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AN ANALYSIS OF PERSONALITY, BEHAVIORAL, AND DEMOGRAPHIC CHARACTERISTICS OF DRUG ABUSERS IN TREATMENT

The Ohio State University

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AN ANALYSIS OF PERSONALITY, BEHAVIORAL,
AND
DEMOGRAPHIC CHARACTERISTICS OF DRUG ABUSERS
IN TREATMENT

DISSERTATION

Presented in partial fulfillment of the requirements of
the Degree of Doctor of Philosophy in the
Graduate School of The Ohio State University

by

Carol Lytle Johnson, B.A., M.A.

* * * * *

THE OHIO STATE UNIVERSITY
1981

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TO GEORGE

Who is always there
ACKNOWLEDGEMENTS

I wish to thank the following people who have helped me complete this last step in a very long process:

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René Saxton, who conscientiously helped me gather data;

All my friends at VITA who were outstanding at listening to my frustrations.
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CHAPTER I
Introduction

Background to the Problem

Drugs—their use and abuse—are a relatively recent, but pervasive factor of American life today. Nearly every man, woman, and child uses some type of drug(s) every day. In 1978 nearly 18.5 billion dollars were legitimately spent on drugs and other health aids—aspirin, vitamins, prescriptions and cough and cold remedies. This represents an expenditure of about $84 for each person living in the United States that year. In addition, alcohol and cigarettes are currently being used or have been tried by a majority of people over age 18 (U.S. Statistical Abstract, 1979). Caffeine from coffee, tea, and soft drinks, another source of drug consumption, is also widely available. Most of the people who are represented in the above figures would not consider themselves to be drug abusers. However, consideration of these statistics certainly implies a culture dependent on drugs in some form.

Before 1950 only a few parts of the world, primarily in Asia and South America, were troubled with drug abuse (Kusevic, 1972). However, it has spread to the extent that in the United States in 1978 the economic and social cost was estimated to exceed $10 billion (Klerman, 1978). How involved this country has become in drug abuse is indicated by further statistics.
In 1977, of youths aged 12-17, 28 percent had used marijuana at some time and 16 percent were current users. In the same year 25 percent of all adults over 18 had used marijuana and 8 percent were current users. In the age group of 18-25, 60 percent had tried it at least one time and 28 percent were current users (U.S. Statistical Abstract, 1979). In 1975, the last year for which data are available, 5.75 million alcoholics were estimated to live in the United States, which was 4.2 percent of the population 20 years old or over. In 1978, 213,400 clients were treated in various settings that provided direct on-site treatment for drug abuse. Also in 1978 nearly 8,000 adult defendants were charged with violations of the Drug Abuse Prevention and Control Act in U.S. District Courts (U.S. Statistical Abstract, 1979). The Alcohol, Drug Abuse and Mental Health Administration estimated that in the United States in 1978 there were more than one-half million heroin addicts (Klerman, 1978).

The question of how to differentiate the drug use and/or dependency that may be a part of everyday life from "drug abuse," "drug addiction," and "substance abuse" is difficult. An operational criterion is the extent the drug use is socially approved. If the drug being "abused" is illegal, implying a cultural as well as legal sanction, or if the drug is used in a manner that society and/or the medical profession finds unacceptable, then it can be considered drug abuse. Social acceptability can, of course, provide only the broadest kind of criterion, one that is subjective in nature.

In order for the drug abusing individual to be given effective treatment, the personality dynamics underlying the act of abusing drugs
must be diagnosed clinically. This is a difficult task, due, in part, to the confusion in defining "drug abuse." In addition, existing research has often yielded contradictory and/or incomplete data due to the lack of a single, consistent theory of drug abuse, its etiology and expected personality patterns. Diagnostic criteria in the American Psychiatric Association's DSM III (1980) rely on the patient's drug-related behavior, its consequences for his/her life and the drug of abuse itself. The utility of this system for differential treatment is doubtful as no cognizance is given personality or motivational factors.

In spite of a lack of empirical evidence, early attempts to classify drug addicts recognized several personality patterns in the "addiction syndrome" through clinical experience. Kolb (1925) established a system of classification which delineated six types of addicts:

(1) Normal individuals accidentally addicted
(2) Individual with a "psychopathic diathesis or predisposition"
(3) Psychoneurotic individuals of all types
(4) Individuals without psychosis, but with psychopathic personalities
(5) Addicts with inebriate personalities
(6) Drug addicts with associated psychoses

Felix (1944) later collapsed these categories into four, using only types 1, 3, 4, and 6. He reasoned that category 2 was redundant and subsumed in category 4 and that addicts in category 5 could be placed in one of the other categories. Early psychoanalytic classification identified the drug addict as an impulsive personality, having low
frustration tolerance, difficulty with socialization, unmet dependency needs, sexual immaturity, and little internal control (Glasscote, 1972).

A line of research that has facilitated a more complete understanding of the drug abusing individual has employed the Minnesota Multiphasic Personality Inventory (MMPI) (Hathaway and McKinley, 1940; Hathaway and Meehl, 1951). This true-false self-report personality measure has been widely used in many clinical and research settings, has been well researched for validity and reliability, and can be easily administered and interpreted (McKinley and Hathaway, 1943). Information concerning the individual's personality is reported on three validity and ten clinical scales. In a five year period (between 1972 and 1977) 96 articles on alcohol and drug abuse using the MMPI appeared in scientific journals (Butcher and Owen, 1978). Continuing this investigation appears to be both important and practical because of the pre-existing data that can be employed as well as the potential for the expansion of information.

A typical finding of MMPI research on drug abusers, particularly opiate addicts, is that their personalities show significant pathology (Sheppard, Fracchia, Ricca and Merlis, 1973; Sutker, 1971; Sutker and Moan, 1972; Hill, Haertzen and Glaser, 1960; Monroe, Ross, and Berzins, 1971; Gardner, 1967). While these studies were conducted on samples where pathology might be expected (e.g., drug abusers in treatment facilities and prisoners), it is a finding that cannot be ignored.

A second general theme found in the research on personality characteristics of drug addicts is "the predominance of sociopathic feature ... reflected by significant elevations on Scale 4" (Psychopathic
Deviate), (Sutker and Archer, 1979, p. 107). Hill, Haertzen and Glaser (1960); Hill, Haertzen and Davis (1962); Gilbert and Lombardi (1967); Sutker (1971); Sutker and Allain (1973); Pugliese (1975); Zuckerman, Sola, Masterson and Angelone (1975); and Overall (1973) found elevations on Scale 4 and sometimes on Scale 9 (Hypomania), leading to the conclusion that the "addictive personality" was sociopathic. The considerable numbers of subjects whose personalities could not be so labeled were ignored for the most part in both research and treatment practice.

In recent years another line of investigation has emphasized the differences in personality patterns among drug abusers rather than the similarities (Monroe, Ross, and Berzins 1971; Sheppard, Fracchia, Ricca, and Merlis, 1972; Dick, 1979; Raines, 1979, among others). Platt and Labate (1976) and Sutker and Archer (1979) point out that discovering the presence of these differences is not a "new" finding. Personality patterns other than the sociopathic have been present in most research on drug abusers as noted above. However, these other patterns were largely ignored due to the interest in the "addictive personality." More emphasis is currently being placed on identifying all the existing personality types represented by drug abusers. Interestingly, these empirical types have been found to be very similar to Kolb's (1925) clinical categories.

A fourth theme characteristic of much research on drug abusers is the search for relationships among behavioral, demographic, psychosocial, and personality variables of drug abusers (Penk, Fudge, Robinowitz, and Neman, 1979; Penk and Robinowitz, 1976; Penk, Woodward, Robinowitz, and Hess, 1978; Penk, Woodward, Robinowitz, and Parr, 1980;
Robinowitz, Woodward, and Penk, 1980; Sutker, Archer, and Allain, 1978; Trevithick and Hosch, 1978; Braucht, Kirby, and Berry, 1978). These researchers have investigated race, sex, drug of abuse, volunteer status, sensation seeking, personality patterns, and other psychosocial variables of drug abusers. This research does not appear to support the hypothesis of the "addictive personality," but does improve understanding of drug abusers by providing specific information about small, similar groups of individuals.

The implicit goal of the above research on drug abusers seems to be the improvement of treatment programs which have generally had poor outcomes (Cancellaro, 1972; Chambers and Taylor, 1972). Drug abusers often leave treatment before meaningful psychological and/or behavioral changes have taken place and recidivism is frequent (Brill and Lieberman, 1969). A method of dealing with this dynamic is to force drug abusers who have legal involvements to remain in treatment through probation or parole requirements. This may facilitate the possibility of success (Brill, Lieberman, 1969). For some personality types, it may be the only effective method of delivering treatment. However, no such requirements are possible for volunteers, the clients who are not involved in the legal system. In addition, coercion may not be an effective technique for treating some types of drug abusers.

The research noted above appears to be based on two assumptions which will also apply to this study: (1) dependence on, addiction to, or abuse of drugs is a symptom or result of psychological processes within the individual; (2) there is no basic difference in the psychological processes involved in either physical or psychological
dependence. In other words, drug abuse and drug addiction, while indicating whether or not physical dependence has taken place, do not indicate different psychological processes for the person involved.

**Need for the Study**

The patterns in drug abuse research discussed previously need to be continued. More attention, however, should be given to relationships among behavioral, demographic, and personality characteristics of drug abusers. While some studies have examined a few of these characteristics, none has investigated relationships among all three categories. This analysis is needed to provide the counselor with additional specific information about drug abusers so that more adequate treatment programs can be planned.

**Statement of the Problem**

For drug treatment programs to be able to improve outcomes, more client information is needed. Specifically, the relationships among personality patterns, race, sex, drug of abuse, volunteer status, age, education level, and drug-taking behavior for drug abusers who are in treatment need to be investigated.

**Purpose of the Study**

It was the purpose of this study to discover whether there are differences because of the race and/or sex of drug abusers in treatment in the drug they abuse, volunteer status, age, education level, drug-taking behavior while in treatment and personality. In addition, the underlying structure among all these variables was examined by means of common factor analysis. A two-way analysis of variance was performed, testing for whether there were any significant differences that were
attributable to race or sex in the rest of the variables which were reduced to principal components. Personality was measured by means of the MMPI. Drug of abuse was classified as narcotic or polydrug. Volunteer status was determined by considering whether or not discernible legal pressures were operating to push the drug abuser into seeking treatment. Drug-taking behavior was assessed by means of urinalysis reports made while the client was in treatment.

**Research Questions**

In order to accomplish the purpose of this study, several questions were asked. These research questions guided the analysis of the data which were collected and provided the structure upon which later conclusions were based.

1. For a sample of drug abusers in treatment what are the underlying common factors for the variables of sex, race, age, education level, obesity or anorexia. Theoretically, any substance that can be ingested can be abused.

2. For a sample of drug abusers in treatment, what are the principal components to which the variables of age, education level, drug of abuse, volunteer status, drug-taking behavior during treatment, and the 13 personality scales of the MMPI can be reduced?

3a. Will the sex of drug abusers in treatment have an effect on the above principal components?

b. Will the race of drug abusers in treatment have an effect on the above principal components?

c. Will there be an interaction between the race and sex of drug abusers in treatment on the above principal components?
Definitions

Because many terms found in the literature were unclear in their meaning, definitions for their use in this study are presented in the following section. The terms defined were selected because their meaning may be ambiguous or because they are technical in nature.

1. **Drugs**: These are medical and/or other chemical substances meant to create physiological or mood changes.

2. **Drug abuse**: Use of drugs in a manner that is not socially and/or medically approved is abuse.

3. **Substance abuse**: This is a general term which includes nonmedical use of drugs as well as abuse of other substances, such as food in obesity or anorexia. Theoretically, any substance that can be ingested can be abused.

4. **Drug dependency**: Dependency produces physical and/or psychological need or desire for drugs which may result from the alteration in mood and/or physiological responses experienced by the user. A drug dependent person is motivated by the desire to avoid negative "subjective effects associated with discontinuance of the drug," (Platt and Labate, 1975, p. 65) as well.

5. **Drug addiction**: This is a more severe form of dependency in which physiological and psychological symptoms occur upon abstinence from the drug. Usually the drug is a narcotic. However, other drugs (e.g., Valium and barbiturates) may produce addiction.

6. **Narcotics**: These drugs produce an alteration in mood and physiological responses, having depressant and pain killing effects and producing a state of euphoria, especially when injected. They are
opiates or synthetics such as opium, heroin, morphine, methadone, dilaudid, or talwin. All produce tolerance, have abstinence symptoms and are addictive. Finally, all but talwin may be substituted for each other to prevent abstinence symptoms.

7. **Polydrugs**: Operationally, this term refers to any drug(s), excluding narcotics. Examples include amphetamines, LSD, PCP, barbiturates, Valium, Quaalude, and others.

8. **Narcotic abusers**: Operationally, a narcotic abuser is a person who is currently abusing or has abused any narcotic. This person may also abuse other drugs as well.

9. **Polydrug abuser**: Operationally, this term refers to a person who is currently abusing or who has abused any drug(s) other than narcotics.

10. **Tolerance**: "Occurs when repeated administration of a certain amount of a drug fails to provide the same effects as the initial dose," (Platt and Labate 1976, p. 65). Addicts often increase their drug intake continuously because of this.

11. **Abstinence symptoms**: Upon stopping drug consumption, numerous unpleasant physical symptoms. These may include insomnia, aches, cramps, runny nose and diarrhea, among others, which last from four days to six months, depending on the level of addiction (Platt and Labate, 1976). These symptoms are often referred to as withdrawal symptoms.

12. **Volunteer**: A subject who is self-referred and has no legal or discernable other pressures to seek treatment is a volunteer.
13. **Nonvolunteer**: A subject who is in treatment because of court stipulation, whose lawyer referred him/her, or who was arrested within two months of admission to treatment is a nonvolunteer.

14. **Dirty urine**: A urine sample is dirty when chemical analysis reveals traces of illicit drugs.

15. **Profile**: As used with the MMPI, a profile is a graphic report of an individual's scores on the thirteen scales. Shape, scatter, and elevation are important characteristics, providing information concerning the individual's personality.

16. **Shape**: On an MMPI profile shape refers to an individual's pattern for the thirteen scales. Shapes of several profiles can be compared, disregarding scatter and elevation if desired.

17. **Scatter**: This term is another means of describing an MMPI profile. It states how much individual scales deviate about the profile mean.

18. **Elevation**: The mean of an individual's scores on the thirteen scales of the MMPI is the individual's elevation.

19. **Configuration**: This term refers to the shape of the MMPI profile. It is used particularly when the total meaning for the profile is being interpreted and discussed. The effect of all the scales on each other is taken into account for the interpretation.

20. **Psychopath, sociopath, antisocial personality**: These are largely interchangeable terms for the personality disorder characterized by delinquency and underachievement before age 15; "inability to sustain consistent work behavior," "... lack of ability to function as a responsible parent," "... failure to accept social norms with respect to lawful behavior," "... inability to maintain
enduring attachment to a sexual partner," "... irritability and aggressiveness," "... failure to honor financial obligations," "... failure to plan ahead, or impulsivity," "... disregard for the truth," and/or "... recklessness," (DSM III 1980, pp. 179-181). Typically, this person will be elevated on scale 4 (Psychopathic Deviate) and probably on scale 9 (hypomania) on the MMPI.

21. **Factors**: These are "hypothesized, unmeasured, and underlying variables which are presumed to be the sources of the observed variables," (Kim and Mueller, 1978b, p. 84).

22. **Principal components**: These are "linear combinations of observed variables, possessing properties such as being orthogonal to each other, and the first principal component representing the largest amount of variance in the data, the second representing the second largest and so on," (Kim and Mueller, 1978b, p. 86). In this study, they are a means of data reduction which does not distort relationships among the observed variables.

23. **Communality**: This term refers to "The variance of an observed variable accounted for by the common factors; in an orthogonal factor model, it is equivalent to the sum of the squared factor loading," (Kim and Mueller, 1978b, p. 83).

24. **Eigenvalue**: The characteristic root of a covariation matrix is the eigenvalue. The eigenvalue of a factor must equal one or more in order to extract that factor for consideration.

25. **Canonical variate**: This weighted linear composite of variables representing a construct may be explained in terms of the real variables by means of loadings, correlation coefficients between a
canonical variate and the real variables, (Hinkle, Wiersma, and Jurs, 1979).

26. Varimax: This orthogonal rotation simplifies the factor structure of the pattern matrix (Kim and Mueller, 1978b).

Limitations

The nature of the sample utilized in this study limits the generalizability of the results. Only drug abusers in treatment make up the sample; therefore, no statements are made about drug abusers not in treatment. In addition, drug abusers who dropped out of treatment before psychological testing could be accomplished are not included in the sample, which may also limit generalizability. The balance between testing a subject while still under the influence of the abused drug or while still in acute withdrawal versus having a complete sample are discussed in Chapter III. Subjects were tested within four weeks of admission to treatment. About 15 percent dropped out before being tested. Invalid profiles were also excluded. Validity criteria are discussed in Chapter III. Less than one percent of the MMPI's were not valid.

Geography is a further limitation to generalizability. Columbus, Ohio, is a metropolitan area of about one million people. Larger urban areas, suburban and rural areas may have drug abusers in treatment facilities who are quite different from this sample.

Effects of history may also limit generalizability. The sample is composed of consecutive admissions, the males for the year 1978 and the females from July, 1977, through December, 1979. However, there is no reason to believe that any factor was operating during the time the
sample was in treatment to alter its nature on the variables selected to be studied.

The categorization of subjects by drug of abuse into polydrug or narcotic abusers may be another limitation of this study. Subjects were classified largely through self-report with medical corroboration made only for narcotic addicts. In addition, separation of these categories was somewhat arbitrary because of the multiple drug use of most subjects. However, subjects classified in this study as polydrug abusers are not addicted to narcotics, the primary difference between the two categories. The rationale for this classification is based on the addictive nature of narcotics, resulting in withdrawal symptoms. A major preoccupation with narcotics necessarily results when the abuser becomes addicted.

Finally, the use of the MMPI is another limitation. Only the personality information provided by this instrument is available for this study. In addition, this instrument was administered to narcotic addicts while they were receiving daily doses of methadone. Little research has been done on the possible effects of this drug on MMPI profiles. However, methadone is the drug of choice for narcotic treatment centers because it has few discernable psychological effects.

Summary and Overview

Chapter I has presented the need for and the purpose of this study. Chapter II is a review of the literature and research related to the variables selected for this study. The research design and statistical analyses are described in Chapter III, while Chapter IV presents the
results. Lastly, Chapter V contains a summary of the results, conclusions, and recommendations.
CHAPTER II
Review of Literature

Introduction

This review examines simple classification systems, etiological theories and empirical studies found in the literature which focus on drug abuse and abusers. Particular attention is given to research on the pathology of the drug abuser, personality patterns that have lead to the conceptualization of the drug abuser as sociopath, typological studies which appear to refute this, and subgroups of abusers classified by sex, race, admission status, drug of abuse, age, and education level. In addition, the limited research concerning illicit drug use by abusers in treatment is discussed.

Classification Systems

In examining the literature of drug abuse, three approaches to dealing with the subject have been observed. One is to simply describe and classify what has been clinically observed. Kolb (1925) and Felix (1944) developed such a system which was widely used for many years by those treating drug abusers. More recently, the DSM III (1980) provides a classification system useful to practitioners as well as researchers. However, information provided by these systems is minimal, as their major purpose is to facilitate uniform classification of drug abuse considered as a mental disorder.
Etiological Theories

Etiological theories are a second approach. They attempt to explain as well as describe drug abuse and the abuser. Platt and Labate (1976) provide concise descriptions of several of these theories, including Conditioning Theories (the abuser receives some sort of reinforcement for his/her drug use), Metabolic Deficiency Theory, Sociological Theories (sociological events and processes produce addiction no matter what personality structure is involved), Psychoanalytic Theories (the personality of the abuser accounts for his/her addiction), and Psychosocial Theories (an integration of psychological and sociological theories). Because psychoanalytic thought has had such a pervasive influence on all areas dealing with personality, the explanations offered by this theory gained widespread acceptance, especially the concept of the "addiction-prone personality." In the formulation of these theories Platt and Labate (1976) note the reliance on clinical observations and/or research studies that have few subjects or severe methodological problems.

Empirical Studies

The third approach to dealing with the subject of drug abuse evident in the literature is the empirical study of the drug abusing population. Much of this research is concerned with the personality structure of drug abusers and employs the Minnesota Multiphasic Personality Inventory (MMPI) (Hathaway and McKinley, 1967). This review will concentrate on the research which has employed this instrument.

Three general findings have been typical of empirical studies: (1) drug abusers show marked pathology (conversely, a few also score within
the "normal" range on the MMPI; (2) elevations on the Psychopathic deviate (Pd, Scale 4) scale are the most common elevation: (3) other elevations occur, but are less frequent. The controversy surrounding each of these findings will be investigated in the following review.

Pathology of Drug Abusers

Pathological elevations on the MMPI have occurred in many studies of drug abusers. Over 90 percent of Hill, Haertzen and Glaser's (1960) sample had abnormal elevations on the MMPI. In Sutker's (1971) study 88 percent of the sample had pathological elevations. Ninety-four percent of the sample in Sheppard, Fracchia, Rica, and Merlis' (1972) study indicated pathology. Gilbert and Lombardi's (1967) study revealed that 96 percent of their sample of addicts (as against 73 percent of their control group of nonaddicts matched for socioeconomic status) indicated pathology on the MMPI. Black's (1975) study of Viet Nam veterans also supports the finding of pathology in drug abusers, as 71 percent of the sample were classified as psychiatrically abnormal. These are but a few of the many studies where pathology for drug abusers is reported. These studies also report a small, but consistent finding of "normals" who are addicted, supporting the clinical observations of Kolb (1925) and Felix (1944).

It might appear that a firm statement such as "a majority of addicts display psychopathological personalities," could be made. However, this cannot be done because the finding has been subjected to the criticism that "data are usually collected among samples of drug abusers applying for treatment, incarcerated in prison systems, or undergoing psychiatric intervention in inpatient or outpatient settings," (Sutker and Archer,
Pathology is an expected finding in such samples. Gendreau and Gendreau (1973) found no differences in pathology between addicts and nonaddicts, demonstrating that volunteer status accounted for the differences in scores for these groups. Pathology was associated with volunteering for treatment. Kojack and Canby (1975) also found no difference in pathology between addicted and nonaddicted servicemen. Few studies control for the "volunteerism" variable.

The Addict as Sociopath

A finding nearly as frequent as the above is that drug abusers have elevations on the Pd scale of the MMPI (Hill, Haertzen, and Glaser, 1960; Hill, Haertzen, and Davis, 1962; Gilbert and Lombardi, 1967; Sutker, 1971; Sutker and Allain, 1973; Pugliese, 1975; Zuckerman, Sola, Masterson, and Angelone, 1975). In the Hill, Haertzen and Glaser (1960) study 54 percent of the sample of addicts had profiles that were psychopathic. Gilbert and Lombardi (1967) controlled for socio-economic background and found that, "The most outstanding characteristics of the addict seem to be his psychopathic traits," (p. 538). Sutker (1971), compared addicted to nonaddicted prisoners, and found

That at least one-half of the addict sample can be described diagnostically as socially deviant or sociopathic, while only 30 percent of the nonaddict prisoners met the criteria for this category. Few "normal" individuals were found within the heroin-addicted sample, while 43 percent of prisoners were classified as normal, (p. 250).

A conclusion which resulted from the findings of studies such as the above was that the "addictive personality" was sociopathic. Hill (1962) stated that the social deviant had a "special vulnerability" to addiction due, in part, to the fact that, "He is deficient in daily pursuits which are reinforced by and bring satisfaction to the larger society,"
(p. 573). In addition, Hill (1962) pointed out, the socially deviant individual has few inhibitions. These problems leave this person "especially susceptible to short-term satisfactions, and if drugs are available he can himself rapidly manipulate his personal state," (p. 573). Because of conclusions from studies such as these, many drug treatment facilities began to treat all their patients as sociopaths and, in fact, were encouraged to do so (Brill and Lieberman, 1969).

**Typological Studies**

Again, controversy arose. Berzins, Ross and Monroe (1971) and Monroe, Ross and Berzins (1971) cautioned against ignoring the other personality patterns of drug abusers. Their research focused on various subgroups (those civilly committed, volunteers, probationers, and prisoners at the National Institute of Mental Health (NIMH) Clinical Research Center in Lexington, Kentucky). They discovered significant elevations not only on Scale 4 (Pd), but also on Scale 2 (D) and Scale 8 (Sc), indicating affective and cognitive disturbances in the groups they studied. Characterological disorders were found in 31 percent of the civilly committed patients, 39 percent of the volunteers, 45 percent of the probationers and 52 percent of the prisoners for a total of 42 percent of the entire sample. Emotional disturbances were found in 31 percent of the civilly committed patients, 36 percent of the volunteers, 26 percent of the probationers and 23 percent of the prisoners for a total of 29 percent of the entire sample. Thinking disturbances were found in 29 percent of the civilly committed patients, 18 percent of the volunteers, 22 percent of the probationers and 19 percent of the
prisoners for a total of 22 percent. Seven percent of the entire sample showed no pathology.

Sheppard, et al. (1973) looked at suburban applicants to a methadone maintenance clinic and found several personality types: Schizotypic--67 percent (most frequent MMPI code type was 8-4-2); sociopathic--22 percent (most frequent code types were 4-2 and 4-9); neurotic--five percent; and affective personality types--three percent. They concluded that motivation to seek treatment (a "volunteerism" factor) may have been why their sample differed in sociopathy from other studies that employed primarily "coerced" samples (prisoners or patients committed to federal and state institutions). The socioeconomic status of suburban patients may also have been an important factor in their results.

Berzins, Ross, English and Haley (1974) continued research on subgroups of drug abusers at the facility in Lexington, Kentucky. Ten subsamples (five for males and five for females) in the four categories of admission previously described, plus one category of mixed admissions were studied. A correlational clustering technique produced two profile types replicated in each of the ten subgroups. Type I profiles showed highest elevations on Scales 2 (D), 4 (Pd), and 8 (Sc) and low ego strength. Type II profiles showed a single peak on Scale 4 (Pd). This was the first of the typological studies employing clustering procedures. Sixty percent of their sample could not be clustered with the procedure they used.

Clustering procedures also were used by Raines (1979) and Dick (1979) in their companion studies of male and female drug abusers in treatment. These studies were performed in the same setting as was used
by the present researcher. Nine male types were found by Raines (1979), accounting for 70.5 percent of her sample. The same clustering technique was used by Dick (1979) and produced seven female types, accounting for 60 percent of his sample. The males investigated by Raines (1979) showed characterologic, psychotic and neurotic disturbances. The largest cluster had a typical sociopathic profile with elevations on Scale 4 (Pd) and Scale 9 (Ma). However, this type accounted for only 15.2 percent of the sample. A second sociopathic profile, 8.3 percent of the sample, had a single elevation on Scale 4 (Pd), accounting for a total of 23.5 percent of this sample.

Dick's (1979) investigation of females at the same treatment facilities showed that 13.5 percent had a single spike elevation on Scale 4 (Pd) and eight percent had 4-9 elevations, accounting for 21.5 percent of the sample as sociopathic, character disorders. An additional ten percent had peaks on Scales 4 (Pd) and 9 (Ma) but these were below 70 T scores and could be called "normal." Five of the seven personality types were classified as personality disorders, antisocial and passive-aggressive types. The other two were primarily psychotic in nature.

Collins, Burger, and Taylor (1976) studied 59 volunteer male heroin users at a methadone maintenance treatment program in a Veterans Administration (VA) hospital. They factor analyzed the fourteen scales of the MMPI (including the ? scale) and found eight types which were significantly different from each other on all scales except ? and K. They concluded, "While the frequency of occurrence of some of the types is too small to permit interpretations, it does seem clear that different patterns within the groups are present," (p. 475). The three
groups that accounted for 60 percent of the sample had elevations on Scales 2, 4, 8, and 9 (D, Pd, Sc and Ma).

Collins, Burger, and Taylor (1977) continued their search for personality patterns of drug abusers by employing the MMPI classification system of Gynther, Altman, and Sletton (1973) on 93 protocols of males at a VA hospital. The two modal profiles were the 4-9/9-4 and 2-4/4-2, accounting for 32 percent of the sample. The remainder showed a great amount of variation, resembling a psychiatric sample. They concluded that the two modal profiles were typical of drug abusers, but that other patterns were also present and that the researcher's sampling technique could tap into greater or smaller amounts of the modal profiles as well as the other types, yielding conflicting results. They also suggested that a two point high code classification system may be inadequate in dealing with these profiles; the profiles may be more complex, needing a three point system which has not yet been reliably established.

It appears that the controversy surrounding the "addictive personality as sociopath" has been more the result of the interpretations of findings than of the findings themselves. As early as Kolb's (1925) and Felix's (1944) classification systems, four types of personality structures were seen in samples of drug abusers. The empirical studies cited in this review discovered consistently the presence of the same four diagnostic categories: psychopaths, neurotics, schizoids, and "normals." The percent of the sample which could be diagnosed as psychopathic, or sociopathic, varies, but usually is about one-fourth to one-third of the sample. The logical conclusion is that the greatest
single group of drug abusers may be diagnosed as character disorders. However, this is not to say that large proportions of the drug abusing population may not be suffering from cognitive or affective disorders. The implications of this for treatment are significant. The confrontive, reality-oriented, coercive treatment that may be necessary in working with character disorders is not likely to be effective with persons having thought or affective disorders. Other treatment strategies may be necessary.

**Subgroups of Drug Abusers**

The results of these studies have one further implication. Subgroups that differ on variables other than personality may exist within the population of drug abusers. Each subgroup may have the range of psychopathology described above, or specific kinds of pathology may be typical of a particular subgroup. The following section reviews the literature that attempts to divide the drug abusing population into categories based on demographic and behavioral variables, describing how personality patterns vary in these subgroups.

The most common variables used to study drug abusers have been sex, race, volunteer status, and drug of abuse. Others have been age, I.Q., education level, drug-taking during treatment, whether the abuser was "street" or "straight," and self-medicator or social/recreational user, among others. Studying the personality patterns of these subgroups of drug abusers can have important results for planning their treatment strategies and can shed more light on the phenomenon of drug abuse.
**Sex of the Abuser**

A frequent method of dividing drug abusers into categories is by sex. However, much more research which focuses on males alone has been performed than that which studies females alone. A few studies have included both male and female subjects. This may reflect the larger number of male drug abusers which traditionally has been encountered in drug treatment facilities (Ellinwood, Smith, and Vaillant, 1966).

Pescor (1944) provided the first comparison of male and female drug abusers encountered in the literature. He studied the first 100 women admitted to the United States Public Health Service Hospital in Lexington, Kentucky, and found that men more often than women were given a diagnosis of "psychopathic personality;" while women more often than men were given a diagnosis of "psychoneurosis." Men appeared to become "addicted through curiosity and association," (p. 772) while women became addicted "for the relief of some painful or distressing physical condition," (p. 772). A similar study was done in 1966 at the hospital in Lexington (Ellinwood, et al., 1966). More men were diagnosed as personality disorders and sociopaths than women and more women were diagnosed psychotic, neurotic, and suffering from drug addiction only than men.

Olson (1964) studied a group of incarcerated women and a group of hospitalized men. The most frequent clinical diagnosis for both groups was sociopathic personality disturbance. The results of a comparison of MMPI scores between the two groups were that men "scored significantly higher on the K scale, while the females scored significantly higher on
the D and the Pa scales," (p. 261). In treatment this would mean that the
males were significantly more defensive and guarded and that the women were more frank and indiscreet, with a noticeable tendency to be more critical of themselves. The higher D score in the female group suggests that they were characterized by a lack of self-confidence, narrowness of interests, and had a poor morale, a tendency to worry, uneasy self-concern, and dissatisfaction with their immediate situation. The significantly higher Pa score suggests that the women were using the paranoid mechanisms of projection, extra-punitiveness, and a reliance on a power orientation (p. 261).

Fifteen percent of the males and 30 percent of the females peaked on scales 4 (Pd) and 9 (Ma). Twenty-three percent of the males and 20 percent of the females were classified as 2-4/4-2, while 22 percent of the males and 17 percent of the females were classified as neurotic. Also, 20 percent of the males and 12 percent of the females were classified as schizoid. This study was the first major effort to delineate similarities and differences in personality patterns between male and female drug abusers.

Ludenia (1972), using a large, heterogeneous sample found that of the deviate profiles obtained, the largest proportion of males were classified as psychotic personality types, followed by pre-psychotic, schizoid, and delinquent types. Elevations on Scale 5 (Mf) were also frequent for males. The greatest number of female deviate profiles were classified as delinquent personality types, followed by schizoid, pre-psychotic and psychotic types. She did not find significant numbers of neurotic profiles, a result that diverges from the studies cited above. Other than the Scale 5 (Mf) elevations for men and the relative frequency of profile types, she found no significant differences in personality between male and female drug abusers.
In their typological study Berzins, et al. (1974) concluded that "for all practical purposes Type I and II profiles were identical within the male and female replication samples," (p. 67). Type I male and female mean profiles had a correlation of .90 and Type II male and female mean profiles correlated .80 which were both significant at P < .001, two tailed. However, visual inspection of the mean Type I and II profiles for men and women present some differences, which, while not statistically significant, may be practically significant. Type I males were more highly elevated on the "neurotic triad" [Scales 1 (Hs), 2 (D), and 3 (Hy), as well as Scale 7 (Pt)] than women. In addition, type I females had a higher elevation on the L scale combined with a lower score on the K than the men. The lower K score for women supports Olson's (1964) finding. Patalano (1978), in a study of both race and sex, found that "the males scored higher than the females on the K, D, Hy, Pt. . . and lower on the Si scales," (p. 1063).

Dick's (1979) study, as mentioned previously, yielded seven personality types for women. Scale 4 (Pd) was prominent in each type; however, elevations on other scales provided information leading to several possible diagnoses. About 56 percent of the clustered profiles were classified as character disorders, 30 percent as thought disorders and 14 percent as a "personality disorder with depression," (Dick, 1979, p. 113). This last type had pathological elevations on all clinical scales except Scales 5 (Mf), 9 (Ma) and 0 (Si).

Raines' (1979) companion study of males yielded nine types, again, all with prominent Scale 4 (Pd) elevations as were found for the women. The profile configurations resulting from the clustering procedure were
interpreted as character disorders (58 percent of the clustered profiles), thought disorders (31 percent) and neuroses (11 percent).

A comparison of these two studies indicates that the women tended to have more Scale 4 (Pd) elevations than the men and that this scale clustered with other scales, producing profile configurations of a characterological nature. No "neurotic" cluster of profile configurations appeared as it did for the men. This is in contrast to the results of Pescor (1944) and Ellinwood, Smith and Vaillant (1966). In addition, the "passive-aggressive V" (Lachar, 1974, p. 81) a high Scale 4 (Pd), depressed (for women) Scale 5 (Mf), and high Scale 6 (Pa), occurred in four of the seven women's profile types. A "passive-aggressive" personality pattern could be interpreted for only one of the male types in Raines' (1979) study. This personality pattern appears to be more frequent for women drug abusers than for men as indicated by the results of these studies.

Two subgroups used in Wells' (1980) study of male and female drug and alcohol abusers contained the same subjects as those in Dick's (1979) and Raines (1980) studies. She performed a discriminant analysis that differentiated male and female drug and alcohol abusers from each other on the basis of their MMPI profiles. Wells (1980) concluded, "There does not appear to be any one characteristic or set of characteristics measured by the MMPI which is common to all four groups," (p. 144).

While Scale 5 (Mf) does not belong to any of the diagnostic categories of neurosis, character disorder, or psychosis; it is an indicator of an individual's identification and comfort with his/her sex role.
This appears to be a frequent scale elevation among male drug abusers as noted by Black and Heald (1975); Hill, et al., 1962; Jansen and Hoffman (1973), and Weiss and Russakoff (1977). Elevations for males on this scale indicate individuals who have a wide range of cultural and aesthetic interests, who may be introspective and sensitive, and who may tend to worry, especially about their sexual identity. Passivity and dependence, which are also measured by this scale, for males, are viewed as significant problems for drug abusers by Freed (1973), Gerard (1955), Kendall and Pittel (1971), Kinsey, Nash and Dodson (1975), Kissin and Begleiter (1977), McLachlan (1975), Olson (1964), Rosenberg (1969) and Torda (1968).

Deren and Koslowsky (1977) and Kilman (1974) indicate that passivity and dependency may also be problems for female drug abusers. However, because Scale 5 (Mf) is scored in the reverse direction for females (low scores indicate an extreme identification with the female role) elevations do not describe the same personality dynamic as for men.

The findings of the studies cited in this section appear to be somewhat contradictory. Whether differences exist between the personalities of male and female drug abusers has not been conclusively established. If differences do exist, it is not clear what they are. The conflicting results of the studies cited in this section could be due to confounding variables which are not controlled for. Voluntarism, drug of abuse, and race may interact with sex to produce the inconclusive results noted above. These variables need further study to determine the effect they may have on the personality patterns of drug abusers in treatment.
Race of the Abuser

Race is a second variable by which to study personality patterns of drug abusers. Penk, Woodward, Robinowitz and Hess (1978) found that black heroin abusers exhibited considerably less pathology than whites, scoring lower on Scales F, 2 (D), 4 (Pd), 7 (Pt), 8 (Sc) and 0 (Si). This is in spite of Gynther's (1972) finding "normal" blacks score higher on Scales F, 4 (Pd), and 9 (Ma) than normal whites. Penk, Robinowitz, Woodward and Hess (1980), in a study of race and admission status, found that white heroin users displayed more anxiety and repression than did blacks.

A few studies concentrated on both race and sex variables. Chambers, Hinesley and Moldestad (1970) examined social, addiction, and "other deviancy characteristics," (p. 260) of female black and white addicts. Of those women who received psychiatric diagnoses, "Negro addicts were labeled sociopathic three times more often than white addicts," (p. 271). This may have been related to sociological rather than to personality factors, however.

Patalano, (1978) found that whites scored higher on Scales 2 (D), 3 (Hy), 7 (Pt), and 0 (Si) and lower on the L scales than blacks with no interaction effects for race and sex. In a similar study Sutker, Archer and Allain (1978) concluded that, while blacks showed less psychopathology than whites, "gender may be of limited value in prediction of personality" (p. 1376) in drug abusers. This appears to be typical of most studies that have investigated the effects of sex and race on the personality patterns of drug abusers.
Volunteerism

Whether or not they volunteer for treatment is a third means of categorizing drug abusers in order to study personality patterns. This factor appears to be an important one. Berzins, Ross, and Monroe (1971) studied volunteers, probationers, prisoners and a new category of civilly committed patients to the Lexington, Kentucky, facility. They found elevations of MMPI provides for all groups, pointing to a general level of "maladjustment." In addition, they found the sociopathic personality to characterize less than one-fifth of each group. Peaks consistently appeared on Scales 4 (Pd), 2 (D), and 8 (Sc). Monroe, Ross, and Berzins (1971), considering only high point codes of 845 males, diagnostically categorized the same four groups into psychological disorders (39 percent of volunteers compared to 31 percent of those civilly committed, 45 percent of probationers and 52 percent of prisoners), emotional disturbance (36 percent of volunteers compared to 31 percent of those civilly committed, 26 percent of probationers and 23 percent of prisoners), thinking disturbance (18 percent of volunteers compared to 29 percent of those civilly committed, 22 percent of probationers and 19 percent of prisoners), and asymptomatic (no MMPI elevation above 70 T scores; seven percent of volunteers compared to eight percent of those civilly committed, eight percent of probationers, and six percent of prisoners). All percentages were significantly different and a pair-wise comparison showed volunteers to be significantly different from those civilly committed and prisoners, but not from probationers. Pathology for volunteers was not supported.
In 1973 Gendreau and Gendreau supported the notion that drug abusers volunteering for treatment were different from those who were coerced in some way into treatment. They were responding to Sutker's (1971) finding that addicted prisoners were more pathological than nonaddicted prisoners on the MMPI and Sutker and Allain's (1973) findings that unincarcerated street addicts were still more pathological than the groups of prisoners. Gendreau and Gendreau (1973) contended that Sutker's (1971) findings were in reality due to the fact that the addicts were largely volunteers for treatment, while the nonaddicts were not. Their conclusion was based on the comparison of volunteer and nonvolunteer addicts and volunteer and nonvolunteer nonaddicts. They state, "While the samples were small (total N = 50), the data clearly demonstrate that whether a prisoner was an addict or not, the fact that he volunteered for treatment was accompanied by an elevated MMPI profile," (p. 140). Finally, they contended the differences between the addicts and nonaddicts were not due to personalities "prone" to addiction but to their volunteer status.

The typological study by Berzins, Ross, English and Haley (1974), while finding two types of personalities among their sample of addicts, did not find differences for volunteers and nonvolunteers. However, the statistical procedure they used did not take into account all aspects of the profiles (only shape, not scatter and elevation). Elevation or the degree of pathology, is an important factor in the volunteerism issue which may explain their findings.

Penk and Robinowitz (1976) studied heroin-using volunteers, non-heroin drug-taking volunteers, heroin-using nonvolunteers, and
non-heroin drug-taking nonvolunteers. Volunteers in each drug-taking category "evidenced heightened disturbance in all aspects of adjustment," (p. 91) when compared to all the nonvolunteers. Penk, Robinowitz, Woodward and Hess (1980) in a study of race and admission status found that, "Those volunteering for treatment \[N = 260\] expressed significantly more anxiety and somatization than nonvolunteers \[n = 67\]," (p. 330). These findings were extended to black volunteers and nonvolunteers (Robinowitz, Woodward, and Penk, 1980), black volunteers scoring significantly higher on Scales 1 (Hs), 2 (D), and 3 (Hy) than black nonvolunteers.

Volunteerism is a highly controversial variable in the study of drug abusers. One position is that the observed pathology of drug abusers in treatment is due, for the most part, to the fact that they have felt enough emotional pain that they want to enter treatment (Gendreau and Gendreau, 1973). It is not the fact of their drug abuse, that accounts for their pathology, rather it is that they were uncomfortable enough to want to seek treatment. The opposite position is that drug abuse itself either is the result of, or causes pathology (Sutker, 1971). The studies cited in this section point to the need for further research into this issue because no clear results have been obtained.

**Drug of Abuse**

The drug which is chosen by the individual is a fourth category by which drug abusers can be studied. Is there a relationship between personality and the type of drug chosen? Torda (1968) noted differences in the "emotional structure of the heroin addict, the chronic alcoholic and the LSD user," (p. 143) through her study which used a biographical
personality assessment test, psycho-pharmacological and psychiatric observations. Henriques, Arsenian, Cutter, and Samaraweera (1972) found significant differences on Scales 6 (Pa) and 9 (Ma) for three groups of drug abusers—heroin users, barbiturate users, and amphetamine users. The amphetamine users scored highest, heroin users second, and barbiturate users last. In addition, they showed that "proportionately more barbiturate users (45 percent) than heroin users (27 percent) or amphetamine users (11 percent) had depression scales ranked highest or next to highest among the various clinical scales of the MMPI," (p. 75). They were unable to determine whether or not the drug itself was causing the elevations. The memory of the psychological state produced by the drug might have been enough to influence the scores, even if the user was not currently under the influence of the drug.

Heller and Mordkoff (1972) attempted to determine whether young, nonaddicted, multiple drug abusers differed from the "traditional heroin addict," (p. 66). They found that studies reporting MMPI profiles for abusers of heroin only had profiles very different from the nonaddicted sample. A study which employed a sample of abusers who were similar to their own sample (Gilbert and Lombardi, 1967) reported MMPI profiles very similar to those they obtained. Heller and Mordkoff's (1972) results show the drug abusers in their sample obtained peaks on scales 4 (Pd) and 9 (Ma) (above 80 T scores) and elevations on Scales F, 2 (D), 5 (Mf), 7 (Pt), and 8 (Sc) (above 70 T scores). This profile looks very different from that of the heroin abusers of Hill et al. (1960) and Olson (1964). The main difference appears to be that the profile is more highly elevated indicating a greater degree of
pathology. Their group also appeared to show more anxiety and depression than the heroin abusing groups they used for comparison.

Four groups of drug abusers were studied by English and Tori (1973): "soft" drug users (marijuana), "hard" drug users (barbiturates, amphetamines, and hallucinogens), opiate addicts, and staff of the community mental health center which provided the setting. The first two groups were largely nonvolunteers, while the opiate addicts were largely volunteers. "Soft" drug users showed least pathology, "hard" drug users were next, and opiate addicts showed the most pathology. All four groups peaked on Scale 4 (Pd) with the opiate addicts showing elevations at or above 70 T scores on Scales F, 6 (Pa), 8 (Sc), and 9 (Ma). "Hard" drug users also scored on Scale 8 (Sc) at 70. The authors point out that the results may reflect the ethnic composition of the different categories of drug abusers, the "soft" drug users being primarily white and well educated and the opiate addicts being primarily black and less educated. However, they state that this is the composition of the groups that are expected to present themselves for treatment in a community mental health facility. Their conclusion may be correct, but making statements about personality and drug of abuse is very difficult when the volunteerism, race and education factors are not controlled.

Carlson and Zuckerman (1977), in a more carefully controlled study, found that

Stimulant use was positively related to the Hypochondriasis, Hysteria, Paranoia, Schizophrenia, and Hypomania scales; hallucinogen use correlated significantly and positively with the F, Hypochondriasis, Depression, Hysteria, Paranoia, Psychasthenia, Schizophrenia, and Social Introversion scales, (p. 592).
They describe the user of hallucinogens as a "socially withdrawn, confused, unrealistic person who is suspicious of others and subject to some peculiar ideation," (p. 598). They, too, could not determine whether drug use caused or resulted from these characteristics. Stimulant users displayed psychotic pathology, but to a lesser degree than that of hallucinogen users. Preoccupation with somatic complaints also characterized stimulant users. More whites than blacks used hallucinogens.

Trevithick and Hosch (1978) employed multivariate analysis of variance and multiple discriminant analysis to determine personality correlates of drug of choice. They found that Scales 1 (Hs) and 6 (Pa) characterized the abusers of heroin, and Scales 3 (Hy) and 8 (Sc) characterized the abusers of barbiturates and amphetamines. In addition, the "overall profile distinguishes addicts from nonaddicts," (p. 180).

A similar study was conducted by Penk, Fudge, Robinowitz, and Neman (1979). They found that heroin users were less pathological than amphetamine users and barbiturate users. They also discovered that heroin users were more likely to score high on Scales K and 9 (Ma), "reflecting managerial, autocratic, and power orientations," (p. 583). Amphetamine and barbiturate users scored higher on Scales 3 (Hy), 7 (Pt) and 0 (Si), indicating that they were suffering from acute alienation. In an analysis of covariance design, Penk, Woodward, Robinowitz, and Parr (1980) controlled for age, education, socioeconomic status, and admission status (volunteerism) and found these variables interacted significantly, but that they did not change the results. While polydrug
abusers scored higher than heroin users, the differences were not significant when multivariate analyses of variance and covariance were performed. They concluded that "differences in personalities of polydrug and heroin abusers are not strong enough once covariates are controlled," (p. 300) and contend that this is a strong argument for dispensing with the "addiction prone personality" hypothesis.

Again, the results of this group of studies are inconclusive. Voluntarism, race, and sex may again be confounding variables when the drug of abuse is studied. A trend toward considering the polydrug abuser as somewhat more pathological than the heroin abuser is evident but controversial.

Drug-Taking Behavior During Treatment

During the course of treatment in most facilities, drug-taking behavior is monitored by use of urinalyses. This provides treatment personnel with a barometer of how the abuser in treatment is faring with respect to his/her continued use of drugs. If remaining drug free is a goal of treatment, urinalyses should be able to give at least an approximation of the "success" of treatment. Schut, Wohlmuth, Nazlin and File (1973) attempted to determine what distinguished those who remained "clean" for a period of time from those who did not. They found 15.5 percent of their sample was totally abstinent for two consecutive months (Group I), of these 6.7 percent of the original sample were abstinent for four out of six months (Group II), and of these only one percent of the original sample were abstinent for the entire six month period. These authors found that the majority of the "successful" patients were white in spite of the population's being predominantly black. In
addition, the education level of "successful" patients was higher than that of other patients. No statistical analyses were performed and other studies looking at this variable could not be found. However, this is an interesting way to approach the difficult area of measuring "success" in treatment.

Summary

The research on drug abusers which has made use of the MMPI has produced several results. The first of these is that drug abusers have pathological personalities. Most studies of drug abusers support this conclusion; however, the possibility exists that volunteering for treatment may be an uncontrolled, confounding variable producing inflated profiles. A second finding is that most drug abusers obtain elevations on Scale 4 (Pd) and often on Scale 9 (Ma) as well. These elevations lead to a diagnosis of the drug abuser as "Sociopath," and implies that no other classification is necessary. Other personality patterns have been all but forgotten due to the interest in this "addictive personality."

A third result of drug abuse research is actually a rediscovery of earlier clinical observations: Several personality types are involved in drug abuse. While sociopathy is generally seen as the most frequent personality type, affective and cognitive disturbances are also present in proportions great enough to merit further attention.

Uncovering potentially confounding variables is a fourth area of research done with drug abusers. The most important of these variables are the sex and race of the abuser, whether the abuser volunteered for or was coerced into treatment and the type of drug abused. Much of the
research which was examined in the section on "Subgroups of Abusers,"
focused on one of these variables but often did not control for the
others, producing inconclusive results. However, some results recur
often enough in well designed studies so that some general conclusions
can be made about these variables. These conclusions are as follows.
1. Sex of the abuser appears to be an important variable in drug abuse
   research. It appears personality patterns may be different for
   males and females, but just what these differences are is not clear.
   Passivity and dependence seem to be problems for both males and
   females.
2. Race may be an even more important variable in drug abuse research
   than sex. Some indications were found that black drug abusers may
   be less pathological than whites.
3. Volunteering for treatment generally was found to be associated with
   greater pathology than being coerced into treatment.
4. Polydrug abusers may indicate higher levels of pathology on the MMPI
   than narcotic abusers. This latter finding is highly controversial,
   however.
CHAPTER III
Research Design

Introduction

This chapter describes the research setting, population, sample, instrumentation, and collection of data for this study. In addition, the research design is discussed and the statistical procedures which were used are explained.

Research Setting

A drug treatment center in Columbus, Ohio, VITA (Victory in Treating Abuse) Services was the setting for this study. Columbus, with a metropolitan area of one million people, is a midwestern city, the state capitol, and the home of The Ohio State University. VITA is part of the Columbus Area Community Mental Health Center, Incorporated. It is the drug abuse treatment component mandated under the comprehensive Mental Health Service Delivery System model of the National Institute of Mental Health. In 1978 and 1979, the years the sample for the present study was in treatment, VITA consisted of two components: (1) a methadone treatment center and (2) an out-patient drug free counseling center.

The methadone program specialized in medical and psychological treatment for persons dependent on opiate drugs (heroin, morphine, demerol, codeine, percodan, dilaudid, etc.). Patients were placed on a methadone maintenance or detoxification program and received
psychological and social readjustment treatment. They also underwent a complete physical examination and were evaluated medically regarding the degree of their drug dependency. Psychological testing evaluated personality and intellectual functioning. A caseworker/counselor provided psychological treatment in conjunction with a psychologist and/or psychiatrist. Urine samples were collected on a weekly basis in order to monitor continued drug use. Patients were medicated with methadone daily, seen by a physician at least monthly, and seen in counseling at least monthly, often more frequently. The staff included three licensed medical doctors (including a psychiatrist), six registered nurses, two licensed psychologists, one psychology intern, two degreed counselors, and two social workers.

The counseling center was the drug free counterpart of the methadone program and was designed to treat persons who were abusing drugs other than those which are opiate based (such as barbiturates, amphetamines and/or hallucinogens). The counseling center received many referrals through the Franklin County Probation Department, Ohio Adult Parole Authority, physicians, and attorneys. Some clients were self-referred, ("volunteers"). All clients received a complete physical examination and some were evaluated by a psychiatrist if necessary. Upon admission, a caseworker/counselor was assigned to each client. Treatment was provided by the counselor on a weekly, biweekly, or monthly basis in conjunction with a psychologist. A test battery was administered to evaluate intellectual and psychological functioning. Urine samples, to screen for continued drug use, were collected from clients one to three times weekly. The staff was composed of one registered nurse, two
degreed counselors, three social workers, one psychology intern and one licensed psychologist. A physician did not work directly with clients because the counseling center was not a medical clinic as was the methadone center. However, the psychiatrist's time was shared between the two centers on an "as-needed" basis. No paraprofessionals or ex-drug offenders were used in the provision of direct service to clients at either center.

The assumption upon which treatment at VITA was based is that substance abuse is a maladaptive, self-defeating behavior and is a symptom of complex medical-emotional-personality problems. It, therefore, requires treatment from a psychiatric-psychological perspective. However, because modifying behavior was the ultimate goal, consequences of the individual's behavior were stressed during treatment. The staff worked closely with probation and parole officers to ensure continuity of treatment for clients with legal involvements. Continued illegal drug use, which was monitored through urinalyses and/or non-compliance with VITA's program requirements could have caused a client on probation or parole to be incarcerated. Self-referred or volunteer clients, while monitored, had no such controls. Many of the volunteers, however, were in the methadone program. Non-compliance for these clients could have meant termination of methadone treatment.

VITA's clients represented a diversity of backgrounds, coming from both the lower and middle class. They had educations ranging from grade school to graduate school. Their ages ranged from middle teens to middle 50's. Both black and white clients as well as males and females were in treatment. The occupation of the clients were also varied.
Many were unemployed; however, some held professional and semi-professional positions. For example, the careers of some clients included pharmacist, registered nurse, probation officer, youth employment counselor, and medical secretary.

Population

The population to which the results of this study are generalizable are drug abusers who are in treatment for their abuse. Because only drug abusers in treatment are part of this study, no statements will be made about drug abusers not in treatment. In fact, these populations are likely to be different from each other.

Phil and Spiers (1978) criticize most drug studies for their limited generalizability because samples are drawn from the population of abusers in treatment. However, rather than being merely a "convenience," it would be difficult to conduct a scientific study with drug abusers not in treatment because of the difficulty of identifying and gathering data on those who might not recognize the problem themselves. Moreover, improvement of programs for drug abusers is the goal of the present study.

Sample

The sample used for this study consists of 345 adult clients age 18 or older from VITA Services. The 215 males were consecutive admissions with complete data from January, 1978, through December, 1978. The 130 females were consecutive admissions with complete data from July, 1977, through December, 1979. The time span was increased for the females in order to provide a sample size more similar to that of the males. No factor affecting the variables of this study appeared to be operating in
the last half of 1977 or in 1979. Therefore, there should be no major differences in the samples of males and females due to the different years they were in treatment.

Sixty-four clients (15.6 percent) who were admitted during this time were not included in the sample because complete data were not available for them. In most of these cases it was the MMPI which was missing, usually because treatment was begun but was not continued long enough to allow completion of the MMPI.

The age range of subjects was 18 to 55. Racial composition was 38.8 percent black and 61.2 percent white with two Puerto Rican subjects included in the white sample. Subjects who abused a wide range of drugs -- barbiturates, tranquilizers, stimulants, hallucinogens, inhalents, alcohol, and narcotics -- were represented. No subject was included if alcohol was the only substance abused. Both volunteer and nonvolunteer clients were part of the sample.

Primary drug of abuse for this sample was either "narcotic" (opiates, derivatives, and opiate synthetics) or "polydrugs" (non-narcotic drugs such as LSD, amphetamines, barbiturates, tranquilizers, inhalents, and others). If a subject abused any narcotic he/she was automatically considered a narcotic abuser. This was done in order to define the operational categories for this study. While abusers often have in their history a considerable number of drugs, narcotics often become the main preoccupation for those who are addicted owing to the withdrawal symptoms they suffer upon abstinence. Therefore, abuse of any narcotic qualified the subject for the category
of "narcotic abuser." Abuse of any other substance, excluding narcotics, qualified him/her for the category of "polydrug abuser."

Admission status was "volunteer" or "nonvolunteer." The volunteer was defined as having no overt legal coercion to seek treatment. A nonvolunteer either was required by the court to be in treatment as part of probation or parole requirements or was advised by a lawyer to seek treatment.

**Instrumentation**

The Minnesota Multiphasic Personality Inventory (MMPI) (Hathaway and McKinley, 1967; Hathaway and Meehl, 1951) short form R was used to collect personality information from the subjects in this study. This true-false self-report inventory was designed to provide the counselor and researcher an objective assessment of major areas of personality functioning and to discriminate between "normal" and "abnormal" personality characteristics. The entire test has 550 items randomly arranged with respect to the characteristic each item assesses. However, only the first 399 items are needed to score three validity (L, lie, F frequency, and K a correction factor and indicator of defensiveness) and ten clinical scales (Scale 1, Hy, Hypochondriasis; Scale 2, D, Depression; Scale 3, Hs, Hysteria; Scale 4, Pd, Psychopathic Deviate; Scale 5, Mf, Masculinity-feminity; Scale 6, Pa, Paranoia; Scale 7, Pt, Psychasthenia; Scale 8, Sc, Schizophrenia; Scale 9, Ma, Hypomania; and Scale 0, Si, Social Introversion). These are the most frequently used by researchers and practitioners and are the ones used in this study. The other 151 items are scored for special scales.
Selection Criteria

The MMPI was selected for use in this study because of its widespread use in both counseling and research. Its counseling utility is related primarily to the quantity and quality of information it reports. However, its ease of administration, scoring, and interpretation also facilitate its use as a diagnostic tool. Empirical studies using the MMPI with drug and alcohol abusers are cited in Chapter II. The previous extensive use of this instrument justifies its further use in research, as it has potential to facilitate the replication and extension of data and to add to the growing body of information about drug abusers. This research data also can be applied easily in counseling settings because the same type of information is known about clients through existing testing procedures. A further reason for selecting the MMPI for this study is that it is routinely administered to clients as part of diagnosis and treatment procedures at VITA Services.

Interpretation

Raw scores for individuals are interpreted by means of a profile which employs standardized T scores (mean of 50 and standard deviation of 10) along the vertical axis. T scores at or above 70 (two standard deviations from the mean, which shows that only two percent of the normal sample scored higher) are generally considered pathological (Gilberstadt and Duker, 1965). A profile is then interpreted by inspecting the "high point code," the one, two or three highest scales, and by analyzing relationships among the scales. Marks, Seeman, and Haller (1974), Lachar (1974), Gilberstadt and Duker (1965), and Webb, McNamara, and Rodgers (1981) contain interpretive statements based on these scale
elevations and configurations. The above authors employ actuarial interpretation, a method of interpreting profile configurations based on the statistical probability that their statements describe psychological and behavioral characteristics of subjects. This is made possible by the large amount of research using the MMPI. Marks, Seeman, and Haller (1974) provide a comprehensive explanation of how actuarial interpretation arrives at interpretive descriptions. Statements in this study made about profile scales and configurations use the actuarial interpretation method.

Lachar (1974) describes the 13 scales of the MMPI, three validity and ten clinical, used in this study.

Validity Scales

L  The Lie Scale, designed to identify a general deliberate, evasive response set, also identifies a significant need to appear in a favorable light. High scorers often use repression and denial, have a lack of insight and are excessively rigid.

F  The Frequency Scale is a measure of general adjustment, high scorers endorsing a wide range of atypical or deviant thoughts and behavior. Ego dysfunction, severe stress, and acute psychotic reactions can also produce high scores on this scale. Disinterest, lack of cooperation, or misunderstanding can also be detected by this scale.

K  A correction factor, this scale also indicates the degree of defensiveness, insight, and ego strength of the subject. A high scorer is often unwilling to discuss personal or family inadequacies necessary for treatment in psychotherapy, while a low scorer may be overly self-critical and lacking social skills.

Clinical Scales

1 (Hs/Hypochondriasis) Scale 1 indicates concern about the individual's physical well-being and bodily functions. Vague
and nonspecific physical complaints may be exaggerated. Defenses against psychological discomfort are likely to be somatic with elevations on this scale.

2 (D/Depression) Measures a state characterized by poor morale, moodiness, and feelings of hopelessness and sorrow. This scale is particularly responsive to the subject's current mood and may be a reflection of a temporary situation stress. It may reflect a more stable personality characteristic as well.

3 (Hy/Hysteria) Hysteroid characteristics—denial, repression, immaturity, egocentricity, suggestibility, naivete, rigidity, and conformity—are indicated by elevations on this scale. Conversion symptomatology, using physical symptoms to solve conflicts or avoid responsibility, is also measured by this scale.

4 (Pd/Psychopathic) (Deviate) A continuum ranging from constricted conformity to the antisocial acting out of impulses is reflected in this scale. Elevations indicate nonconformity, rebelliousness, and impulsivity. As the elevation increases, poor social adjustment, antisocial behaviors, low frustration tolerance, inability to profit from experience, and conflict with authority figures become more likely.

5 (Mf/Masculinity-Femininity) Sex role identification for both males and females is measured by this scale. For males, elevations may indicate sensitivity, passivity, a tendency to worry and a wide range of cultural interests. For females, the scale is inverted so that high scores may indicate a woman who is adventurous, aggressive, competitive and confident. A low score for females suggest a passive, self-pitying, fault-finding individual.

6 (Pa/Paranoia) Over-sensitivity, suspiciousness, distrust, delusional beliefs, ideas of reference, feelings of persecution and rigidity are measured by this scale.

7 (Pt/Psychasthenia) This scale reflects anxiety, worry, tension low self-esteem, moodiness, indecision, fears, and obsessive-compulsive thinking. It is a general measure of discomfort.
Unusual thought processes, apathy, feelings of social alienation, peculiarities of perception, and reality contact are the areas which this scale measures.

Elevations on this scale indicate hyperactivity and agitation, irritability, restlessness, grandiosity, euphoria, and impulsivity.

This scale provides an index of the subject's comfort on the introversion-extraversion continuum. Elevations on this scale indicate a person who does not like and withdraws from social interaction and may have limited social skills. Distrust, sensitivity, withdrawal, and feelings of inferiority are also indicated. On the other hand, a low score of this scale indicates an extrovert, one who seeks and derives satisfaction from social interaction.

**Empirical Scale Development**

Hathaway (Dahlstrom, Welsh, and Dahlstrom, 1972) describes the construction of the MMPI, which began in the late 1930's. Items were empirically developed from experiences with various hospitalized psychiatric groups with known diagnoses which were based on the then-current Kraepelinian diagnostic system. The responses of these groups were compared to responses of a sample of normal adults. Items which discriminated between the two groups were included in the scale under construction. Because of this empirical approach, actual item content is irrelevant, avoiding the issue of "item transparency." Test-takers are not always sure what they are endorsing in many of the items, which prevents much conscious altering of responses. Hathaway (Dahlstrom, Welsh, and Dahlstrom, 1972) acknowledges that many difficulties remain with this instrument and its method of development. However, he contends that nothing better has been developed to assess personality dynamics. The research employing the MMPI cited in Dahlstrom, Welsh,
and Dahlstrom (1972, 1975), Newmark (1979), and elsewhere can be taken as corroboration of his contention.

**Validity**

The criterion-oriented, empirical method of deriving items for the MMPI also affords it the advantage that the instrument's validity was defined at the time of its construction. Goldstein and Neuringer (1976) consider a criterion-oriented test to be valid by definition. Nevertheless, validity studies of the MMPI will be described below.

Validity of an instrument is an important issue in any research. Does the test being employed actually measure what the researcher or clinician is assuming it measures? An examination of the literature related to this question reveals several validity studies done on the MMPI. McKinley and Hathaway (1943) reported that in 60 percent of new psychiatric admissions an elevated score on an MMPI scale predicted the patient's clinical diagnosis. In other cases where an elevated score did not actually predict the diagnosis, the trait in the individual was found to be present in an abnormal amount. Agreement between an instrument such as the MMPI and clinical diagnosis is difficult to achieve because the orientation and skills of the diagnosing practitioners may diverge. Also, the diagnostic systems employed are subject to confusion and have been changed several times since the MMPI was developed (Dahlstrom, Welsh, and Dahlstrom, 1972). However, Little and Schneidman (Welsh and Dahlstrom, 1956) found that clinical descriptions of individuals and descriptions based on MMPI profiles often agreed substantially. While no instrument has been found to be highly efficient in
identifying drug abusers from other groups, Siegel (1976) found some success with the MMPI.

Another method of assessing validity is to determine how well the test measures the psychological concepts or constructs it is intended to measure, its construct validity (Cronbach, 1970). This avoids the limitations in assessing validity which result from differences in the diagnostic systems employed and the skills of the clinicians. However, there is little information that defines the constructs which the MMPI is intended to measure, other than the names of the scales themselves and actuarial interpretations of individual scales and profile configurations. This confusion prevents an adequate assessment of its construct validity. However, factor analytic studies in conjunction with actuarial descriptions of individual MMPI scales can make clearer just what is being measured by these scales. The factor analytic work of Astin (1959); Comrey (1957, 1958); Comrey and Marggloff (1958); Graham, Schroeder and Lilly (1971); Harris and Lingoes (1968); O'Connor and Stefic (1959); and the actuarial descriptions of Lachar (1974), Marks, Seeman and Haller (1974) and Webb, McNamara and Rodgers (1981) provide clear descriptions of the content of each scale. Wells (1980) has provided a summary and comparisons of this research in her study.

Little can be said concerning the construct validity of the MMPI at this time due to the lack of clear, agreed-upon definitions; however, the constructs are becoming increasingly well defined. While personologists still have many areas of disagreement, personality tests such as the MMPI are being used in practice until more theoretical agreement can be reached.
Reliability

Reliability of the instrument used to collect data is another issue with which a researcher must be concerned. Table 1 summarizes the results of seven test-retest reliability studies conducted on several types of samples at different time intervals. High coefficients are generally achieved when the retesting is done within a few days to two weeks of the original testing. Mauger's (1972) study using college students indicates the reliability coefficients for the MMPI decline a great deal over an eight month time span. However, the longer the time interval between tests, the more likely is error resulting from changes in the subjects' emotional state. Reliability of testing is difficult to achieve with a phenomenon as ephemeral as personality.

Limitations

An instrument such as the MMPI which attempts, by means of paper and pencil, to measure a complex structure like personality is quite likely to have limitations. It is important that the counselor and researcher be aware of these so that the interpretation of data (both ideographic and nomothetic) can be done more accurately. The discussion which follows concentrates on five major limitations that might influence the data of this study.

1. The first such limitation is the intercorrelation that exists among the scales of the MMPI. This is important to consider when examining the common factor variance later in this study. The intercorrelations Swenson, Pearson, and Osborn (1973) found among MMPI scales for a sample of 50,000 male and female medical outpatients at the Mayo Clinic, Rochester, Minnesota are summarized in Table 2. Other intercor-
### TABLE 1

**MMPI TEST-RETEST**

**RELIABILITY COEFFICIENTS**

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relational studies (Hathaway and McKinley, 1940; Goldberg, 1969; and Lingoes, Crook, and Harris, 1958) are reported in Dahlstrom, Welsh, and Dahlstrom (1975, pp. 261-263).

These intercorrelations were subjected to factor-analytic studies which yielded a variety of discoveries. Dahlstrom, Welsh, and Dahlstrom (1975) state, "When the factor analysis is focused primarily upon the basic MMPI scales (the validity subset plus the ten clinical scales), the internal structure of the common variance in the MMPI profile has usually been characterized as basically two-dimensional (p. 122)."

These two factors are an anxiety or general maladjustment factor and a factor of repression or "generalized inhibition or control over expression of psychopathology," (Dahlstrom, Welsh and Dahlstrom, 1975, p. 122). Welsh (1952) was the first to identify these factors, supported later by Eichman (1961, 1962). The scales that contain the most relationship to other scales (common variance) are Scales 2 (D), 7 (Pt), and 8 (Sc); while Scales 5 (Mf) and 6 (Pa) have little common variance with the others.

2. A second limitation of this instrument important to this study is that many of the MMPI scales make use of some of the same items. This may influence a factor analysis of the scales. The method of developing the MMPI employed a pragmatic clustering of "symptoms which overlap and interrelate in a variety of ways," (Dahlstrom, Welsh and Dahlstrom, 1972, p. 231), justifying the use of a common item pool for the test itself. However, researchers, particularly those who employ factor analytic methods, must recognize these interrelations when making interpretations. Many individual items on the test are scored for a
number of scales. For some of these items responses are scored either in the opposite or in the same direction. For example, a true answer to one item could be scored for Scales 2 and 7 or a false for that item might be scored for Scale 9 and not for 2 or 7.

The F scale and Scale 5 (Mf) have equal numbers of uniquely scored items, while the K scale has the fewest number of items scored only for that scale. Scales 1 (Hs) and 3 (Hy) have the greatest number of common items, Scales 7 (Pt) and 8 (Sc) the next greatest number all scored in the same direction. Scale 0 (Si) has the greatest number of items scored opposite from the other scales. There are only seven pairs of scales that have no common items. Wheeler, Little, and Lehner (1951) found correlations from -.15 to .46 among the basic scales, based on the actual amount of overlap among the items. Dahlstrom, Welsh, and Dahlstrom (1972, p. 233) state, "These correlations show the degree to which each of the scales will covary with the other basic scales as a result of the experimental dependence arising from shared items," (p. 234). A table of the absolute amount of item overlap among the basic scales and the intercorrelations resulting from this overlap can be found in Dahlstrom, Welsh, and Dahlstrom, (1972, p. 233).

3. The research questions for which the MMPI is being employed in this study give rise to the third possible limitation. In this research race is a variable which is carefully examined. However, some questions have been raised about the use of the white norms of the MMPI with black subjects (Gynther, 1972). Lachar (1974) and Dahlstrom, Welsh, and Dahlstrom (1974) cite many studies that support the finding that blacks score higher than whites (both psychiatric and non-psychiatric samples)
on Scales L, F, 1 (Hs), 8 (Sc) and 9 (Ma). Because the MMPI was normed on an entirely white sample, comparisons to samples of blacks are difficult to make. However, the differences appear to be somewhat consistent from study to study. Lachar (1974) discusses whether these differences are "true" differences or whether they are the result of measurement error. The studies of Miller, Knapp, and Daniels (1968) and Gynther, Fowler and Erdberg (1971) "definitely support the position that black profiles must be interpreted differently," (Lachar, 1974, p. 15). Gynther (1972) found that one indicator of pathology (F> 25) must be interpreted quite differently for blacks than for whites. The possible variance in MMPI scores due to race is an important consideration when the results of the present study are interpreted.

4. Sex is a variable which is being examined closely in this study and which MMPI research reports to be another possible source of variance in scores. Separate norms have been established for men and women on Scales 1 (Hs), 2 (D), 3 (Hy), 5 (MF), 7 (Pt), and 8 (Sc) because the norming process indicated differences resulted from measurement error rather than from actual differences between males and females (Dahlstrom, Welsh, and Dahlstrom, 1975). While norming has apparently facilitated accurate ideographic interpretations, the nomothetic distribution of code types is affected by the sex variable (Lacher, 1974). Hathaway and Briggs (1957) provide means and standard deviations of each scale for the males and females of the norm group. This data is summarized in Table 3. On the K scale, females scored lower than males, but not enough to warrant a separate norm. This may mean that women tend to be somewhat less defensive than men, possibly admitting to more
<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>4.05</td>
<td>4.27</td>
</tr>
<tr>
<td>F</td>
<td>3.88</td>
<td>3.49</td>
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<tr>
<td>K</td>
<td>13.45</td>
<td>12.08</td>
</tr>
<tr>
<td>1 (Hs)</td>
<td>11.34</td>
<td>13.14</td>
</tr>
<tr>
<td>2 (D)</td>
<td>16.63</td>
<td>19.26</td>
</tr>
<tr>
<td>3 (Hy)</td>
<td>16.49</td>
<td>18.80</td>
</tr>
<tr>
<td>4 (Pd)</td>
<td>19.30</td>
<td>18.41</td>
</tr>
<tr>
<td>5 (Mf)</td>
<td>20.44</td>
<td>36.51</td>
</tr>
<tr>
<td>6 (Pa)</td>
<td>8.06</td>
<td>7.98</td>
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<tr>
<td>7 (Pt)</td>
<td>22.95</td>
<td>25.21</td>
</tr>
<tr>
<td>8 (Sc)</td>
<td>22.26</td>
<td>22.65</td>
</tr>
<tr>
<td>9 (Ma)</td>
<td>17.00</td>
<td>16.12</td>
</tr>
<tr>
<td>0 (Si)</td>
<td>25.00</td>
<td>25.00</td>
</tr>
</tbody>
</table>

Source: Hathaway and Briggs (1957)
psychological problems, which would result in more scale elevations. Other differences in scale scores for men and women of the norm group show that women score higher on all the scales for which separate norms were derived (1 (Hs), 2 (D), 3 (Hy), 5 (Mf), 7 (Pt) and 8 (Sc). However, they scored an average of nearly a point lower on scales 4 (Pd) and 9 (Ma) and exactly the same on scale 0 (Si).

5. The last major limitation of the MMPI applicable to this study involves the educational level of the subjects. Level of education has been shown to be a source of variance in MMPI scores. Persons with higher education levels tend to score higher on the K scale (defensiveness) and lower on all the clinical scales except scale 5 (Mf). On this scale, educated males tend to score higher.

Collection of Data

The data collected for this study consists of urinalysis reports, sex, race, drug of abuse (narcotic or polydrug), age, admission status (volunteer or nonvolunteer), education level, and personality test results. A complete list of all men admitted in 1978 and women admitted between July 1977 and December 1979 was obtained. Whether each of those individuals would be a part of the sample was determined on the basis of age (must be over 18) and whether he/she remained in treatment long enough to produce a valid MMPI profile. Sex, age, race, education level, drug(s) of abuse, and referral source (whether "self," of the legal system) were data gathered during the usual intake procedure. Subjects were required to give urine samples at least once per week during the time they were in treatment. Records of the results of urinalyses performed to detect the presence of illicit drugs were kept
in charts maintained for each client. These reports were collected for the members of the sample. The percent of dirty urines was calculated for each subject and was the form in which this variable was recorded for statistical analysis.

Personality information for this study was collected by means of the MMPI. Personality testing of a sample of drug abusers for use in research presents several problems. Pihl and Spiers (1978) state that a major difficulty with such research is that testing is done either while the client is in acute withdrawal or while still under the influence of the abused drug. In order to avoid this difficulty, they recommend "an optimal time for testing a drug-abusing population is approximately two to three weeks after detoxification or four weeks after admission," (Pihl and Spiers, 1978, p. 110). At VITA, waiting four weeks usually meant that many of those admitted had dropped out of the program. Therefore, in an attempt to balance the problems of having a complete sample versus testing during a period of patient instability, testing was done between one and four weeks after the subject was admitted for treatment.

The standardized instructions for administering the MMPI provided in the manual (Hathaway and McKinley, 1967) were followed by the mental health professional who supervised the subjects taking the test. Each answer sheet was scored by an individual trained in this procedure using templates provided by the Psychological Corporation. K-corrected scores were plotted on the appropriate male or female profile, thereby converting them to standardized T scores. These T scores were the form in which scores were recorded for statistical analysis in this study.
Invalid profiles were removed from the sample on the basis of whether they met the following criteria:

1. F minus K exceeded 16 raw score points.
2. There were 30 or more omissions on the answer sheet.
3. F exceeded 99 T scores while L and K were less than 66 T scores (Lachar, 1974).

Regarding the first criterion for determining invalidity, Lachar (1974) suggests that the subject may not have been attending to the test items or was deliberately attempting to "fake bad." In the second case, not enough data is provided for adequate interpretation if the subject omits more than 30 test items. For the third criterion Lachar (1974) states that this validity configuration indicates the subject, "produced a large number of extremely rare responses" (p. 110), indicating a lack of understanding of either the test items or the instructions or possibly indicating a random response. Lack of motivation, "reading limitations, or receptor deficits," (Lachar, 1974, p. 110) could account for these validity scale scores. Profiles with validity configurations meeting the above criteria would not be likely to reflect accurately the psychological state of the subjects and would therefore not be useful in this study.

All the above information, available in individual charts, was collected for each subject in the sample and was coded so that the identity of each subject was protected. Access to data from these charts was granted by the executive director of VITA Services who signed a letter granting permission to use the information obtained in clients' charts (see Appendix B). The Ohio State University Social and
Research Design and Statistical Analyses

The data collected for this study underwent a variety of statistical procedures, each with a different purpose. The first goal was to describe the sample as completely as possible. Therefore, the means, standard deviations, and frequencies of each variable were computed for the entire sample as well as for subgroups defined by sex, race, volunteer status, and drug of abuse. Mean MMPI profiles for each of these subgroups were also computed. These group profiles may be quite efficient at removing the "noise" of measurement error from the "signal" of basic personality processes, particularly for neuroticism and sociopathy (Goldberg, 1972). A review of the literature indicates these personality types are frequent among drug abusers.

The second goal of the statistical procedures used in this study was to describe the patterns of relationships among all the selected variables and to identify underlying constructs among them. Rummel (1970) indicates that common factor analysis is the appropriate procedure to accomplish this.

Discovering whether there were significant differences because of race and/or sex in the personality, age, education level, admission status, drug-taking behavior during treatment, and drug of abuse was the third goal of the statistical procedures used in this study. In order to accomplish this in an economical manner, the variables, excluding race and sex, were reduced to principal components which are linear
combinations. These principal components were then used as dependent variables in a series of analyses of variance with race and sex as the independent variables.

Kim and Mueller (1978b) raise a question about the suitability of the factor analytic model for variables measured at any level below the interval level. Employing correlation matrices implies the necessity for interval measurement because it is associated with the Pearson r. In addition, there is no clear definition for ordinal or nominal variables specified as weighted sums of underlying factors. Other measures of association (e.g., Kendall's tau) which might be used in place of the Pearsonian r do not satisfy the need for the additive quality of interval measurement. Kim and Mueller (1978b) caution in particular against using dichotomous variables in a factor analytic model, but state there is an exception: When it is done as an heuristic device. Therefore the statements made about common factors in this study are exploratory statements only. The suggested underlying structure describes the sample and facilitates an understanding of drug abusers in treatment.

A further exception for the use of dichotomous variables in a factor analytic model is noted by Kim and Mueller (1978b).

Even in dichotomies, the use of phi's can be justified if factor analysis is used as a means of finding general clusterings of variables, and if the underlying correlations among variables are believed to be moderate—say less than .6 or .7 (p. 75).

Inspection of Table 6, (p.75) the correlation matrix, shows that no dichotomous variable has a correlation at or above .6 with any other variable.
In addition to the above justifications for employing the factor analytic model when dichotomous variables are part of the correlation matrix, is that phi's are used only when both variables used to compute the coefficient are dichotomous (e.g., race and sex, race and drug of abuse). This occurred only six times in the correlation matrix used for the common factor analysis. Point-biserial correlation coefficients are computed when one variable is dichotomous and the other is interval (e.g., between race and education level). This type of correlation does not present as much of a problem for the factor analytic model because nonrandom measurement errors are not as likely to distort the results of the factor analysis (Kim and Mueller, 1978b). Therefore, the problems associated with using dichotomous variables are minimized for this study.

For the principal components analysis, the second use of the factor analytic model in this research, two of the four dichotomous variables were removed from the correlation matrix (see Table 10 p. 86) so that they could be employed in response to research Question Three as independent variables. Therefore, a phi was calculated only once in the matrix. Further reducing the problems associated with using factor analysis, this phi is .422, well below Kim and Mueller's (1978b) recommended level of .6 or .7.

The third goal of this study was to determine the effects of sex and race on age, education level, drug taking behavior during treatment, volunteer status, drug of abuse, and personality. The first statistical procedure used to accomplish this was a principal components analysis with an orthogonal (Varimax) rotation (Rummel, 1970) performed on the
dependent variables. The data was thereby reduced to a few components which were then used as dependent variables in a two-way analysis of variance (ANOVA) design testing for main effects and interactions of race and sex (Iverson and Norpoth, 1976).

Two variants of factor analysis have been used in this study. "Common" or "classical" factor analysis, which was used to describe the underlying structure of all the variables in the entire data set, assumes that the observed variables are linear combinations of some underlying (hypothetical or unobservable) factors. Some of these factors are assumed to be common to two or more variables and some are assumed to be unique to each variable, (Kim and Mueller, 1978b, p. 8). Only the common factors, not the unique factors, make a contribution to the common variation and are assumed to be the source of the variation in the observed variables (Kim and Mueller, 1978a).

Principal components analysis, the second kind of factor analysis used in this study, does not assume the existence of these hypothetical causal factors. It "is a method of transforming a given set of observed variables into another set of variables," (Kim and Mueller, 1978b, p. 14). The second set is usually smaller than the first. The purpose of principal components analysis is "to account for as much variance as possible in the data," (Kim and Mueller, 1978b, p. 17), rather than to account for the covariation among the variables. Parsimony, without losing valuable information, is achieved. Both methods, however, explore how the variables are interdependent.

Because factor analysis is concerned only with variables that are mutually dependent, another method must be used when some are to be considered as independent variables. In this case, because race and sex
are attributes, and because of the nature of the findings of previous research, they were treated as independent variables. Therefore, a two-way analysis of variance design was employed with each of the principal components used as dependent variable. A separate ANOVA was performed for each of the identified principal components.

In these analyses of variance, each level of both independent variables contained a different number of the sample due to the use of principal components as dependent variables. Therefore, rather than employing the ANOVA procedure of the Statistical Analysis System (SAS), the General Linear Model procedure for unbalanced ANOVA was employed. This compensates for the uneven numbers in the cells of the 2 x 2 table.

Because principal components analysis is a rather complex procedure, the question may be asked why it was necessary to use it for this study. Separate two-way ANOVA could be performed with each of the 18 dependent variables (age, education level, drug of abuse, volunteer status, drug-taking behavior during treatment, and the 13 scales of the MMPI). This would result in two major disadvantages, however. First, having a statistically significant main effect by chance is substantially increased when this many separate ANOVA are performed on variables from the same sample. If, on the other hand, the data can be reduced to a fewer number of dependent variables, the chance of accumulating this error is considerably reduced.

Another reason for first using a principal components analysis is that relationships among the variables are preserved that otherwise would be lost if 18 separate ANOVA were to be performed. Each principal component can be described by the amount of total variance it accounts
for. In separate ANOVA, each dependent variable is considered with equal weight to every other dependent variable. How they may be related to each other is lost.

This research design suggests another possible statistical analysis which might have been employed, multivariate analysis of variance (MANOVA) (Hinkle, Wiersma, and Jurs, 1979). In this procedure the main effects and/or interactions of several independent variables can be tested on several dependent variables simultaneously. Alpha error does not accumulate as it does in a series of separate ANOVA. In addition, the relative proportion of variance which each dependent variable contributes to total variance is preserved. The design of the present study calls for one degree of freedom (N of the levels of the independent variables minus one) in the MANOVA procedure. This means that one canonical variate would be employed as the dependent variable for this data. Hinkle, Wiersma, and Jurs (1979) define a canonical variate as a weighted linear composite of variables representing a construct. It may be explained in terms of the real variables by means of loadings, "correlation coefficients between a canonical variate and the real variables," (p. 423). The greatest possible amount of variance is accounted for by the canonical variate.

That only one canonical variate is computed is the major limitation of this procedure for this study. Principal components analysis can produce more components, potentially accounting for more variance, while at the same time making use of loadings in the same manner as the canonical variate. In addition, the components are orthogonal, further reducing the chance of accumulating alpha error. Therefore, it appears
that analyses of variance with principal components as dependent variables is a sound compromise solution to the problem of which statistical method to employ. Maximum amounts of variance and relationship are balanced with minimum amounts of accumulated error.

Another means of reducing alpha error could be to adopt a stringent criterion for rejecting the null hypothesis. However, this is unnecessary because of the orthogonality of the principal components. Therefore, main effects and/or interactions for the independent variables will be considered significant if they are at or beyond the .05 level.

The statistical procedures described above were run on the computer at The Ohio State University. The statistical package, Statistical Analysis System (SAS), provided the programs for the procedures used.
CHAPTER IV

Results

Introduction

Findings from the study are presented in this chapter. The first section contains a description of the sample characteristics. Findings by research question are detailed in the second section of this chapter.

Characteristics of the Sample

All subjects included in this study have been diagnosed as drug abusers. At the time the sample was drawn, all were in treatment for their drug abuse. Table 4 contains a summary of the sample characteristics. The total sample numbers 345 subjects, 215 males (62.3 percent) and 130 females (37.7 percent). The mean age for the entire sample is 26.1 years, with a range of 18 to 55 years. Nearly 57 percent of the sample completed high school; the average number of years of education completed is 11.6. The racial composition is 134 blacks (38.8 percent) and 211 whites (61.2 percent; two Puerto Ricans were included in the number of white subjects). One hundred sixty-five subjects (47.8 percent) were classified as volunteers and 180 (52.2 percent) as non-volunteers. Two hundred one (58.3 percent) subjects were narcotic abusers and 144 (41.7 percent) were polydrug abusers. Urinalyses performed while subjects were in treatment revealed that 10 percent of
<table>
<thead>
<tr>
<th></th>
<th>SEX</th>
<th>RACE</th>
<th>VOLUNTEER STATUS</th>
<th>DRUG OF ABUSE</th>
<th>ABUSE</th>
<th>TOTAL SAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Black</td>
<td>White</td>
<td>Volunteer</td>
<td>Nonvolunteer</td>
</tr>
<tr>
<td>Mean Age</td>
<td>25.7</td>
<td>26.4</td>
<td>28.0</td>
<td>24.8</td>
<td>26.7</td>
<td>25.2</td>
</tr>
<tr>
<td>Median</td>
<td>25.0</td>
<td>25.0</td>
<td>27.0</td>
<td>24.0</td>
<td>26.0</td>
<td>24.0</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>5.78</td>
<td>5.73</td>
<td>5.29</td>
<td>5.71</td>
<td>5.45</td>
<td>1.79</td>
</tr>
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<td>Mean Education Level</td>
<td>11.6</td>
<td>11.5</td>
<td>11.7</td>
<td>11.6</td>
<td>12.0</td>
<td>11.2</td>
</tr>
<tr>
<td>Median</td>
<td>12.0</td>
<td>12.0</td>
<td>12.0</td>
<td>12.0</td>
<td>12.0</td>
<td>11.0</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>1.86</td>
<td>1.89</td>
<td>1.80</td>
<td>1.91</td>
<td>1.88</td>
<td>1.79</td>
</tr>
<tr>
<td>Percent Completed</td>
<td>59.7</td>
<td>51.4</td>
<td>54.3</td>
<td>58.0</td>
<td>64.3</td>
<td>48.9</td>
</tr>
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<td>High School</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Percent Dirty</td>
<td>7.9</td>
<td>13.5</td>
<td>12.5</td>
<td>8.4</td>
<td>13.6</td>
<td>6.8</td>
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<tr>
<td>Urines While in</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>3.0</td>
<td>8.5</td>
<td>8.0</td>
<td>2.0</td>
<td>10.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
the total urine samples taken from subjects contained traces of illicit drugs ("dirty" urines).

Black subjects are somewhat older (mean age 28.0) than white subjects (mean age 24.8 years); while narcotic abusers average a few years older (mean age 27.5 years) than polydrug abusers (mean age 23.9 years). Males and females, volunteers and nonvolunteers are close to the mean age of the sample.

The mean education level and the percent who completed high school are very similar for all subgroups of the sample. However, volunteer subjects have a somewhat higher average number of years of education completed (12 years) and higher percent who completed high school (64.3 percent) than the average for the entire sample. "Dirty" urines appear to be somewhat more common among females (13.5 percent) than males (7.9 percent), blacks (12.5 percent) than whites (8.4 percent), volunteers (13.6 percent) than nonvolunteers (6.8 percent), narcotic abusers (14.0 percent) than polydrug abusers (4.5 percent).

**MMPI Characteristics**

Table 5 describes the sample in terms of the percentage of pathological elevations on the MMPI for each of the four dichotomous categories used in this study. On the MMPI, scores falling at or above two standard deviations from the mean (M = 50 T's; SD = 10 T's) are considered pathological.

The highest percent of elevation occurred on Scale 4 (Pd) for all subgroups of this sample. With the exception of polydrug abusers, more than half of all the subgroups have elevations at or above 70 T's on this scale. Scale 9 (Ma) is the second most frequent scale elevation.
<table>
<thead>
<tr>
<th>MMPI Scale</th>
<th>SEX</th>
<th>RACE</th>
<th>VOLUNTEER STATUS</th>
<th>DRUG OF ABUSE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Black</td>
<td>White</td>
</tr>
<tr>
<td>L</td>
<td>4.3</td>
<td>.7</td>
<td>4.3</td>
<td>2.2</td>
</tr>
<tr>
<td>F</td>
<td>21.6</td>
<td>22.9</td>
<td>23.6</td>
<td>21.2</td>
</tr>
<tr>
<td>K</td>
<td>7.4</td>
<td>2.1</td>
<td>3.6</td>
<td>6.5</td>
</tr>
<tr>
<td>1 (Hs)</td>
<td>26.8</td>
<td>15.0</td>
<td>21.4</td>
<td>22.9</td>
</tr>
<tr>
<td>2 (D)</td>
<td>29.0</td>
<td>25.0</td>
<td>25.0</td>
<td>29.0</td>
</tr>
<tr>
<td>3 (Hy)</td>
<td>17.7</td>
<td>21.4</td>
<td>17.1</td>
<td>20.3</td>
</tr>
<tr>
<td>4 (Pd)</td>
<td>52.4</td>
<td>56.4</td>
<td>59.3</td>
<td>50.6</td>
</tr>
<tr>
<td>5 (Mf)</td>
<td>16.0</td>
<td>2.1</td>
<td>12.1</td>
<td>10.4</td>
</tr>
<tr>
<td>6 (Pa)</td>
<td>20.8</td>
<td>31.4</td>
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<td>22.9</td>
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<tr>
<td>7 (Pt)</td>
<td>27.3</td>
<td>20.7</td>
<td>19.3</td>
<td>28.1</td>
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<tr>
<td>8 (Sc)</td>
<td>33.3</td>
<td>30.7</td>
<td>31.4</td>
<td>32.9</td>
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<tr>
<td>9 (Ma)</td>
<td>46.3</td>
<td>38.6</td>
<td>47.9</td>
<td>40.7</td>
</tr>
<tr>
<td>0 (Si)</td>
<td>5.2</td>
<td>10.0</td>
<td>5.7</td>
<td>7.8</td>
</tr>
</tbody>
</table>
With the exception of females, 40 percent or more of all subgroups scored at or above 70 T's on this scale. About 20 percent or more of most subgroups of the sample have pathological elevations on all the clinical scales, excluding the L-F-K validity scales and Scales 5 (Mf) and 0 (Si). A further observation is that all scales for volunteers show a somewhat greater percent of pathological scores than for non-volunteers. The validity scales and Scale 5 (Mf) are the only exceptions.

Findings by Research Question

This section presents the findings by research question. A brief description of the statistical analyses performed is also provided

Question 1

The first question which was considered in this research was:

For a sample of drug abusers in treatment, what are the underlying common factors for the variables of sex, race, age, education level, drug of abuse, volunteer status, drug-taking behavior during treatment and the 13 scales of the MMPI?

A factor analysis was performed using the Statistical Analysis System (SAS) package with a Process Factor instruction. Principal axis factoring using squared multiple correlations in the main diagonal of the correlation matrix as prior estimates of communality was employed. As a result, common factors, which are assumed to be the source of the observed variables and to account for the correlation among them (their covariance), were extracted (Kim and Mueller, 1978b). The goal of this question was to identify meaningful dimensions of the data for which this "classical" factor analytic model is particularly suited (Kim, 1975).
Table 6 contains a correlation matrix of all the variables, behavioral, demographic, and personality, used in this study and is the basis for the factor analysis used for this question. This matrix was the first step of the factor analysis procedure; the second step was the extraction of common factors; and the third step was a Varimax orthogonal rotation to simplify the factor structure and to facilitate interpretation.

In the extraction step, inferred factors are the result of the assumption made in this factor analytic model that some variables are influenced by shared determinants and other variables are likewise influenced by other shared determinants. Common factors are the determinants shared by several variables, while unique factors are determinants that are idiosyncratic to each variable (Kim, 1975). When the main diagonal is replaced by prior estimates of communality, an additional assumption is made: if the sources of variance that are common are removed from the observed variables, no correlation between the variables will remain. Only a portion of each variable is involved in how they are patterned.

In this model, we are assuming the existence of a unique factor or a unique variance of a variable not involved with any other variables. By replacing the diagonal elements in the correlation matrix, we are taking out the presumed unique variance of each variable and only analyzing the remaining portions of the variables (Kim, 1975, p. 480).

Therefore, the factor structure among the variables is analyzed on only the common variance that remains after the presumed unique variance is removed. The prior estimates of communality, squared multiple correlations in this case, are the common variances used in extracting the factors.
### TABLE 6

**CORRELATION MATRIX FOR ALL VARIABLES**

|       | SEX | RACE | AGE | EDUC. LEVEL | VOL. STATUS | DRUG OF ABUSE | URINALYSES | L | F | K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|-------|-----|------|-----|-------------|-------------|---------------|-------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sex**<sup>1</sup> |     |      |     |             |             |               |             | 100|   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| **Race**<sup>2</sup> | -19 | 100  |     |             |             |               |             |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| **Age** | 06  | -27  | 100 |             |             |               |             |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| **Educ. Level** | -04 | -02  | 11  | 100         |             |               |             |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| **Vol. Status**<sup>3</sup> | -19 | 02  | -14 | -19         | 100         |               |             |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| **Drug of Abuse**<sup>4</sup> | -26 | 40  | -29 | -11         | 42          | 100           |             |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| **Urinalyses**<sup>5</sup> | 19  | -14 | 17  | 02          | -23         | -32           | 100         |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| **MMPI Scales** |     |     |     |             |             |               |             |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| L     | -07 | -06 | -09 | -09         | 17          | 14            | -14         | 100 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| F     | -01 | -02 | -15 | -18         | -01         | 03            | -03         | 16  | 100|   |   |   |   |   |   |   |   |   |   |   |   |
| K     | 17  | 03  | 03  | 12          | 03          | 02            | 00          | 51  | -38| 100|   |   |   |   |   |   |   |   |   |   |
| 1 (Hs) | -09 | 05  | 13  | 05          | -13         | -11           | 18          | 05  | 36 | 08 | 100|   |   |   |   |   |   |   |   |   |   |
| 2 (D)  | -02 | 10  | 08  | -01         | -15         | -11           | 12          | -15 | 39 | -12| 60 | 100|   |   |   |   |   |   |   |   |   |   |
| 3 (Hy) | -04 | 14  | 06  | -12         | 00          | 16            | 00          | 20  | 17 | 75 | 61 | 100|   |   |   |   |   |   |   |   |   |   |
| 4 (Pd) | 11  | -02 | 01  | -12         | -07         | -13           | 12          | 10  | 31 | 04 | 36 | 50 | 45 | 100|   |   |   |   |   |   |   |   |   |   |
| 5 (Mf) | -39 | -12 | 13  | 05          | 06          | -01           | -03         | 01  | 08 | 00 | 10 | 08 | 14 | 02 | 100|   |   |   |   |   |   |   |   |   |   |
| 6 (Pa) | 13  | 03  | -10 | -06         | -04         | 06            | 00          | -13 | 58 | -26| 33 | 45 | 35 | 42 | 12 | 100|   |   |   |   |   |   |   |   |   |   |
| 7 (Pt) | -04 | 07  | -02 | -02         | -10         | -03           | 11          | -19 | 52 | -13| 53 | 69 | 49 | 50 | 09 | 54 | 100|   |   |   |   |   |   |   |   |   |   |
| 8 (Sc) | -04 | -01 | -12 | -07         | -07         | 02            | 05          | -12 | 76 | -15| 51 | 53 | 40 | 47 | 15 | 64 | 76 | 100|   |   |   |   |   |   |   |   |   |   |
| 9 (Ma) | -14 | -06 | -17 | 01          | 02          | 04            | -02         | -21 | 33 | -25| -02| -16| -09| 15 | 09 | 13 | 15 | 32 | 100|   |   |   |   |   |   |   |   |   |   |
| 0 (Si) | 23  | -02 | 08  | -11         | -03         | -07           | 03          | -19 | 38 | -41| 23 | 51 | 11 | 18 | -06| 32 | 48 | 37 | -23 | 100|   |   |   |   |   |   |   |   |   |

(Decimals have been eliminated)

1Coded so that 1 = Male, 2 = Female
2Coded so that 1 = Black, 2 = White
3Coded so that 1 = Volunteer, 2 = Nonvolunteer
4Coded so that 1 = Narcotic, 2 = Polydrug
5Percent of dirty urines was coded
Inspection of Table 7 shows that the greatest amount of initial common variance is found among the personality scales on the MMPI, particularly scale 8 (Sc). Scales 7 (Pt), 2 (D), 3 (Hy), F, 1 (Hs) and K also have common variances that are large. The behavioral and demographic variables have the lowest squared multiple correlations indicating that they account for relatively little of the common variance of the characteristics of drug abusers under study. However, of these variables, urinalyses (percent of dirty urines) and sex contribute most to the common variance.

Theoretically, when factors are extracted in this manner, the total number is limited only by the number of variables under consideration. However, a point of diminishing returns is reached in terms of the amount of common variance accounted for by each factor. A frequently used criterion for determining the number of factors is to use a minimum eigenvalue equal to one (Kim and Mueller, 1978b). The largest eigenvalue indicates that factor accounts for the most common variance, the second largest eigenvalue indicates that factor accounts for the second most common variance, etc. The sum of all the eigenvalues will equal the sum of the prior estimates of communality for the variables. Table 8 presents the eigenvalues for all the factors included in this study. The slight difference between the sum of eigenvalues in Table 8 and the sum of communalities in Table 9 is due to rounding errors. Inspection of Table 8 indicates that if the criterion of an eigenvalue equal to at least one is met, four factors will be retained from this data.

In the extraction process, the equation
\[ \det(R_l - \lambda I) = 0 \]
TABLE 7

COMMUNALITY ESTIMATES

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<th>Prior Estimate-Squared</th>
<th>Multiple Correlation</th>
<th>Final Estimates</th>
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<td>K</td>
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(Decimals have been eliminated)
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<td>Total</td>
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</table>
was solved, where $R_1$ is the correlation matrix with squared multiple correlations in the main diagonal and $I$ is an eigenvalue equal to unity (Kim and Mueller, 1978b). Table 8 also indicates that the four factors with an eigenvalue of one or more also account for nearly 93 percent of the common variance of all the variables. Factor One alone accounted for 47.7 percent of the common variance, while the other three together accounted for a total of 44.9 percent.

The final step in the factor analytic procedure was to simplify the factor structure through rotation. "The rotation procedure is the transformation of a factor matrix to obtain another factor matrix that provides a better fit between factors and measures," (Hinkle, Wiersma, and Jurs, 1979, p. 434). A number of different procedures could have been employed. However, the decision was made by the research to make the factors orthogonal in order to facilitate their interpretation. Varimax rotation was employed which maximizes the variance of the squared loadings in each column and makes the factors orthogonal (Kim, 1975). Rummel (1970) states, "Varimax is now generally accepted as the best analytic orthogonal rotation method," (p. 392).

Table 9 summarizes the rotated factor pattern for all the variables of this study. The data included in this matrix are correlation coefficients as well as regression weights (i.e., it is both a pattern and a structure matrix; Kim, 1975). Correlations between factors (columns) and variables (rows) show the amount and direction of relationship between the two. In addition, the variance of each variable accounted for by the factors can be calculated from this matrix. The designation $h_j^2$ refers to the communality of the variable, the
### TABLE 9

**ROTATED ORTHOGONAL FACTOR PATTERN**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
</thead>
<tbody>
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<td>Sex (^1)</td>
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<td>229</td>
<td>-433</td>
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</tr>
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</tr>
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<td>-053</td>
<td>055</td>
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<td>Drug of Abuse (^4)</td>
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<td>-087</td>
<td>056</td>
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</tr>
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<td>F</td>
<td>542</td>
<td>176</td>
<td>563</td>
<td>164</td>
</tr>
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<td>K</td>
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<td>-027</td>
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<td>162</td>
</tr>
<tr>
<td>1 (Hs)</td>
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<td>061</td>
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<td>045</td>
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<td>034</td>
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<tr>
<td>0 (Si)</td>
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<td>026</td>
<td>383</td>
<td>-527</td>
</tr>
</tbody>
</table>

Proportional Contributions to Common Variances by Factors: 4.290 1.554 1.961 1.152

Coded 1 = Male; 2 = Female
Coded 1 = Black; 2 = White
Coded 1 = Volunteer; 2 = Nonvolunteer
Coded 1 = Narcotic; 2 = Polydrug
Percent of dirty urines coded
variance accounted for by combining all the factors. It is calculated by squaring each of the factor loadings for a variable (rows) and adding them together. This gives the final estimate of communality (see Table 7, page 77). Unique variance, that not accounted for by any of the factors, is the complement of communality and is designated $1-h^2_j$.

The final estimates of communality found in Table 7 (p. 77) indicate that more than 80 percent of the variance of Scale 8 (Sc) is shared by other variables in the set; more than 70 percent of the variance in Scales 2 (D) and 7 (Pt) is shared by other variables; and more than 60 percent for Scales 3 (Hy), F, and 9 (Ma) is shared. The K scale, scales 9 (Ma), and 6 (Pa), and drug of abuse have about 50 percent or more of their variance in common with other variables. The rest of the variables have less than 40 percent of their variance accounted for by the four factors. The remainder is unique variance.

How important a factor is can also be calculated by squaring column loadings and adding them together, resulting in the proportional contribution to common variance by each factor (see Table 9, page 80). These figures can be considered to be final eigenvalues for each rotated factor. It can be seen that Factor Three assumed relatively more importance than Factor Two.

Inspection of Table 9 (p. 80) reveals that two factors reflect personality variables (Factors One and Three), one reflects behavioral and demographic variables (Factor Three), while one reflects a combination of all types (Factor 4).

Factor One, labeled "General Psychopathology," accounted for 47.7 percent of the common variance. Nine of the 13 MMPI scales loaded
substantially on this factor. The highest loadings were for Scales 2 (D) and 7 (Pt), indicative of general distress—nervousness, tenseness, depression, and anxiety. Scales 1 (Hs), 8 (Sc), and 3 (Hy) had the next highest loadings on this factor, pointing to somatization of emotional conflicts and thought disturbances. Scales 6 (Pa), 4 (Pd), F, and 0 (Si) also had substantial loadings on this factor. These scales indicate the possibility of hypersensitivity, paranoia, social deviance, unconventional thoughts and social introversion (Lachar, 1974). Further description of these scales appears in Chapter III.

Factor Two, labeled "Probationary Status" had the most substantial loadings on behavioral and demographic variables. It accounted for 17.7 percent of the common variance. Drug of abuse had the highest loading on this factor, with volunteer status, age, and urinalyses having less substantial, but similar loadings. Interpreting the scaling for these variables shows that this factor is characterized by polydrug abuse, nonvolunteer status, younger age, and urinalyses indicating minimal drug usage during treatment. These characteristics appear to be typical of subjects whose treatment was stipulated by the legal system as part of their probationary status.

Factor Three, named "Social Inadequacy," accounted for 16.7 percent of the common variance and had the most substantial loading in the negative direction on the K validity scale of the MMPI. Meaningful loadings also occurred on the F scale in a positive direction and L Scale in a negative direction. This validity configuration could be interpreted to represent individuals who have deficits in ego functions. A general negative self-image and realization of need for psychological assistance are common characteristics.
Significant psychological problems are likely (Lachar, 1974, p. 108).

Scales 9 (Ma), 0 (Si), and 6 (Pa), also had positive loadings which can be considered in interpreting this factor. The loading for Scale 9 (Ma) may indicate maladaptive hyperactivity in thoughts and actions, and irritability while Scale 0 (Si) indicates introversion, and Scale 6 (Pa) hyper-sensitivity and suspiciousness. The negative loading on Scale 3 (Hy) could indicate a naive and self-centered individual. Configural interpretation of the profile suggested by these factor loadings indicates individuals who often have difficulty in relating socially because of hostility and suspiciousness. Projection of blame is frequent and they may overreact to stimuli in the environment, appearing tense, anxious, irritable and jumpy (Lachar, 1974).

Factor Four was the only one to load on a combination of personality and demographic variables. It accounted for 10.5 percent of the common variance and was named "Hyperactive Extroversion." Scale 9 (Ma), indicates the possibility of hyperactivity, but also enthusiasm, sociability, optimism and independence can be interpreted from this scale. This is especially supported by the loading on the 0 scale (Si) in the direction of social extroversion. However, this sociability may be superficial, indicating a high need for social approval. The substantial loading for sex indicates that males display these characteristics in this sample. The loading on scale 5 (Mf), when interpreted for males, indicates interest patterns of an aesthetic nature, and a man who does not conform to a stereotyped masculine image. It may also indicate passivity, since there is little relationship to education indicated by the loadings for this variable. Scale 5 (Mf) may also
Indicate a possible reaction formation against passivity, an interpretation supported by the loadings on the Scales 9 (Ma) and 0 (S1) (Lachar, 1974).

The factors underlying the variables being studied provide a detailed description of the dimensions of the data from this sample. By examining the relationships among variables, the contributions to the variance of the factors, and the contribution of the factors themselves to the common variance of the data, a dynamic understanding of this particular sample can be gained.

**Question Two**

The second research question considered in this study was

For a sample of drug abusers in treatment, what are the principal components to which the variables of age, education level, drug of abuse, volunteer status, drug-taking behavior during treatment, and the 13 scales of the MMPI can be reduced?

A similar procedure, principal components analysis, was employed to respond to this question. This procedure transforms and reduces the data by means of a linear combination of the observed variables (Kim and Mueller, 1978b). This process results in defined factors (compared to the inferred factors in Question One) which are exact mathematical transformations of the original variables. This process does not assume and cannot disclose any possible underlying causal structure explaining the correlations among variables as does "classical" factor analysis. A particular combination of variables is sought that accounts for more variance in the data than any other linear combination. The first principal component removed from the data can be considered to summarize best the linear relationships in the data, the second component is the
second best, summary, etc. Each component is orthogonal to the others (Kim, 1975).

As in the factor analytic technique, there are three steps: (1) construction of a correlation matrix, (2) extraction of principal components, (3) rotation to simplify the correlation matrix. Table 10 contains the correlation matrix for this research question. It differs from Table 6, page 75, in that only 18 variables are included, race and sex being omitted. The latter two variables will be used as the independent variables for Question Three, while the principal components will be treated as the dependent variables.

In the next step, defined factors were extracted. This is accomplished by not inserting a prior estimate of communality in the main diagonal of the correlation matrix, thereby allowing the unity to remain. Therefore, all the variance of the variables is assumed to be common, no unique variance is removed. This is appropriate since principal components are linear combinations of the variables that account for more variance in the data than any other linear combination could (Kim, 1975). As in the factor analytic process used in Question One, the number of principal components which can be extracted is equal to the number of variables used in the study. However, diminishing amounts of variance are accounted for by each succeeding extraction. Therefore, in order to limit the number of components as well as to account for a significant portion of the total variance, the criterion of eigenvalues equal to one or more is applied. Table 11 contains the eigenvalues, the percent of variance each component accounts for and the cumulative percent of variances each succeeding extraction accounts for.
TABLE 10

CORRELATION MATRIX OF SAMPLE CHARACTERISTICS
TO BE TREATED AS DEPENDENT VARIABLES

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<th>Age</th>
<th>Education Level</th>
<th>Volunteer Status</th>
<th>Drug of Abuse</th>
<th>Urinalyses</th>
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**MMPI Scales**

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<tr>
<th></th>
<th>L</th>
<th>F</th>
<th>K</th>
<th>1 (Hs)</th>
<th>2 (D)</th>
<th>3 (Hy)</th>
<th>4 (Pd)</th>
<th>5 (Hs)</th>
<th>6 (Pa)</th>
<th>7 (Pt)</th>
<th>8 (Sc)</th>
<th>9 (Ma)</th>
<th>0 (St)</th>
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</table>

**Decimals have been eliminated**

*Coded so that 1 = Volunteer, 2 = Nonvolunteer

Percent of dirty urines was coded

*Coded so that 1 = Narcotic, 2 = Polydrug
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<tr>
<th>COMPONENTS</th>
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<th>PERCENT OF VARIANCE</th>
<th>CUMULATIVE PERCENT</th>
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Inspection of this table shows that six components meet the eigenvalue of one or more criterion and that together they account for 69.6 percent of the total variance. The first component, as is usual, accounts for more variance (27.5 percent) than the others. The variance each component accounts for decreases after each succeeding component is extracted so that Factor Six accounts for only 5.6 percent of the total variance.

The final step in the factor analytic process is to rotate the factors to a final solution in order to simplify the structure. Again, it was decided to make the components orthogonal; therefore, the Varimax procedure was used. In Table 12, the six rotated factors and the loadings for each variable are presented.

Like Table 9, page 80, the loadings in Table 12 are correlation coefficients between the variable and the factor as well as regression weights. Since they are orthogonal, the matrix is again both a pattern and a structure matrix (Kim, 1975). The final estimate of communality, the sum of the squares of each factor loading for a variable, also appear in Table 12. These figures indicate how much variance in each variable is accounted for by all the factors. More than 80 percent of the variance in each variable is accounted for by all the factors. More than 80 percent of the variance in education level, and Scales 8 (Sc), 9 (Ma), and 0 (Si) is accounted for by the six principal components. More than 70 percent of the variance of Scales 2 (D), K, 5 (Mf), 7 (Pt), 3 (Hy), and F is accounted for by the components and more than 60 percent of the variance of Scale 1 (Hs), age and drug of abuse is accounted for. The remainder of the variables had 50 percent or less of their variance
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<th>Factor 1</th>
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<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
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<th>Final Communality Estimates</th>
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</table>

Proportional Contributions to Common Variances (Decimals have been eliminated)

by Factors | 4.685 | 1.873 | 2.098 | 1.551 | 1.142 | 1.175 |
accounted for by the six components. The proportional contribution to common variance by each factor (the sum of the squared loadings in each column), final eigenvalues for each rotated factor, appear in Table 12 as well. The relative importance of the components shifted after rotation. Factor Three has a higher final eigenvalue than Factor Two, Factor Six is third, followed by Factor Four and then Factor Five.

The data in Table 12 also indicate that Factors One and Three load most heavily on personality variables. Factors Two and Six load heavily on behavioral and demographic variables. Finally, Factors Four and Five load most heavily on all types of variables.

As in Question One, Factor One is labeled "General Psychopathology" because of its high loadings on a variety of MMPI scales. It accounted for 27.5 of the total variance. Scales 7 (Pt) and 8 (Sc) have the highest loadings, indicating the presence of anxiety, tension, alienation, rumination and possibly a thought disorder. Scales 2 (D), 1 (Hs), and 3 (Hy) have the next highest loadings indicating depression, neuroticism, somatization of emotional conflicts and hysteria. Scales 4 (Pd), F, and 6 (Pa) with loadings above .6 indicate social deviance, unconventional thoughts and behaviors, and hypersensitivity or paranoia. Scale 0 (Si) also loads on this factor but less substantially. This indicates the presence of social introversion and alienation (Lachar, 1974).

Factor Two is again labeled "Probationary Status," appearing similar to Factor Two of Question One. This factor loaded most heavily on drug of abuse, urinalyses, volunteer status and age. It accounted for 12.1 percent of the total variance. The scaling for these variables shows
that this factor is characterized by polydrug abuse, urinalyses that indicate little use of illicit drugs during treatment, nonvolunteer status in treatment, and younger age.

Factor Three, named "Defensiveness," accounts for 10.4 percent of the total variance and loads most substantially on the K scale in a positive direction. Scale L loads next most heavily in a positive direction. Scales 0 (S1) and F load in a negative direction. Scale 3 (Hy) which loads in a positive direction makes a contribution to this factor as well. Rigidity, lack of personal insight and lack of responsiveness in treatment characterize K scale elevations. The L scale elevation reinforces this interpretation as it also indicates repression, denial and lack of insight. The low scale 0 (S1) suggests adeptness at social contacts, but these contacts may be superficial in nature. The Scale 3 (Hy) contribution to this factor may indicate an individual who is affiliative and constrictedly over-conventional. Configural interpretation suggests,

Such individuals in their relations with others show an over-determined striving to be liked and accepted. Characteristically they maintain an unassailable optimism and emphasize harmony with others at the expense of any internal value system. They are made extremely uncomfortable in situations demanding angry response, independent decision or the exercise of power... They are most resistant to considering that their difficulties may be within themselves (Lachar, 1974, p. 56).

The fourth factor is named "Hyperactive Extroversion," loading most heavily on Scale 9 (Ma) in a positive direction and Scale 0 (S1) in the direction of extroversion. Age and Scale 2 (D) also contribute to Factor Four, both in a negative direction. This factor described an individual who may have hyperactivity of thoughts and actions; difficulty in channeling energies; and who may be irritable, restless and
Impulsive. Relationships are likely to be superficial but numerous (Lachar, 1974). A relatively young age is also associated with this factor. The negative loading on Scale 2 (D), when associated with the low Scale 0 (Si) may indicate a person who is "probably cheerful, enthusiastic, optimistic, active, and outgoing." (Lachar, 1974, p. 19). But this person could be so inhibited as to arouse hostility in others. In addition, an individual with the high Scale 9 (Ma) and low Scale 2 (D) which is indicated in this factor could be using a high activity level to ward off depression. The total variance accounted for by this factor is 7.8 percent.

Factor Five loads most heavily on Scale 5 (Mf) and age in a positive direction, accounting for 6.2 percent of the total variance. This is a difficult factor to label and describe because Scale 5 (Mf) elevations are interpreted in opposite directions for males and females. The sex variable was excluded in this analysis because it will be treated as an independent variable for the next question. In research Question One, males were associated with Scale 5 (Mf) elevations in Factor Four. Therefore, this factor will be interpreted in terms of male elevations on Scale 5 (Mf) and will be labeled "Passivity." This factor may indicate "an intelligent, imaginative, sensitive and prone-to-worry individual with a wide range of interests," (Lachar, 1974, p. 20). Passivity is also frequent with elevations on the scale for men. The loading for age on this factor indicates an older individual.

Factor Five for females could be labeled "Aggressiveness." Women with Scale 5 (Mf) elevations are usually confident, spontaneous and
uninhibited. They may be in traditionally male occupations and display dominance, toughness and aggressiveness (Lachar, 1974).

The last factor, named "Educated Volunteerism," accounts for 5.6 percent of the total variance. Level of education and volunteer status load most substantially on this factor, higher levels of education being associated with seeking treatment voluntarily.

**Question Three**

The data for research Question Three were analyzed by means of a series of two-way analyses of variance (ANOVA) using the components from Question Two as dependent variables and race and sex as independent variables. The question was divided into three parts and the results will be reported accordingly.

a. Will the sex of drug abusers in treatment have an effect on the above principal components?

b. Will the race of drug abusers in treatment have an effect on the above principal components?

c. Will there be an interaction between the race and the sex of drug abusers in treatment on the above principal components?

Table 13 summarizes the results of the analysis of variance procedure. It shows that the ANOVA procedure with Factor One, "General Psychopathology," as the dependent variable found no significant difference because of race, sex, or any interaction for these variables. The null hypotheses that no significant differences exist in the population means for this variable for blacks and whites, males and females, or combinations of them, were not rejected. The F ratios for each were too small to be significant at the .05 level, the level at which all hypotheses will be tested. The results of this study indicate that the
**TABLE 13**

ANALYSIS OF VARIANCE TABLE FOR PRINCIPAL COMPONENTS

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>Degrees of Freedom</th>
<th>Mean Squares</th>
<th>F-Ratio</th>
<th>Significance</th>
</tr>
</thead>
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psychopathology of drug abusers in treatment is not different because of race and/or sex.

In considering Factor Two, "Probationary Status," as the dependent variable, the null hypothesis of no difference because of race or sex in the group means of this variable were rejected at the .0001 level of significance, but the null hypothesis for no interaction could not be rejected at this level. Table 14 summarizes the factor score means for each level of the independent variables and their interactions indicating that the main effect for sex is due to the higher mean factor score for males and the main effect for race is due to the higher mean factor score for whites. Being white and being male is significant for the variables that load on this factor in the population of drug abusers in treatment.

The null hypothesis of no difference because of race could not be rejected at the .05 level for Factor Three "Defensiveness." However, the difference between the means for males and females was significant at the .0027 level. Interaction of race and sex was not significant at the .05 level. Inspection of the mean factor scores in Table 14 indicates that the main effect for sex was due to the higher mean score for males. Being male is significant for the variables that load on this factor in the population of drug abusers in treatment.

In considering Factor Four, "Hyperactive Extroversion," as the dependent variable, only sex made a significant difference in the means of the factor scores for the variables loading on this factor. The null hypothesis that the mean factor scores for males and females on Factor Four are equal in the population was rejected beyond the .05 level of
TABLE 14
FACTOR SCORE MEANS FOR MALE, FEMALE, BLACK AND WHITE DRUG ABUSERS IN TREATMENT

<table>
<thead>
<tr>
<th></th>
<th>Factor 1 General Psychopathology</th>
<th>Factor 2 Probationary Status</th>
<th>Factor 3 Defensiveness</th>
<th>Factor 4 Hyperactive Extroversion</th>
<th>Factor 5 Passivity (Aggressiveness)</th>
<th>Factor 6 Educated Volunteerism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>-035</td>
<td>393</td>
<td>290</td>
<td>213</td>
<td>276</td>
<td>028</td>
</tr>
<tr>
<td>Females</td>
<td>058</td>
<td>-650</td>
<td>-480</td>
<td>-352</td>
<td>-457</td>
<td>-046</td>
</tr>
<tr>
<td>Blacks</td>
<td>-315</td>
<td>-578</td>
<td>-115</td>
<td>026</td>
<td>318</td>
<td>001</td>
</tr>
<tr>
<td>Whites</td>
<td>200</td>
<td>367</td>
<td>073</td>
<td>-017</td>
<td>-202</td>
<td>-000</td>
</tr>
<tr>
<td>Black Males</td>
<td>-327</td>
<td>-346</td>
<td>308</td>
<td>134</td>
<td>722</td>
<td>215</td>
</tr>
<tr>
<td>Black Females</td>
<td>-305</td>
<td>-817</td>
<td>-551</td>
<td>-085</td>
<td>-097</td>
<td>-220</td>
</tr>
<tr>
<td>White Males</td>
<td>099</td>
<td>735</td>
<td>282</td>
<td>249</td>
<td>070</td>
<td>-059</td>
</tr>
<tr>
<td>White Females</td>
<td>433</td>
<td>-479</td>
<td>-407</td>
<td>-626</td>
<td>-828</td>
<td>133</td>
</tr>
</tbody>
</table>

(Decimals have been eliminated)
significance. Table 13, indicates the actual level to be .0008. Race
did not make a significant difference in the mean scores nor did an
interaction of race and sex. Table 14, indicates that males have the
higher mean factor score and that it is this level of the variable sex
that accounts for the main effect.

In light of the results of the ANOVA with Factor Five as the de­
pendent variable, it can be named "Passivity" with accuracy. Both race
and sex made significant differences in the means for this factor. The
null hypotheses that the population means for males and females are
equal and population means for blacks and for whites are equal were both
rejected beyond the .05 level of significance. Table 13 indicates both
were significant at the .0001 level. Table 14 indicates that it is the
higher mean factor scores for males that produced the main effect for
sex. Blacks have a higher mean of factor scores than whites, accounting
for the rejection of the hypothesis of no difference because of race in
the population means of this factor.

In the final ANOVA, performed with Factor Six, "Educated Volunteer­
ism," as the dependent variable, the null hypothesis of equal population
means for blacks and whites and for males and females could not be
rejected at the .05 level of significance. It appears that neither race
nor sex by itself makes a significant difference among educated volun­
teers in the population of drug abusers in treatment. However, the
interaction of race and sex is significant (< .0265). Table 14, page 96,
indicates that the highest mean factor scores were obtained by black
males (.215), followed by white females (.133). Being a black male or a
white female meant that the individual was likely to have a higher mean
factor score for Factor 6, "Educated Volunteerism," than being a black female or a white male.

Statistically Nonsignificant Differences Among Groups

Inspection of Table 14, page 96, also reveals some differences among groups that, while not statistically significant, may have some utility for treatment programs and for directing future research. On Factor One, General Psychopathology, white females have a considerably higher mean score (0.433) than any of the other groups. They also appear to be most different from black males who had a mean score of -0.324. Blacks, in general, scored somewhat lower on this factor (-0.315) than other groups.

On Factor 2, Probationary Status, black females had a considerably lower mean factor score (-0.817) than white males (0.735). Scores of black males (-0.346) and white females (-0.479) were also a great deal lower than white males. It appears that, while no significant interaction was found on this factor, white males tend to score highest on this factor.

The mean factor scores for Factor Four, Hyperactive Extroversion, reveal that white females scored considerably lower (-0.626) than white males (0.249) or black males (0.134). While black females also scored low (-0.085), there was a considerable difference from their white counterparts. The interaction of race and sex was very nearly statistically significant at the .05 level, it being .066.

Factor Five, Passivity, has considerable nonsignificant differences between groups. White females had a mean factor score of -0.828, while
black males mean scores were .722. Black females (-.097) and white males (.070) had much more similar scores on this factor.

**Summary**

This chapter began with a detailed description of the sample. Subgroups defined by sex, race, volunteer status, and drug of abuse were described in terms of frequencies, age, education level, volunteer status and drug of abuse. MMPI characteristics of each subgroup were noted, particularly the frequency of pathological elevations on Scales 4 (Pd) and 9 (Ma), measures of sociopathy. Volunteers were noted to have, in general, more pathological elevations on the MMPI than nonvolunteers.

The next section of this chapter presented the findings by research question. In response to Question One, after a Varimax rotation, four common factors with an eigenvalue of one or more were found among the 20 variables of this study: General Psychopathology, Probationary Status, Social Inadequacy, and Hyperactive Extroversion. For Question Two, a principal components analysis revealed six components having an eigenvalue of one or more after a Varimax rotation. These linear combinations of the variables excluding race and sex were General Psychopathology, Probationary Status, Defensiveness, Hyperactive Extroversion, Passivity, and Education Volunteerism. For Question Three, these principal components were used in a two-way analysis of variance as dependent variables with race and sex as the independent variables. Six instances of statistically significant (<.05) differences and one significant interaction were found. The group means for whites and males were significantly higher than for blacks and females on the Probationary Status factor. On the factors Defensiveness and
Hyperactive Extroversion the males' group mean scores were significantly higher than those of the females. For the Passivity factor, males' and blacks' group mean scores were significantly higher than the scores of the females and the whites. The significant interaction of race and sex on the factor Educated Volunteerism means that black males and white females had significantly greater amounts of education and were more likely to be volunteers in treatment than white males and black females.

Some differences in mean factor scores, while not significant statistically, were important in view of their implications for further research and treatment practices. This was particularly true of the findings that white females scored higher and black males scored lower than all other groups on the General Psychopathology factor, that white males scored higher and black females scored lower than all other groups on Probationary Status factor, that white males scored higher and white females scored lower than all other groups on the Hyperactive Extroversion factor, and that white females scored lower and black males scored higher than all other groups on the Passivity factor. The differences in mean scores for these groups were considerable, but not statistically significant.
CHAPTER V
Summary, Conclusions, and Recommendations

Summary

Introduction

The use of drugs in this country is a widespread occurrence. Deciding what constitutes abuse of these drugs presents a major difficulty. However, a useful criterion appears to be whether or not the use of the drug is medically or socially approved. After an individual is determined to be a drug abuser, the diagnosis of the psychological dynamics underlying the abuse presents a second major area of difficulty. Early classification systems based only on clinical experience have some commonalities with more recent empirical findings about drug abusers. For example, in both cases, four basic types of drug abusers have been described: "normals," neurotics, psychopaths, and addicts with psychoses.

A great deal of recent research has employed the Minnesota Multiphasic Personality Inventory (MMPI) which reports personality dynamics of individuals that are useful in practice as well as in research. Typical research studies which include the use of this instrument indicate that drug abusers have a substantial amount of psychological pathology, that sociopathic features predominate, but that other pathological patterns exist as well. More recently, the MMPI has
been used to study other behavioral and demographic characteristics of drug abusers. Facilitating treatment of drug abusers appears to be the implicit goal of most of this research.

There is a need to expand the research on behavioral and demographic variables along with personality variables. It was the purpose of this study to discover whether the race and/or sex of drug abusers in treatment have an effect on their drug of abuse, volunteer status, age, education level, drug-taking behavior during treatment and personality as measured by the MMPI. In addition, the underlying structure among all these variables was examined in order to fully describe the sample and the variables under consideration.

**Procedures**

The setting from which the sample came was Victory in Treating Abuse (VITA) Services located in Columbus, Ohio. Two components of this program, a methadone treatment facility, and a counseling center provided services to a broad range of drug abusers.

The sample for this study consisted only of drug abusers in treatment. It was composed of 215 males who were in treatment at VITA Services in 1978 and 130 females who were also in treatment at VITA Services from July, 1977, through December, 1979. The mean age of the sample was 26.1 years with 57 percent of the sample having completed high school. The racial composition was 38.8 percent black and 61.2 percent white. Volunteer clients composed 47.8 percent of the sample, while nonvolunteers numbered 52.2 percent. Drugs of abuse were classified as "narcotic" (58.3 percent of the sample abused these) or "polydrug" (abused by 41.7 percent of the sample). Urinalyses to detect
use of illicit drugs while the subjects were in treatment revealed that ten percent of such samples were "dirty."

The statistical analysis of the data from this study utilized three procedures. Common factor analysis to describe the sample in terms of the underlying structure of the variables was the first. Principal components analysis to reduce the data to a smaller number of factors which would be used as dependent variables was the second. The third was an analysis of variance testing for effects of race and sex on the principal components obtained in the second procedure.

**Findings**

For this summary research questions will be restated. Each question will be followed by a brief statement concerning the findings.

1. For a sample of drug abusers in treatment what are the underlying common factors for the variables of sex, race, age, education level, drug of abuse, volunteer status, drug-taking behavior during treatment and the 13 personality scales of the MMPI?

Four factors with an eigenvalue of one or more were found when common factor analysis was performed on all 20 demographic, behavioral and personality variables. Squared multiple correlations were used as prior estimates of communality so that only common factors were extracted. Unique variance for each variable was disregarded. The first factor, labeled "General Psychopathology," accounted for 47.7 percent of the common variance and was composed of nine of the 13 scales of the MMPI. The second factor, named "Probationary Status," accounted for 17.7 percent of the common variance, loading most heavily on polydrug abuse, younger age, nonvolunteer status and "clean" urines.
Factor three was named "Social Inadequacy" and accounted for 16.7 percent of the common variance. It loaded most substantially on the K validity scale of the MMPI in a negative direction, the F and L validity scales in a positive direction, Scales 9 (Ma), 0 (Si), and 6 (Pa) in a positive direction and Scale 3 (Hy) in a negative direction. The profile configuration suggested by these factor loadings indicate an individual who has low ego defenses, is unable to relate to others in a positive manner, and may be maladaptively hyperactive.

Factor four, named "Hyperactive Extroversion," accounted for 10.5 percent of the common variance. It was composed of loadings on Scale 9 (Ma) in a positive direction; Scale 0 (Si) in the direction of social extroversion; Scale 5 (Mf) in a positive direction which, because of the high negative loading for sex indicates that males are associated with this factor. The interpretation of the profile suggested by these loadings indicates individuals who are very active with many, probably superficial, relationships with others. A high need for social approval, aesthetic interests not typical for males and passivity in relationships are also suggested.

2. For a sample of drug abusers in treatment, what are the principal components to which the variables of age, education level, drug of abuse, volunteer status, drug-taking behavior during treatment, and the 13 personality scales of the MMPI can be reduced?

The second research question of this study involved reducing all the variables except for race and sex to principal components. This process differs from the above mentioned common factor analysis in that unique variance is not first removed from the variables. The variables are analyzed on the basis of their total variance. The components to which
the data are reduced are therefore linear, weighted combinations of variables. The total variance which a principal component accounts for can be discussed. Discovering an underlying structure among the variables is not the goal of this procedure as it is for common factor analysis.

Principal components analysis reduced the data to six components having an eigenvalue of one or more. These factors accounted for a total of 69.6 percent of the total variance. Factor One was again labeled "General Psychopathology" due to the variety of MMPI scales which loaded on it (nine of the 13 scales). It accounted for 27.5 percent of the total variance. Factor Two was labeled "Probationary Status" because of its similarity to Factor Two in the common factor analysis. Factor Three was labeled "Defensiveness" due to the high positive loading on the K scale, and negative loading on the F scale. In addition, social extroversion (high negative loading on Scale 0, Si) repression, denial and lack of insight (positive loadings on Scale F and 3 (Hy) are indicated. Factor Four was named "Hyperactive Extroversion," accounting for 7.8 percent of the total variance. A high positive loading on Scale 9 (Ma), a high negative loading on Scale 0 indicating social extroversion, negative loadings on age and Scale 2 (D) were present. The possibility of an individual who is attempting to ward off depression by a high activity level was suggested by the factor loadings of Scales 9 (Ma) and 2 (D). Factor Five, named "Passivity," had high positive loadings on Scale 5 (Mf) and age. Factor Six, labeled "Educated Volunteerism," accounted for 5.6 percent of the total variance.
3a. Will the sex of drug abusers in treatment have an effect on the above principal components?

b. Will the race of drug abusers in treatment have an effect on the above principal components?

c. Will there be an interaction between the race and sex of drug abusers in treatment on the above principal components?

Six main effects and one interaction were found to be statistically significant at or beyond the .05 level. No significant differences due to race and/or sex on Factor One, "General Psychopathology" were found. On the factor "Probationary Status" significant differences because of race (whites' mean factor scores accounted for the main effect) and sex (males had the higher factor scores) were found. Mean factor scores were significantly higher for males than for females on Factors Three and Four, "Defensiveness" and "Hyperactive Extroversion." Males and blacks were enough different in mean factor scores on Factor Five, "Passivity," to reject the null hypothesis that there are no population differences for blacks and whites, males and females. Black males and white females were more likely to have higher mean factor scores for "Educated Volunteerism," than black females or white males.

Conclusions

Several conclusions can be drawn from the results of this study. First, there is no significant difference because of either race or sex in the psychopathology of drug abusers in treatment. The "General Psychopathology" factor which both the common factor analysis and principal components analysis isolated is an expected finding for drug abusers in treatment. Hill, Haertzen, and Glaser (1960) in one of the early studies on drug abusers found 94.5 percent of their sample had
pathological elevations on the MMPI. Sutker (1971), Sheppard, Facchia, Ricca, and Merlis (1973), Gilbert and Lombardi (1967) and Black (1975) all found 70 percent or more of their samples were classified as psychopathological. The isolation of this factor which accounted for more common variance as well as total variance in the sample than any other factor, was supported by the frequency of MMPI elevations above 69 T scores attained by the subgroups of this sample (see Table 5, page 72). This conclusion is important because it supports an assumption which many drug researchers and practitioners make: Drug abuse is either a symptom of or the result of the psychological processes of the abuser. This study reconfirms the findings of psychopathology in drug abusers.

A second conclusion which can be made from the results of this study is that the factor "Probationary Status" describes a definite type in treatment. Other studies describe subjects who are forced to seek treatment (Berzins, Ross and Monroe, 1971; Monroe, Ross, and Berzins, 1971; Penk and Robinowitz, 1976; Penk, Robinowitz, Woodward, and Hess, 1980; Robinowitz, Woodward, and Penk, 1980) in terms of psychological dynamics. The factor analytic process used in this study related demographic and behavioral variables instead, revealing very little relationship to personality dynamics. From the results of this study this type can be described as male, white, a polydrug abuser, a non-volunteer, remains relatively drug free during treatment and is young.

It can be assumed that because a drug abuser who has treatment stipulated by the court has profound consequences of illicit drug use while in treatment (the possibility of being sent to prison), he is, in
fact, drug free during treatment. Brill and Lieberman (1969) state that coercion is the primary mode through which treatment for drug abusers can be effective. If remaining drug free during treatment is to be taken as a criterion of success, this study supports that conclusion. However, this may be a superficial criterion, as personality processes are not accounted for. In addition, no measure of recidivism has been made. A probationer may be able to remain drug free for the duration of his probation (usually about six months). However, after legal obligations are met, this study has no evidence that he is able then to remain drug free.

A third conclusion drawn from the findings of this study is that male and female drug abusers in treatment are quite different from each other. This conclusion is based on Factor One, General Psychopathology, and Factor Two, Probationary Status, of both the common factor analysis and the principal components analysis; and on Factor Three, Social Inadequacy, of the common factor analysis; and on Factor Four, Hyperactive Extroversion, and Factor Five Passivity of the principal components analysis.

These factors described women who were seriously disturbed and in need of psychological treatment. Personality characteristics that were present were deteriorated defenses, lack of social skills, low ego strengths and self-concept, irritability, hostility, and delusions. On the other hand, men appeared to be more rigid, unwilling to look at themselves as a possible cause of their difficulties, and to dislike emotional expressions, especially hostility and affiliativeness. In addition, males, unlike females, tended to be maladaptively hyperactive,
restless, impulsive, uninhibited and to have numerous superficial social relationships.

The men, more than the women, tended to be in treatment as a result of probation or parole requirements. They were younger, abused polydrugs, and abstained from illicit drugs during treatment more often than women.

This conclusion is supported to a certain extent by the literature. Ellinwood, Smith, and Vaillant (1966) diagnosed men as sociopathic and personality disorders, while women were diagnosed as psychotic and neurotic. Olson (1964) found that men had significantly higher K scale elevations than women, who had higher Scale 2 (D) and 6 (Pa) elevations. Dick (1979) and Raines (1979) found different personality types for females and for males. Wells (1980), using the same data, demonstrated that being male or being female discriminated among these personality types. On the other hand, Berzins, Ross, English, and Haley (1974) and Ludenia (1972) found few differences between personality patterns of male and female drug abusers in treatment. The results of this study do not support the conclusion that all male and all female drug abusers in treatment have different personality dynamics, especially when the "General Pathology" factor is considered. However, the conclusion is supported that quite different clusterings of personality structures exist for male and for female drug abusers in treatment.

A fourth conclusion drawn from the results of this study is that male drug abusers in treatment may not conform to the sex-role patterns established by our culture. This does not appear to be true of female drug abusers in treatment which also further substantiates Conclusion
Three. Wells (1980) also came to the same conclusion. The factor "Passivity" with its highest loading on Scale 5 (Mf) indicates non-stereotypic interest patterns, passivity and dependency in interpersonal relationships for males. It may be that these men use drugs to counter their feelings of discomfort with the male role. Or it may be that drug use can be considered a "masculine" activity which may allow them both to hide from others their somewhat feminine interests as well as to avoid facing it in themselves. The identity of "drug abuser" or "addict" may be more acceptable in such cases than that of "homosexual" or "queer." This is not to say that Scale 5 (Mf) elevations can identify homosexuals, but it does identify to what extent an individual's interests and behaviors are more or less identified with his own or the opposite sex.

The passivity and dependency which is part of this factor may also help explain a major reason for male drug abuse in another way: They may have been easily influenced by other drug abusers. Saying "no" would have been difficult for them because of their dependency needs. This factor appears to describe a quite different personality type from the factors "Hyperactive Extroversion" and "Defensiveness" which were also male factors.

The fifth conclusion from this study is that drug abusers in treatment cannot be characterized only as sociopathic personalities as previous research has done (Gilbert and Lombardi, 1967; Hill, 1962; Sutker, 1971). A rather surprising finding is that the sociopath is not a factor in this sample of drug abusers in treatment. This is probably true because Scale 4 (Pd) elevations may be subsumed in the "General
Pathology" factor and Scale 9 (Ma), which is part of the sociopathic configuration, appears to have more of its variance in common with other variables in this study. While Table 5 (page 72) indicates 4-9 elevations are the most common, every other scale for every other subgroup in the sample also has members scoring in the pathological range. Therefore, while the sociopathic nature of this sample cannot be denied, it also cannot be concluded that it is part of the underlying structure among the variables of this study. Other personality patterns are present.

A sixth conclusion is that race was the source of some differences in drug abusers in treatment. Blacks did not appear to be as pathological since they scored lower on Factor One, General Psychopathology, than whites. They were not as likely as whites to be stipulated for treatment through the legal system; and were more likely to be narcotic abusers, to be older, and to use illicit drugs during treatment. Finally, they were more likely than whites to be passive, sensitive, unlikely to worry and to have some difficulty identifying with their sex role.

**Recommendations**

The results of this study have implications for the conduct of future research as well as for treatment of drug abusers. In this section recommendations for research will be made first, followed by recommendations for treatment programs.

**Research**

1. First, studies focusing on the volunteerism issue in the pathology of drug abusers need to be designed. Previous research has
utilized so many different definitions of "volunteer" and "nonvolunteer" status that a general conclusion about this variable cannot be made. The results of this study are inconclusive as well because "volunteer status" was examined in a general way. However, factor loadings on the "General Pathology" factor do indicate a slight relationship with volunteering for treatment for members of this sample. In addition, "volunteers" had a higher percent of pathological elevations than "nonvolunteers" on the MMPI. A multivariate analysis of variance design with "volunteer status" as one independent variable and the MMPI scales as the dependent variables would be a more powerful test of the effects of this variable. In order to control for a possible confounding factor, "drug of abuse" could be another independent variable in this design. Then, interactions could also be studied.

2. A second recommendation for future research is that the issue of recidivism and coercion in treatment should be studied more closely. It was noted in the conclusions of this study that, while lack of drug use during treatment, or "clean" urines, is one indication of "successful" treatment, it is, at best, a superficial criterion. One method of judging the effectiveness of treatment could be to determine the incidence of the return to treatment by those judged to be successfully terminated. This would necessitate a longitudinal approach which would be complicated by the necessity of a long-term follow-up as well as by the mobility of the sample.

Another method of determining "success" in treatment would be to design an appropriate criterion on which the subject could be judged when he/she terminated treatment. A follow-up MMPI might be one such
criterion. Behavioral criteria could also be designed (e.g., job satisfaction and stability, family and peer relationships, etc.) which could accurately judge whether treatment had been successful. A comparison could also be made between coerced treatment and volunteer treatment. Whether controls exercised during treatment have any real effect on its success could thereby be measured.

3. A further recommendation is that additional research should be done on the black drug abuser and the part drugs play in the black culture. Very different processes may be operating for blacks than for whites. This recommendation is prompted by the factor "Probationary Status," which raises some questions. Do blacks abuse narcotics or polydrugs primarily? It appears from the results of this study that narcotics are blacks' primary drug of abuse. Whether this is so needs to be examined more closely. If it proves to be true, then why blacks choose to abuse narcotics rather than polydrugs needs to be investigated.

Another question that needs to be addressed is why are blacks not on "Probationary Status?" Do they get arrested as often for drug abuse and drug related crimes? If not, why not? If they do get arrested as often, why do they not receive treatment as part of probation or parole?

4. Another area for further research is the need for more extensive study of the use of the MMPI with black subjects. In the sample of drug abusers in treatment used in this study previous research on the MMPI and the race of the subject was only partially supported. Previous research has indicated that blacks in both psychiatric and nonpsychiatric samples tended to score higher on Scales L, F, 1 (Hs), 8 (Sc).
and 9 (Ma) than whites in similar samples. However, Scales L, F, 4 (Pd), 5 (MF), 6 (Pa), and 9 (Ma) are the scales on which this sample of blacks scored higher than whites. That fewer blacks than whites scored above 69 T's on Scale 8 (Sc) is particularly important in light of Gynther's (1972) findings. The results of this study should be investigated further. Whether different results were obtained because this study used a sample of drug abusers should also be investigated.

5. A fifth area of further research suggested by this study would be to examine the effects methadone may have on MMPI profiles. This is a more complicated problem than it may appear. Individuals who are receiving methadone are addicted to narcotic drugs. If methadone is not administered, the subjects will either be in acute withdrawal or will be abusing street drugs, both of which have been demonstrated to affect MMPI profiles. Waiting until withdrawal symptoms have subsided after detoxing off methadone introduces the problem of reliability of the MMPI over time. Another possible confounding variable is the level of the dose which the subject receives.

6. Another area of further research is suggested by the "Educated Volunteerism" factor. A question which might be pursued is whether cognitive development might have an influence on client readiness for treatment. Does a certain level of development need to be reached so that an individual is able to recognize the need for and benefits of treatment? Moreover, investigating why it is that black males and white females compose this group of educated drug abusers who seek treatment voluntarily might reveal some further relationships between the two groups.
7. This study yielded few conclusive findings concerning personality and the drug of abuse of the subject. The results of other studies indicate this is a variable that needs further investigation. In any case, drug of abuse is a possibly confounding variable that should be controlled for in future studies which focus on drug abusers and personality.

8. The nonsignificant differences found for white females on the General Psychopathology factor suggests that specific attention should be given this group in research on the psychopathology of drug abusers. Other research designs could focus on this question and provide more definitive answers.

9. Attention should also be given to the nonsignificant difference between white females and white males on the personality dynamics represented by Factor Four, Hyperactive Extroversion found in this study. First, whether this difference is true in the population of drug abusers in treatment should be investigated. Then, reasons for this should be sought so that a clearer understanding of the differences between male and female drug abusers can be gained.

10. The nonsignificant, though considerable, differences found between white females and black males on Factor Five, Passivity, suggest another area for further research. Focusing on the personality dynamics suggested by this factor with other instruments or behavioral criteria might provide valuable information useful in treating drug abusers.

Program

This final section will discuss programmatic recommendations suggested by the results of this study.
1. Different treatment strategies should be employed with clients according to the personality structure of the individual. This means that adequate assessment, whether by interview or by testing, will be necessary early in treatment. The results of this study indicate that there is no one "addictive personality," and that one treatment strategy is not likely to be effective. This recommendation may be difficult to implement because many treatment programs are designed to treat the sociopathic personality, but are not flexible enough to include other types of treatment.

2. Related to the previous recommendation, education facilities that are preparing counselors for drug treatment programs should dispel the myth of the drug abuser as sociopath as well. Counselors prepared to deal with a variety of psychopathology are needed in programs treating drug abusers.

3. Treatment programs might begin to emphasize further education for their clients in view of the "Educated Volunteerism" factor found in this sample. Education may facilitate the cognitive development of clients, or it may enable them to see how treatment can help them better their lives. Because counseling and teaching are related, education might be a means of preparing the client for treatment.
APPENDIX A

Mean MMPI Profiles by Race, Sex, Volunteer Status, and Drug Of Abuse
FIGURE ONE

MEAN MMPI PROFILE FOR MALE DRUG ABUSERS IN TREATMENT
FIGURE TWO

MEAN MMPI PROFILE FOR FEMALE DRUG ABUSERS IN TREATMENT
FIGURE THREE

MEAN MMPI PROFILE FOR BLACK DRUG ABUSERS IN TREATMENT
FIGURE FOUR

MEAN MMPI PROFILE FOR WHITE DRUG ABUSERS IN TREATMENT
Figure Five

Mean MMPI Profile for Volunteer Drug Abusers in Treatment
FIGURE SIX

MEAN MMPI PROFILE FOR NONVOLUNTEER DRUG ABUSERS IN TREATMENT
FIGURE SEVEN

MEAN MMPI PROFILE FOR POLYDRUG ABUSERS IN TREATMENT
FIGURE EIGHT

MEAN MMPI PROFILE FOR NARCOTIC DRUG ABUSERS IN TREATMENT
APPENDIX B

Permission to Gather Data
PERMISSION TO GATHER DATA

Permission is hereby granted Carol L. Johnson to perform research using data gathered on patients at VITA Treatment Center, Counseling Services and Residential Services of Columbus, Ohio. This data will be coded so that total confidentiality of all VITA clients will be maintained. Identifying information will not leave VITA's premises. All federal confidentiality requirements concerning drug treatment clients will be met.

Ronald L. Pogue
Executive Director/VITA
APPENDIX C

The Ohio State University Social and Behavioral Sciences Human Subject Review Committee

Permission to do Research Involving Human Subjects
With regard to the employment of human subjects in the proposed research entitled:

AN ANALYSIS OF PERSONALITY, BEHAVIORAL, AND DEMOGRAPHIC CHARACTERISTICS OF DRUG ABUSERS

James V. Wigtil/Carol Lytle Johnson is listed as the principal investigator.
Special Services
257 Arps
1945 N High

THE SOCIAL AND BEHAVIORAL SCIENCES REVIEW COMMITTEE HAS TAKEN THE FOLLOWING ACTION:

☐ Approved  □ Disapproved
☐ Approved with conditions *  ☑ Waiver of Written Consent Granted

* Conditions stated by the Committee have been met by the Investigator and, therefore the protocol is approved.

It is the responsibility of the principal investigator to retain a copy of each signed consent form for at least four (4) years beyond the termination of the subject's participation in the proposed activity. Should the principal investigator leave the University, signed consent forms are to be transferred to the Human Subject Review Committee for the required retention period. This application has been approved for the period of one year. You are reminded that you must promptly report any problems to the Review Committee, and that no procedural changes may be made without prior review and approval. You are also reminded that the identity of the research participants must be kept confidential.
BIBLIOGRAPHY


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