquents with no differences between the later two groups. For the black and Chicano subjects, there were no significant differences among the three groups.

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

TABLE 2

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

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

* = significant difference between the two groups

FIGURE 2

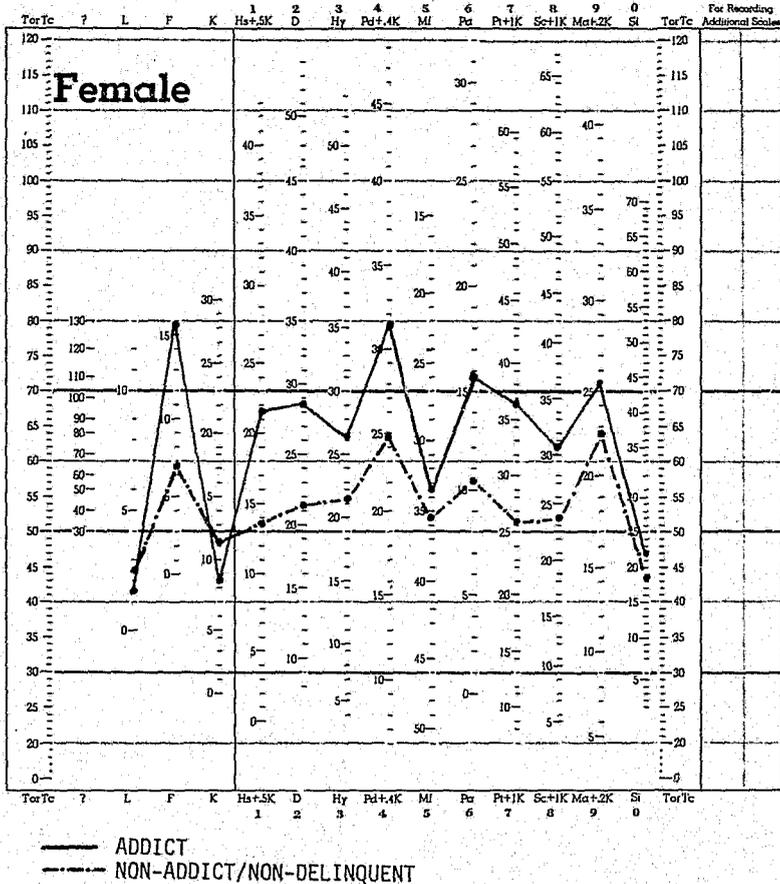


Figure 2 depicts the MMPI profiles for the two groups. As with the males, the differences between the two groups were in accord with differences found in other studies. Corroborating the results for the male subjects, significant differences were found between the two groups of female subjects for all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

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

Task 1

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

TABLE 3

Mean number of choices of the delayed reward.

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

Task 2

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

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

TABLE 4

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

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

TABLE 5

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

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

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

Task 3

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

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

TABLE 6

Mean rates of lever pull per second

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

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

DISCUSSION

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

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

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

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

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

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

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

FOOTNOTES

1. TAT - Thematic Apperception Test
16PF - 16 Personality Factor Questionnaire
I-E scale - Internal-External Locus of Control Scale
EPPS - Edwards Personal Preference Schedule
CPI - California Psychological Inventory
2. Scales of MMPI-168: Pt - Psychasthenia; Sc - Schizophrenia;
L - Lie; Ma - Hypomania

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