# RELATIONSHIPS BETWEEN PERSONALITY AND DEMOGRAPHIC VARIABLES AND TREATMENT OUTCOME IN AN ALCOHOLISM TREATMENT CENTER

by

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## ABSTRACT

The purpose of this study was to determine the relationships of client pretreatment characteristics to treatment outcome (measured in terms of alcohol drinking behaviour 1 year after treatment) of 141 male alcoholics admitted to an alcoholism treatment center in British Columbia during the past 3 years. Data gathered prior to treatment included: (a) Demographic data: (i) Age, (ii) Level of Education, (iii) Marital Status; (b) Psychological test data: (i) Minnesota Multiphasic Personality Inventory, (ii) Edwards Personal Preference Schedule, (iii) Sixteen Personality Factors Questionnaire, (iv) Alcohol Addiction Test, (v) Shipley-Institute of Living Scale; and (c) Duration of Treatment data. The outcome classifications (successes and failures) were based on information from letters, cards, and phone calls made by former clients to their counsellors during the criterion time-period, as well as through return visits made by clients to confirm sobriety, and finally through employer and "grapevine" reports. The t-test for significance of differences between means was conducted on the variables, Age, Level of Education, and Duration of Treatment, while the Chi-square test of independence was conducted on the variable Marital Status. The psychological test data were put into proportional form with an ArcSin transformation, so that the unique amounts of variance contributed by each variable to the total could

be properly compared. Discriminant analysis in two steps was then performed on the psychological test data, seeking to discover those variables which contributed significantly to discrimination between the outcome groups in a predictive sense. The variables chosen by the discriminant process were then correlated among one another in order to illustrate the nature of relationships of each scale (variable) to the others. Results showed that there were no statistically significant differences for any of the demographic variables, and similarly for the 'duration of treatment' variable. However, the discriminant analysis procedures revealed four psychological variables (scales) that maximally discriminated between outcome groups, and when considered together, explained 19% of the total variance on the criterion measure, and correctly classified 68.1% of the cases. These four variables were scales 'PA' (Paranoia), 'MA' (Hypomania), and 'SI' (Social Introversion) from the MMPI, and scale 'N' (Forthright vs. Shrewd) from the 16 PF . Correlations among these scales revealed a low, with definite but small relationship between scales 'MA' and 'PA' ($\underline{r}$ = 0.37, $p < .001$), 'PA' and 'SA' ($\underline{r}$ = 0.30, $p < .001$), and a slight, almost negligible relationship between scales 'MA' and 'N' ($\underline{r}$ = -0.16, $p < .026$). Correlations between 'MA' and 'SI', 'SI' and 'N', and 'N' and 'PA' were not significant.

(Thesis Chairman)

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# CHAPTER I

## Introduction to the Study

"Alcohol abuse and alcoholism are recognized as major health problems in most developed and many developing nations" (U.S. Dept. of Health, Education, and Welfare, 1971). It has been widely observed that consumption levels of alcoholic beverages are - and have been for quite some time - on the rise. Canada is one of approximately 12 nations which together consume roughly four-fifths of all alcohol used for pleasure purposes throughout the world. The combined population of these same countries on the other hand, comprises less than one-quarter of the world total (Sulkunen, 1976).

Citizens of British Columbia have been the largest consumers of alcoholic beverages in Canada annually since at least 1967. As of 1976, consumption of pure 100% alcohol is an average three gallons per year for everyone 15 years of age and over. This represents an increase of 36% over 1967 figures, and is equal to 1.1 ounces per day (Newsletter: Alcohol-Drug Education Service, 1977; 1978). This is 30% more than the figure reported by de Lint (1977) as being the average daily consumption of individuals who seek help at alcoholism clinics for their addiction and related problems.

A press release from the British Columbia Ministry of

Health (1978) stated that, "alcoholism causes 40% of hospital admissions, 31% of all suicides, 60% of all homicides, and 40% of all family court problems". Hansard (1976) records the Honourable Marc LaLonde (Minister of National Health and Welfare, Ottawa) as reporting that there is no specific answer to the question about the cost of health care due to alcohol abuse in Canada, but that recent estimates indicated nearly $2 billion annually were being spent in this regard.

Alcoholism is a complex problem. There now seems to be a recognition of this fact by everyone working in the field, including agreement that alcoholism is multifaceted in its symptomatology and etiology (Levinson, 1977). The evidence suggests that alcoholism is a:

> product of possibly physiological and certainly psychological and sociological [and cultural] factors [a full understanding of the interrelationships of these factors awaits further study]. This complexity bears upon the problem of treatment for characteristically some things work in some cases, but not in others. (Lowe, 1977, p. 107)

The lack of full understanding of causal and relational factors involved in alcoholism means that treatment obviously cannot be undertaken except on a hit-or-miss basis. Therapists still vary in their training and theoretical persuasions, thereby affecting the nature and effectiveness of treatment programs. The best results are usually attained through programs involving a combination of physiologically, psychologically, and socially based treatments. In addition,

such programs are most effective when tailored to the particular needs and resources of the individuals who are seeking help, and who are at different stages in their personal history of alcohol abuse. However, the high cost associated with treatment programs makes it difficult (but not totally impossible) to develop individually tailored treatment programs in every case. Group therapy (less expensive) is often the main method used in inpatient or residential settings. While this type of treatment may or may not be effective, there still is a need for a greater number of effective treatment programs.

Given the reality then, of the imperfect state of our knowledge and understanding of the nature of alcoholism - and a derivative of this fact, namely, the existence of differing kinds of treatment programs due to various theoretical persuasions of therapists - it can be concluded that the wisest course of action to follow, is for those engaged in offering rehabilitation services to determine what they do best (i.e., results of treatment), and with whom (i.e., type of alcoholic). The other fact that points to such a conclusion, is the relative lack of resources in the field of alcoholism (i.e., treatment programs). Therefore the maximal use of a treatment agency becomes even more important.

## Nature of the Problem

According to Heilbrun (1974):

> the rehabilitation of the alcoholic is not guided by any common fund of knowledge or agreed-upon principles of intervention. Procedures vary widely from one agency to the next and within an agency, from one practitioner to the next. Under such circumstances it is encumbent upon the agency and its individual staff members to continually monitor the effectiveness of its approaches to rehabilitation and to make changes where experience dictates. A formal outcome prediction system will not in itself accomplish this end, but such a system contains the ingredients which make its accomplishment possible. (p. 182)

This author is associated with a Center in the Lower Mainland of British Columbia that provides treatment for male alcoholics in a rural, and residential setting. The major concern of the staff at this Center is to maximize the effectiveness of their efforts on behalf of alcoholics seeking help for their addiction and related problems. This concern has developed out of experience common to therapists engaged in work with this kind of populations, that is, staff working in alcoholism treatment centers encounter clientele who are disinterested in overcoming their dependency on alcohol.

When therapy programs are ineffective, counsellors experience frustration, which in turn leads to counsellor burn-out over a period of time (18 months to 2 years commonly). Although the doors of the Center with which the author is associated are open to all applicants with an alcohol abuse problem, the staff realize that their time and effort might be more wisely spent with some clients rather

than others. This is especially relevant to other therapists who work with addicts too, for "by the very nature of their disability, a high recidivism rate may be expected so that the demands for help from chronic alcoholics...[which in Canada probably number over one million] are never at a premium" (Heilbrun, 1974, p. 181). This type of selection process at this Center, would increase the overall level of effectiveness of the treatment program and would contribute directly to reducing the levels of counsellor frustration and eventual burn-out. Therefore the Center staff need a way to determine - or predict - who will be the most likely candidates for successful rehabilitation (and who will not) before the applicants actually enter the treatment program.

## Purpose of the Study

This study was conceived in order to facilitate the above mentioned need (goal) of the Center staff. Its purpose is to determine the relationships between client pretreatment socio-psychological characteristics and treatment outcomes of alcoholics who were admitted to this Center over the past 3 years. Significant relationships revealed by the data can then be used by the Center staff in the future, to predict that men with similar pretreatment profiles would most likely be good or poor candidates for rehabilitation from dependency on alcohol through this treatment program. The data from which this is to be

determined are the following: (a) Demographic data: (i) Age, (ii) Marital Status, (iii) Level of Education; (b) Psychological test data from: (i) the Minnesota Multiphasic Personality Inventory (MMPI), (ii) the Edwards Personal Preference Schedule (EPPS), (iii) the Sixteen Personality Factors Questionnaire (16PF), (iv) the Alcohol Addiction Test (ALCADD), (v) the Shipley-Institute of Living Scale (SILS); (c) Duration of Treatment data; and (d) treatment outcome classification "scores".

## Definition of Terms

Several terms have been mentioned thus far in the thesis whose definition should facilitate understanding of the study. These definitions follow.

### Alcoholism

Literally hundreds of definitions of alcoholism are available. Many of these are very helpful, but none has become distinguished by universal acceptance. Jellinek (1960) has written a 246-page analysis of over 100 of the existing definitions of alcoholism. However, the main concepts of alcoholism can be reasonably presented here, and are as follows.

Alcoholism, as it is generally understood, is evidenced by compulsive drinking which occurs repeatedly, frequently, and continually over a long period of time. It is generally

described as an addiction, in which the person is "hooked" on alcohol; that is, he craves it, and must have it, being unable to get along without it. Alcoholism can therefore be defined as a condition in which the individual drinks compulsively (loss of control) to the point of intoxication, does so repetitively (habituation), and continues to do so chronically.

An early formulation of a definition of alcoholism by Keller (1958), interacting with a description of alcoholism set down in the first report of the World Health Organization expert committee on mental health, alcoholism subcommittee (1951), covered the various epidemiological approaches to alcoholism by stating that alcoholism is:

> Repeated drinking of alcoholic beverages to an extent that exceeds customary dietary use or ordinary compliance with the social drinking customs of the community and that interferes with the drinker's health, interpersonal relations or economic functioning. (p. 19)

In a later formulation, he collaborated with M. McCormick (Keller & McCormick, 1968), and together they produced the following important definition. Alcoholism is:

> A chronic and usually progressive disease, or a symptom of an underlying psychological or physical disorder, characterized by dependence on alcohol (manifested by loss of control over drinking) for relief from psychological or physical distress or for gratification from alcohol intoxication itself, and by a consumption of alcoholic beverages sufficiently great and consistent to cause physical or mental or social or economic disability. Or a learned (or conditioned) dependence on alcohol which irresistibly activates resort to alcohol whenever a critical internal or environmental stimulus occurs. (p. 14)

These definitions - from the initially simple to the increasingly complex and more accurate - help the reader to better understand the nature of alcoholism, and therefore to understand something of the kinds of problems that alcoholic individuals are presenting to the staff of this particular Center. However, for the purpose of this study, one final definition (that of an alcoholic) is presented, since it is the definition used as a guideline by the Center staff.

> An alcoholic is one who is unable consistently to choose whether he shall drink or not, and who, if he drinks, is unable consistently to choose whether he shall stop or not. Or, one who exhibits the criteria of alcoholism (q.v.). (Keller & McCormick, 1968, p. 12)

## Level of Education

This variable was recorded in terms of the number of years of schooling that the client had completed.

## Marital Status

This indicates whether a client was currently single, married, separated, divorced, or widowed upon entering treatment. Common-law status was considered synonymous with married status.

## Duration of Treatment

This was recorded in terms of the number of days a

client spent in the treatment program. The figure includes the total of all days - to a maximum of 999 days - where a client had returned for treatment one or more times, but did not include additional days in treatment following the point at which the client had been out of treatment for one year.

## Outcome Classifications

Clients were classified into one of two groups based on their reported alcohol drinking behaviour, 1 year after leaving treatment. The established guidelines for classification decisions were as follows.

Successes. Those individuals who, 1 year following treatment were either: (a) not drinking alcohol at all, being abstinent; or (b) were drinking alcohol in a socially acceptable, nonabusive manner, that is, taking only one or two drinks in the course of an evening, perhaps up to half a dozen times during the year, and never involving inebriation.

Failures. Those individuals who, 1 year following treatment were either: (a) exhibiting binge drinking behaviour, that is, bouts of excessive and steady alcohol drinking, characterized by chronic intoxication of two to three weeks duration, interspersed with substantial periods of sobriety; or (b) had returned to unmitigated, totally recidivistic alcohol drinking, similar to or worse than that

which pertained prior to entering treatment. This last kind of alcohol drinking is characterized by few, if any, extended periods of sobriety. (It should be noted that the majority of individuals who entered treatment at this Center for the first time, were drinking in a manner consonant with the lattermost description of alcohol drinkers, namely, failures.)

## Significance of the Study

A concern of any rehabilitation agency is to improve its performance through the use of evaluation procedures. In this process, advances in the current state of knowledge in the particular field in question are sought. This is especially true when thinking of treatment programs for alcoholics. It is a field rife with conflicting opinions and theories regarding the nature and etiology of alcoholism, which in turn influence the kind of treatment procedures used, and determine what are to be the outcome goal(s) of treatment (Larkin, 1974). Many alcoholism studies have been conducted. In fact, in all the literature on alcoholism, there are approximately 400 studies which have evaluated alcoholism treatment programs (Emrick, 1974; 1975). However, the quality of this research has not equalled the quantity, and therefore well designed evaluation studies are needed, that is, studies which will conform to the criteria underlying reliable research.

For example, these studies have suffered greatly from methodological weaknesses. Reviews by Baekeland and Lundwall (1975), Davidson (1974), and Hill and Blane (1967) have shown the seriousness of the problem. This latter study has suggested that such weaknesses render inconclusive nearly all studies evaluating the effects of traditional psychotherapy with alcoholics (even though most of the studies were intended primarily as descriptive rather than as research reports). Examples of the methodological weaknesses found by the above reviews are: (a) sampling problems; (b) no, or inadequate comparison groups; (c) weaknesses in follow-up procedures; (d) definitional problems; and (e) incorrect or inadequate statistical analysis.

Another, and most important reason (to this study) for needing additional research is the hope that evaluation findings can be employed to develop an alcoholism treatment outcome prediction system. The necessity for systems of prediction in the field of alcoholism treatment has been recognized by Heilbrun (1974) and by Skoloda, Alterman, Cornelison, and Gottheil (1975). While there has been a history of prediction studies of success in fields such as industry, education, vocational counselling, and others, Heilbrun emphasized the still existing need for prediction systems in the field of alcoholism treatment, saying:

> There is something worse than having a prediction system with all its inherent limitations and that is having no system at all. The rehabilitation

> agency which exists only to render service to some sector of the disabled population and fails to take advantage of its own experience is missing a rare opportunity. This opportunity, in a nutshell, is to find out what they do best and with whom, and by these discoveries divert the course of their services from simply being busy to being effective. (p. 181)

Skoloda, et al. (1975) also felt that, "the development of an objective predictor or predictors of treatment outcome would represent a considerable advance in the treatment of alcoholism" (p. 377).

It is this second reason for conducting additional evaluation studies, namely, the possibility of developing systems of prediction, that is the justification for conducting the present study. The results obtained in this study may potentially be employed by the Center to develop its own prediction system, and thereby increase the effectiveness and efficiency of the treatment services offered each client.

There are several reasons why a system of prediction is needed. First, as Heilbrun (1974) stated above, a prediction system allows treatment, that is, rehabilitation, centers to determine what they do best (e.g., effect abstinence; controlled drinking; increased social functioning; etc.), and with whom, that is, with what type of alcoholic.

Secondly, since there are many more alcoholics than treatment centers can accomodate, a system for determining who they (the agency) will be most effective with, could be

utilized. However, ethical or legal reasons may determine that clients be treated on a first come, first served basis. But in such a situation the value of a prediction system would be of a somewhat different nature. Concern with ethics here is very important and is not to be passed over lightly. A comment made by Bolton (1972), is helpful in this regard:

> The only morally defensible use of predictor procedures is to assign clients to differential treatments which maximize the probability of successful outcome. (The use of predictor data for selection purposes can only be regarded as a temporary expedient. The goal of all rehabilitation efforts is to provide appropriate services to all clients, regardless of their probability of success.). (p. 53)

In this case, a prediction system would have to be utilized to determine which clients should be carefully monitored after treatment due to the high probability of recidivism. For example, those inpatient clients with a poor prognosis for recovery could be automatically referred for continuing treatment on an outpatient basis (or halfway house). This idea is supported by the findings of Lemere and Voegtlin (1950) that those most likely to be abstinent had received further treatment after leaving inpatient service (e.g., booster sessions; AA attendance; halfway house care; outpatient care; or even other inpatient care). That is, those individuals who have an initially poor prognosis for recovery, can increase their chances for attaining abstinence by engaging in further treatment services on some kind of outpatient or inpatient basis.

A third reason for needing a system of outcome prediction,

or a way of using it, is in regard to clients dropping out of treatment. The following quote from Baekeland and Lundwall (1975) illustrates this need succinctly:

> Thus it is clear that the treatment of many chronic conditions is hampered by so many patients failing to persevere in treatment. Such a state of affairs is of particular concern at the present time, which is marked by a simultaneous rapid increase in treatment expectations and treatment costs. Typically, most clinics have more applicants than they can treat. Hence, before treatment starts, it seems all the more important to be able quickly and efficiently to distinguish the patient likely to persevere from the one who is not. (p. 739)

Special precautions might then be taken in order to keep such clients in treatment.

In concluding this section, it can be stated that if the data being analysed in this study indicate several variables that are effective in predicting outcome, then the development and use of a prediction system can be recommended. Consequently, the efficiency and effectiveness of the treatment program is likely to increase. Conversely, if the data indicate very few or no variables are effective in predicting outcome, then it can be recommended to the Center staff to direct their efforts in further study toward finding measurable characteristics of the alcoholic population they work with, which are predictive of outcome.

## Limitations of the Study

Although this past section was concerned with the need for conducting adequate evaluation studies, and particularly

with the possibilities of developing systems of prediction based on the results of such studies, it must be stated that this present study is neither intended as an evaluation of the alcoholism treatment program in question, nor does it intend to incorporate the development of a system of prediction based on the findings of the analysis, into its primary task. Therefore, the immediate goal of this study is to determine the relationships between pretreatment characteristics of male alcoholics and posttreatment drinking behaviour after 1 year out of treatment. The findings of this exploratory study will reveal what the possibilities are for future development of a prediction system for this Rehabilitation Center. The findings of this study therefore, should indicate that the data traditionally gathered by the Center are, or are not of value for the development of a prediction system at this point in time, and if not, that new criteria for data gathering are required before a prediction system can legitimately be developed.

## Overview of the Study

The thesis as introduced in this Chapter progresses as follows. Chapter II contains a review of the relevant literature and is concluded by stating the research questions. This is followed in Chapter III by a discussion of the methodology employed in the study. The thesis concludes in

Chapters IV and V with a presentation of the results of the study, discussion of the implications arising out of those results, and suggestions for further research.

# CHAPTER II

## Review of the Literature

### Related Research

Literally hundreds of studies have been conducted on various aspects of alcoholism. With respect to the concern of this study, an attempt was made to comprehensively review the relevant literature on alcoholism. Therefore only the following areas of research will be focused upon in this chapter: (a) outcome measures of treatment effectiveness; (b) the effects of different modes of treatment on outcome; (c) the relationship of pretreatment characteristics to treatment outcome; (d) duration of treatment; and its corollary (e) dropping out of treatment.

### Outcome Measures of Treatment Effectiveness

The traditional approach to measuring treatment effectiveness has been the comparison of abstinence versus drinking (Pattison, Coe, & Rhodes, 1969). However, this straightforward formulation has continually been challenged ever since the report by Davies (1962) which indicated that a small percentage of treated alcoholics return to normal (non-abusive) drinking patterns. A full appreciation of the merits of both sides of this controversy is presented by Kleckner (1977), Larkin (1974), and Pattison (1976).

Subsequently, some behaviour modification practitioners in alcoholism have used controlled drinking as the goal of treatment outcome rather than abstinence (Bigelow, Cohen, Liebson, & Faillace, 1972; Lloyd & Salzberg, 1975; Lovibond & Caddy, 1970; Sobell & Sobell, 1972).

Other approaches are illustrated by those who hold with what may be termed the abstinence-plus view. This is the belief that a person's drinking behaviour is not affected in isolation from other social and relational aspects of the clients life. Thus, Emrick (1974), in his review of treatment outcome studies, was able to list other outcome criteria used by researchers. These included: (a) affective-cognitive measures; (b) work situation; (c) home situation (marital, familial and residential); (d) further treatment (inpatient, outpatient and Alcoholics Anonymous); (e) physical health; (f) arrests and other legal problems; (b) social situation; (h) financial situation; and (i) other criteria used very infrequently.

Such measures of treatment effectiveness add an important supplement to the simple abstinence versus drinking dichotomy, since drinking behaviour is not perfectly correlated with all other areas of functioning (Emrick, 1974; Lloyd & Salzberg, 1975). Also, it is natural to expect that the techniques used for treating alcoholics, drawn as they are from the field of mental health, would affect psychological aspects of functioning: e.g., self-concept (image), and social interaction. Lastly, one hopes that professionals who

work with alcoholics are desirous of producing positive growth in these other areas in conjunction with the cessation of a drinking problem.

## Effects of Treatment Type

Emrick (1975), following up his 1974 review, looked at most of the psychologically-oriented alcoholism treatment studies reporting outcomes - published between 1952 and 1973 - in order to assess the relative effectiveness of different treatment methods. Some of the variety of treatments reported in the literature reviewed by Emrick (1975), were: (a) client-centered group therapy; (b) learning theory groups; (c) social discussion groups; (d) psychoanalytic group therapy; and (e) behaviour therapies (e.g., classical aversive conditioning, biofeedback mechanisms, training toward socially acceptable behaviours). One of Emrick's major findings was that differences in treatment methods did not affect long-term outcome (defined as longer than 6 months).

Of the 384 studies reviewed, 72 were chosen for greater analysis in that they alone directly compared two or more types of treatment. Conclusions regarding relative effectiveness of treatment methods were limited to differences found more than 6 months after termination of treatment. This eliminated 36 studies from analysis. Of the remaining 36 studies, 31 reported no differences between groups. The remaining 5 studies revealed one striking characteristic in

common. Significant differences appeared to have been derived, "at least in part", not from one treatment approach being relatively beneficial, but from "some aspect of one treatment plan being relatively harmful by retarding improvement" (p. 91).

The criterion adopted by Emrick (1975), that conclusions only be drawn from studies where follow-up occurred more than 6 months following treatment termination, was an important one and is supported in the literature. For instance, some researchers found very high rates of return to drinking in less than 6 months following termination of treatment. A study by Davies, Shepherd and Meyers (1956), revealed that 90% of their clients resumed drinking in under 6 months (nearly all in under 3 months), while Vallance (1965) showed nearly 75% of inpatient clients relapsed during this period. Levy, Livingstone and Collins (1967), also reported a high drinking relapse rate during the first 6 months following discharge. Conversely, other researchers have demonstrated a stabilization occurring in outcome following rehabilitation treatment once 6 to 12 months have passed (Gerard & Saenger, 1959; Robson, Paulus & Clarke, 1965; and Vallance, 1965).

It can be seen then that the alcoholism literature on differential treatment effects is full of negative findings. On the other hand, it has been found that quite a number of client pretreatment characteristics do have an effect on treatment outcome.

Client Pretreatment Characteristics and Treatment Outcome

Straus and Bacon (1951), examining the characteristics of over 2000 male outpatient clients, indicated that an index of social stability (family, community, and occupational integration) was a good prognostic index of recovery from uncontrolled drinking. Dorothy Mindlin (1959), having researched the characteristics of alcoholics as related to prediction of therapeutic outcome, found the following key pretreatment characteristics correlating with treatment outcome: (a) marital status; (b) present economic resources; (c) usual occupation; (d) arrest history; (e) motivation in seeking treatment; (f) current intellectual functioning; (g) psychiatric diagnosis; and (h) Rorschach signs. A combination of these 8 items and the use of weighting gave an index which correctly identified 80% of a validation group of 60 cases.

Heilbrun (1971) identified 4 of 20 variables as predictive of outcome, which was defined as the amount of time in the program. These characteristics were: (a) length of education; (b) IQ estimate (from the Shipley-Institute of Living Scale, 1940); (c) Schizophrenia scale (MMPI); and (d) Hypomania scale (MMPI). It should be noted that amount of time in the program was the outcome criteria due to Heilbrun's belief that duration of rehabilitation process is related to quality of outcome (e.g., subsequent drinking behaviour; quality of the person's cognitive or emotional functioning; etc.) and therefore would offer "a simple and

objective basis for inferring the effectiveness of a treatment program", thereby avoiding "the problems of human bias which plague quality-of-outcome decisions" (Heilbrun, 1974, p. 187). That is, one would then be able to avoid reliance on complex inferences.

Zimberg (1974) found that abstinence was not associated with treatment methods but was significantly related to indices of social stability. The indices which correlated significantly were: (a) married; (b) not being on welfare; (c) not living in social isolation; and (d) coming from a higher social class.

Gatschenberger (1973), and Lowe and Thomas (1973) found that the traditional practice, at the VA Hospital in Shreveport, Louisiana, of using extensive psychological evaluation of patients seeking to enter treatment for alcoholism, was of little predictive value. Instead, data obtained in the intake interview seemed to offer a more satisfactory method of selection. Both studies supported the assumption that demographic data, easily obtained at admission, are better predictors of posttreatment adjustment than are psychological data (Lowe & Thomas, 1975). The specific nature of the demographic data obtained at intake were not reported.

The literature cited here overwhelmingly suggested that the data being analysed in this study would more likely reveal a significant relationship between the demographic data and the outcome measures. On the other hand, it was not

likely that a significant relationship would be found between the psychological test data and the outcome measures.

## Duration of Treatment

Along with the findings on client pretreatment characteristics has been the perception that duration of treatment may be positively related to successful treatment outcome (Heilbrun, 1971; 1974). In his review, Emrick (1975) compared clients who received little or no treatment (minimum treatment was defined as less than 5 outpatient contacts or less than 2 weeks inpatient treatment) with others who received maximum treatment, which was anything more than minimum treatment. While he found no significant difference in the rate of abstinence (15.9% versus 24.5% respectively), he did find a significant difference in the total percentage improved (41.9% versus 65.1% respectively). He concluded that treatment seemed to increase an alcoholic's chances of reducing his or her drinking problem. However, he cautioned that these clients were not equated for pretreatment differences, and that it was possible these results were obtained because clients remaining in treatment for longer periods may have been those most likely to benefit from that treatment as predicted by pretreatment variables.

Numerous other studies of inpatient treatment have reported a positive relationship between duration of treatment and long-term outcome (Bowen & Androes, 1968; Ferneau &

Desroches, 1969; Katz, 1966; Moore & Ramseur, 1960; and Van Stone & Gilbert, 1972). Similarly corresponding results have been obtained in studies of outpatient alcoholics (Fox & Smith, 1959; Gerard & Saenger, 1966; Ritson, 1969; and Thomas, Gliedman, Imber, Stone, & Freund, 1959). But according to Baekeland and Lundwall (1975), the confounding effect of dropping out of treatment, and its relationship to client pretreatment characteristics, has not been adequately controlled.

## Dropping Out of Treatment

Several sources indicated that between 52% and 75% of outpatient alcoholism clients drop out of treatment by the fourth session (Baekeland, Lundwall & Shanahan, 1973; Blane & Meyers, 1963; 1964; Chafetz, Blane, Abram, Golner, Lacy, McCourt, Clark & Meyers, 1962; Gerard & Saenger, 1966; Storm & Cutler, 1968; and Wilby & Jones, 1962). The incidence of inpatient-client treatment drop-outs was lower, with an approximate range of 14% to 40%, with a mean of 28% (Bowen & Androes, 1968; Hoy, 1969; Knox, 1972; Pokorny, Miller & Cleveland, 1968; Rohan, 1970; Simpson & Webber, 1971; Tomsovic, 1968; and Wilkinson, Prado, Williams & Schnadt, 1971). The characteristics of clients who drop out of treatment were closely related to the pretreatment characteristics commonly associated with poor treatment outcome.

Thus, a person was more likely to drop out of treatment

if he/she: (a) was in an advanced state of alcoholism (Baekeland & Lundwall, 1975); (b) had high MMPI scores; was hostile and aggressive; had low self-esteem; and was socially isolated or unaffiliated (Goldfried, 1969; Miller, Pokorny & Hanson, 1968; Wilkinson, et al., 1971; Zax, Marsey & Biggs, 1961); (c) was of lower socioeconomic status (Baekeland, Lundwall & Shanahan, 1973; Kissin, Rosenblatt & Machover, 1968; Pisani & Motansky, 1970); (d) had ambivalent or negative attitudes toward treatment (Baekeland, et al., 1973; Blane & Meyers, 1963; Zax, 1962); (e) had poor motivation (Goldfried, 1969; Zax, et al., 1961); and (f) had a history of arrests (Goldfried, 1969). Baekeland & Lundwall (1975) concluded their review of alcoholic outpatient drop-out characteristics by stating:

> In sum, the composite picture of the alcoholic outpatient who is most likely to drop out of treatment is that of a field-dependent, counter-dependent, highly symptomatic, socially isolated lower class person of poor social stability who is highly ambivalent about treatment and has psychopathic features. The skid row alcoholic is the most extreme example of this kind of patient. (p. 751)

The literature dealing with duration of treatment (including the review on dropping out of treatment) suggests that the effect of length of treatment on outcome is confounded by client pretreatment characteristics. Three other references further questioned the length of treatment effect. Tomsovic (1970) reported that length of stay predicted outcome only for drop-outs. Ritson (1969) reported that when

drop-outs were excluded from his analysis, length of in-patient treatment did not predict outcome. Lastly, Mosher, Davis, Mulligan, and Iber, (1975) found no difference in outcome between a 9-day and a 30-day inpatient program of treatment. Again, citing Baekeland and Lundwall (1975), it appears that the question of the effect of length of treatment on outcome is still an open one due to the confounding problem of pretreatment prognostic indicators in both inpatient and outpatient settings.

Summary

In summarizing the major findings relevant to this thesis, it can be stated that: (a) treatments are equally effective, regardless of modality; (b) client pretreatment characteristics are related to treatment outcome; and (c) the effect of length of treatment on outcome has not been adequately determined.

The preceding knowledge can be profitably applied to the concerns of the present study in the following manner: (a) time will not have to be spent in discovering how the specific mode of treatment in use at this Center affects the alcohol drinking behaviour outcome of the clients because it will not be expected to be any different in its effect from any other type of treatment; (b) confidence is increased that some positive (significant) results will be obtained through the statistical analysis, and therefore

the Center staff may be encouraged toward the further development of a system of prediction; and (c) the nature of the results of correlation between duration of treatment and treatment outcome will indicate whether or not further analysis beyond the immediate task of this study is warranted, and if so, it should suggest how to regroup the data so that further analysis becomes meaningful.

## The Purpose Restated

The purpose of this study was to determine the relationships of client pretreatment characteristics to treatment outcomes of male alcoholics who were admitted to a British Columbia alcoholism treatment center over the past 3 years. The pretreatment data were the following: (a) Demographic data: (i) Age, (ii) Marital Status, (iii) Level of Education; (b) Psychological test data: (i) The Minnesota Multiphasic Personality Inventory, (ii) The Edwards Personal Preference Schedule, (iii) the Sixteen Personality Factors Questionnaire, (iv) the Alcohol Addiction Test, (v) the Shipley-Institute of Living Scale; and (c) Duration of Treatment data. The outcome data were established through Center staff consultations about clients' alcohol drinking behaviour for a period of 1 year after leaving treatment. This information would hopefully be used as the basis for the development of a prediction system for this Center.

## Research Questions

This was an exploratory study, and was not experimental in design. Consequently, it was more appropriate to pose what may be referred to as research questions rather than formal hypotheses.

The specific research questions investigated through the means of the statistical analyses were:

1. Which demographic and psychological variables, that is, pretreatment characteristics, significantly relate to treatment success as determined 1 year after treatment?

2. What is the nature of the correlations among the variables chosen through step-wise discriminant analysis?

3. What is the nature of the relationship between 'duration of treatment' and treatment outcome?

4. Do the findings from research question 3 support Heilbrun's (1971) belief that time in treatment is highly related to quality of outcome, that is, subsequent drinking behaviour?

5. Will the demographic and/or psychological data provide the basis for the development of a system of prediction of treatment effectiveness?

# CHAPTER III

## Methodology

### Subjects

The sample consisted of subjects who met a two-fold criterion for selection. Clients were included in the sample if: (a) they had complete data records (psychological tests and demographic data), and (b) if they had been out of treatment for one full year. The first criterion was necessary because of the type of statistical analysis proposed. The second criterion was necessary in order to obtain a stable measure of outcome.

The sample was characterized by: (a) having been predominantly middle-class in origin; (b) having experienced personal and social disintegration due to alcohol dependency; and by (c) arrival at the alcoholism treatment center mainly through detoxification/recovery centers (some others were referred from the business and industrial community, and others arrived as self-referrals). The sample size was 141 subjects (278 individuals actually fit the above criteria, but just under one half were not included in the sample due to lack of follow-up information).

Procedures

Classification of subjects into criterion groups. There was no division of the sample into experimental and control groups since no experimental conditions were imposed. However, all subjects were classified with regard to their alcohol drinking behaviour one year following treatment. The first group - labelled Successes - were those who were either consistently abstaining from drinking alcohol; or were those who drank in a socially acceptable manner, that is, taking only one or two drinks in the course of an evening, perhaps up to half a dozen times during the year, and never involving inebriation. The second group - labelled Failures - were those subjects who either exhibited binge drinking behaviour, that is, excessive alcohol drinking over two to three week periods at a time with substantial periods of sobriety in between; or were those who had returned to unmitigated, totally recidivistic drinking, similar to or worse than that which pertained prior to entering treatment.

These descriptions of success and failure seemed reasonable and appropriate, even though the treatment program conducted by the Rehabilitation Center predicated success solely on being totally abstinent (and therefore those who drank any amount of alcohol at all were considered failures), since it may be thought that there is a more natural division between those who can drink a small amount while still being able to maintain personal and social integration, and those

who engage in binge drinking behaviour or worse. Therefore those who drank in a socially acceptable manner (maintaining personal and social integration) were also included as treatment successes for the purposes of this study.

Although the Center staff did not use formal follow-up procedures with clients who had been through the rehabilitation program, subjects were classified with respect to their alcohol drinking behaviour one year following treatment, based on the results of consultation by and agreement among the treatment staff about each client's status. The information used to determine this status in lieu of formal follow-up procedures came from letters, cards, and phone calls made by former clients to their counsellors during the criterion time-period, as well as through return visits made by many clients to the Center to confirm sobriety, and finally through employer and "grapevine" reports.

Intake procedures and administration of program. Upon entry to the Rehabilitation Center the men were given thorough medical examinations, and as full a case history as possible was collected for each. Depending on the state of the person, sufficient time was provided for him to experience cessation of alcohol withdrawal symptoms (usually 10 days to 2 weeks) before entering treatment events. Also during this time, an intake counsellor interviewed all new and returning residents to complete life-data information sheets. The battery of five psychological tests was

administered at the end of 3 weeks, and the resultant scores recorded in a card file.

When the information gathering process had been completed, the men were assigned to a counsellor. The counsellor, with the aid of the test and life data now available to him, interviewed each resident assigned to him in order to determine an individually based treatment program. The activities and amount of time to be spent in them were selected from three categories of treatment events: (a) social milieu events; (b) core-compulsory events; and (c) non-compulsory, but highly advised treatment events (all residents received a modal treatment regardless of their psychological symptoms, which was group therapy).

Social milieu events were freely participated in by all residents. They represent the various aspects of communal life experienced at the Center: e.g., recreation, meals, rest, reading, films, and other non-structured socialization activities. Core-compulsory events were considered essential and hence compulsory. These were discussed by the counsellors with each resident at the initial interview so that they were fully understood. The voluntary, highly advised events were also explained and a committment for involvement was sought (this was the only category of events where individuals could exercise choices). Thus the treatment events that all men were involved in were: (a) daily formal group therapy sessions; (b) didactic lectures on various aspects of alcoholism (minimum, twice/week); (c) one-to-one counselling at

least once a week; (d) psychological testing and test interpretation; and (e) Bible studies, devotional periods and Chapel services.

The entire program focused on a form of the "twelve steps" of Alcoholics Anonymous which stood as a statement of the philosophy and view of man as held by the Rehabilitation Center. All aspects of the treatment program were seen as ancilliary to the effectiveness of this spiritually based orientation to bringing hope and recovery to men debilitated by alcohol dependency.

## Instruments

The existing data from the battery of psychological tests administered by the Center staff since 1975 were analyzed. In this study, each of the instruments in that battery is reviewed below by citing one or two comments made by reviewers as contained in various volumes of O.K. Buros' Mental Measurements Yearbook. More detailed information can be obtained by reading those reviews in their entirety, and by reading the particular test Manuals.

The Minnesota Multiphasic Personality Inventory. The MMPI can be considered the major standardized psychological test in use at the present time for the purposes of objective clinical assessment of intrapsychic pathology, that is, "assessment of some of the major personality characteristics that affect personal and social adjustment" (Hathaway and

McKinley, 1967, p. 7). It is a screening device used to aid in the identification of abnormal emotional states by eliciting a wide range of self-descriptions from each test subject. Using standard scoring procedures (T-scores), a clinical test profile is generated, illustrating the nature and degree of emotional upset. This profile is composed of four "validity indicator" scales and ten clinical (personality) scales. The scales consist of items which differentiated between specified clinical groups of about 50 persons each (per traditional psychiatric diagnostic groups) and a normal control group of approximately 700 persons.

Quoting Buros' Third Mental Measurements Yearbook, from a descriptive review of the MMPI by Rotter (p. 109, 110), "Test-retest reliabilities for the separate scales are reported as ranging from .71 to .83. Validity measures are for single scales and are usually in terms of overlap between patients of a given nosology, unselected patients, and normals. Satisfactory differentiation is reported in most instances". However, it is worth noting that, "its reliability and validity are dependent on the reliability and validity of diagnosis of disease entities themselves" (Rotter, 1949, p. 110). It appears that when validity of the MMPI is referred to, authors are usually concerned with the appropriateness or acceptability of any one administration of the test - which is determined from the validity indicators of the test itself, namely, the L, F, K, and ?

scales - rather than the kind of validity that is of more common concern to practitioners. This kind of validity is that which looks for statistical evidence that the instrument has about it, a property which "legitimizes the particular substantive psychological inferences that may be drawn from score values generated by appropriate administration of that scale" (Dahlstrom, Welsh, and Dahlstrom, 1972, p. 99).

The MMPI was used by the staff at the Center as a tool to define the ways for each client in which his personality was similar to known descriptions of abnormal behaviour. In addition to profile analysis, an item analysis was conducted on the various scales for specific information not revealed by the profile analysis. This information was investigated with the client in individual counselling sessions, so that fullest understanding of personal dysfunction could occur.

The Edwards Personal Preference Schedule. This is a test designed to measure an individual's motivations for behaviour. In other words, it finds to what extent one is driven by needs and pressures (in 15 selected drives). Scores on each scale can be evaluated in terms of both percentile and T-score norms for college men and women (based on 760 men and 749 women tested in 29 colleges across the United States) with additional percentile norms derived from a general adult sample (based on 4,031 men and 4,932 women tested in both urban and rural areas across 48 states).

The significant mean differences found between these two groups illustrates the need for specific group norms on this personality test. This has been attempted in the case of alcoholics by Fitzgerald, Pasewark and Tanner (1967); Goss, Morosko, and Sheldon (1968); Manaugh and Scott (1976); and Pryer and Distefano (1970).

However, an important caution to bear in mind is that the EPPS makes use of ipsative scores. In other words, the strength of each need is expressed in relation to the strength of the individual's other needs, and not in absolute terms. Because of this fact, the use of normative scores for any group may be questioned. In addition, the combination of normative and ipsative scores serves to make the interpretation of test scores confusing (Anastasi, 1976, p. 512).

On matters of test reliability and validity, the review article by Heilbrun in Buros' Seventh Mental Measurements Yearbook is illuminating. He stated that, "scale reliabilities are satisfactory [.74 to .88 retest, and .60 to .87 split-half], norms are based on stable samples, and inter-scale correlations are reasonably low". However, he criticized the EPPS for a continued lack of validity evidence since its initial appearance in 1954. He also stated that, "the EPPS served as a useful catalyst for research and psychometric debate over the role of social desirability response set and the effect of ipsative scaling", but while

there is neither evidence for or against the EPPS having predictive validity, "it boils down to the amount of prudence which the user feels impelled to exercise with the test results" (Heilbrun, 1972, p. 148, 149).

The Center staff used each individual's profiled test results in individual counselling sessions to facilitate understanding of how the tested person was motivated, as compared with others within the same age grouping.

The Sixteen Personality Factors Questionaire. This personality inventory was constructed on the basis of factorial research by Raymond B. Cattell and co-workers (1949). The 16PF attempts to define personality by delineating the uniqueness of each individual on 16 descriptive personality characteristics. It has been found to be extremely useful in promoting greater depth in the individual and group counselling processes at the Center.

Anastasi (1976), reported that:

> Reliabilities of factor scores for any single form of the 16PF are generally low ... parallel-form reliabilities center in the .50's and retests after a week or less often fall below .80 .... information on normative samples and other aspects of test construction is inadequate. Empirical validation data include average profiles for more than 50 occupational groups and about the same number of psychiatric syndromes. "Specification equations" are provided for a number of occupations, in the form of multiple regression equations for predicting an individual's criterion performance from scores on the 16PF. (p. 509)

Rorer (1972), reviewed the 16PF in Buros' Seventh Mental Measurements Yearbook. He stated that data which would

allow the instrument to be properly evaluated, while present in the Manual, were not reported in "coherent and usable form", and furthermore, the 1970 handbook to the 16PF left the practitioner with an "overwhelming impression ... of disorganization, contradiction, and confusion" (p. 332, 333). "There is also some question about the factorial homogeneity of items within each scale, as well as the factorial independence of scales" (Anastasi, 1976, p. 509). It seems therefore, to be difficult to accept the results of an administration of this test with confidence, where scale or profile interpretation is desired.

The Alcohol Addiction Test. The ALCADD test was designed to be able to identify alcoholic adults and individuals with problems related to the use of alcohol. The Center staff use it because they find that it helps to confirm to the doubter or denyer that he is indeed drinking in a pattern like that of known alcoholics. It has also been found to be useful in pointing out ways or areas in which the alcohol drinker's behaviour still differs from those of known alcoholics. A reliability coefficient of .92 for males is reported by the author of this test, and one investigator found that by using the ALCADD's cut-off scores, 80 - 100% of four groups tested (active alcoholics, members of AA, social drinkers, and abstainers) were correctly identified. However, "since no systematic work has been reported for this test ... criticisms made in

the original Mental Measurements Yearbook reviews [the five traits are subjective conceptions and have no objective analysis to warrant them, and it is not known how well the test will work with subjects who do not admit to alcoholism] remain unanswered" (Campbell, 1965, p. 149). Discreetly used on known alcoholics in a treatment setting, results similar to those discussed in the manual can be expected; and it may well be a valuable addition to clinical methods.

The Shipley-Institute of Living Scale. This test is used for measuring intellectual impairment by assessing the relative intactness of abstract reasoning and verbal abilities. Score values are generated in the areas of Abstract Reasoning (Abstractions), Verbal Ability (Vocabulary), Mental Age (called the Total score, and can be matched to a Wechsler adult intelligence IQ equivalent [Bortz & Loy, 1970]), and lastly, the principal score of the instrument, a scale known as the Conceptual Quotient. This last score - the "CQ" - is intended to be an index of intellectual impairment which has occurred as a result of the particular disturbance in question.

A review by Yates in Buros' Seventh Mental Measurements Yearbook criticized this test for its failure to control factors of age, sex, and educational level when producing the standardization data; and stated that subsequent attempts to improve the test by doing studies on reliability and

validity "have not been particularly encouraging or consistent". Still, the SILS has remained a popular clinical instrument, probably due to its brevity; and is "a useful screening device or indicator of change where more intensive or direct experimental investigation is not possible" (Yates, 1972, p. 322).

## Design

The data analysed in this study were gathered on the basis of the belief that each item was contributing some unique information toward the compilation of a complete profile on each client (note that a battery of five psychological tests were administered). In other words, all this information was believed to be necessary to enable the Center staff to gain a full, and accurate understanding of the nature of each individual's emotional, intellectual and behavioural impairments; and further, from this data, the Center staff might be able to predict the likelihood of each client's successful rehabilitation through treatment. The statistical analysis that was carried out was intended to show whether or not this belief could be supported; and if not, how then to appropriately modify the information gathering process so that only the most relevant variables are dealt with (e.g., the Center staff might not have to give all the tests).

This was a descriptive and exploratory study using

tests for significance as well as correlational and discriminant function procedures. It involved the analysis of existing data in order to determine the nature and degree of relationships among variables. Altogether, the relationships among 60 variables were investigated.

Data were gathered and recorded by the Center staff prior to this author's association with the Center. The author put the data into usable form so that a computer analysis could be conducted. No client names were included since identification of individuals was not necessary. This was because all summary statistics were to be presented as group summary statistics. Total confidentiality of client names and associated data were thus ensured.

The data recorded and analyzed included 59 independent variables: (a) Age; (b) Level of Education; (c) Marital Status; and (d) Duration of Treatment; plus test scores from (e) the MMPI (10 clinical scales plus 3 of the 4 validity scales); (f) the EPPS (16 scales); (g) the 16PF (16 scales); (h) the SILS (4 scales); and (i) the ALCADD test (6 scales). There was one dependent variable: alcohol drinking behaviour, measured 1 year after treatment. This measure of treatment outcome was divided into two groups: (a) successful drinkers (successes); and (b) unsuccessful drinkers (failures). One of the statistical procedures used took into account the large number of independent variables and the relatively small number, by comparison, of subjects in the sample. This

procedure was effectively a data reduction technique (employed to remove redundant variables and thereby improve the ratio of the number of independent variables to the number of subjects) which looked for the most salient independent variables in the sense of which of them had the greatest predictive capability. Step-wise multiple regression analysis would normally be used, except for the fact that this kind of analysis required the dependent variable to be both normally distributed and continuous in nature. These criteria were not met by the outcome (dependent) variable in this study. Therefore the appropriate statistical procedure to use in such a case as this was a form of multiple regression analysis known as step-wise discriminant function analysis. Discriminant analysis then was the central inferential procedure followed for data analysis in this study.

## Analysis of Data

There were two types of statistics rendered by analysis: (a) descriptive; and (b) inferential. The descriptive statistics reported were: (a) means and standard deviations (on each variable for each outcome category except for the one variable - marital status - where this was inappropriate); and (b) correlation coefficients: cross-instrument subscales (using those subscales chosen by discriminant analysis. The inferential statistics reported were: (a) Step One -

discriminant analysis of the data resulting from the use of each instrument; (b) Step Two - discriminant analysis of chosen subscales from the procedure conducted under Step One; and (c) t-tests and a Chi-square test conducted on the appropriate demographic data.

Due to the limited sample size, the regression analysis was carried out in stages. That is, several step-wise discriminant function analyses were conducted in order to determine that combination of variables which led to maximum discrimination between the outcome groups in a predictive sense. In Step One, each of the instruments was examined separately to identify those test subscales (variables) that contributed maximally to the separation. In Step Two, those variables identified by the Step One process were combined together for a further discriminant function analysis to see finally, which among them maximally discriminated between outcome groups, thereby obtaining the most parsimonious solution. This inferential procedure, in addition to the descriptive procedures: (a) effectively reduced the initial number of independent variables (59) to a much lower number (4) through eliminating those other variables that, while not necessarily redundant, did not contribute in any significant degree to discrimination between outcome groups; and (b) because of the improved ratio of number of variables to subjects, increased the ability to detect real differences where they truly existed

(avoiding Type I error). This analysis constructed a linear combination of the set of variables that maximally discriminated between the outcome groups with the effects of the less relevant variables removed (Tatsuoka, 1970, p. 3, 4).

# CHAPTER IV

## Results

The data collected during the study were analysed statistically. Results of the analyses are reported in this chapter in terms of the research questions that were investigated.

### Subjects

Data were gathered for analysis on 141 male alcoholics. These subjects were assigned to one of two groups (success or failure) on the outcome (criterion) variable, namely, alcohol drinking behaviour 1 year after treatment. There were 65 subjects classified as successes, and 76 subjects classified as failures.

### Demographic Data

Age, and level of education. The age range of the sample was 20 to 64 years. Level of education ranged from zero (no years of schooling completed) to 7 years of University training (19 years of schooling completed). A *t*-test for significance of the difference between the means was conducted for these two variables. These were both two-tailed tests, and were carried out at the .05 level of significance. According to the result, there was no

statistically significant difference for the age variable, nor was there a statistically significant difference for the level of education variable. Table 1 presents these results, as well as the means ($\bar{X}$) and standard deviations (s.d.) for the two variables.

TABLE 1

DESCRIPTIVE STATISTICS AND *t*-TEST RESULTS FOR VARIABLES AGE AND LEVEL OF EDUCATION

| Variables | | Age | | Level of Education | |
|---|---|---|---|---|---|
| | | $\bar{X}$ | s.d. | $\bar{X}$ | s.d. |
| Outcome Groups | Success (65)[a] | 41.97 | 8.42 | 10.89 | 2.86 |
| | Failure (76) | 41.29 | 11.11 | 9.95 | 3.10 |
| *t*-Test | *df* | 139 | | 139 | |
| | *t*-value | 0.40 | | 1.89 | |
| | 2-tail Prob. | 0.69* | | 0.06 | |

[a] figures in parentheses are the numbers of subjects classified into the respective outcome categories

* $\alpha = 0.05$

Due to the wide range of ages (20-64) represented in this sample, and the lack of statistical significance on the *t*-test for this variable, it was thought that by breaking the ages into smaller groupings and running *t*-tests on each of the reformulated groups, statistically significant differences

between the means might be found in one or more of these groups. However, no statistically significant differences between means were found on any of the five age groups. These results are reported in Table 2.

Marital status. A Chi-square test of independence was carried out on this data ($\alpha = 0.05$). When no statistically significant difference was found between the observed and expected frequencies of the original five groups (Single, Married, Divorced, Separated, Widowed), these groups were collapsed into two groups (Single, Married, Widowed; and Divorced, Separated), and a second Chi-square analysis was conducted. This was done because it was thought that a possible, major reason for the particular marital status of the divorced or separated men, was that of their exhibited dependency on alcohol. In other words, it was supposed that those who had experienced marital affiliation and lost it due to alcoholism, were more likely to be the failures on the outcome measure. This conjecture was not supported by the second Chi-square analysis. That is, no statistically significant difference was found between the reformulated groups. These results are reported in Tables 3 and 4.

TABLE 2

DESCRIPTIVE STATISTICS AND t-TEST RESULTS FOR VARIABLE AGE: IN 5 GROUPS

| Age Groups | Outcome Groups | | t-Test | | |
|---|---|---|---|---|---|
| | Success | Failure | df | t-value | 2-tail Prob. |
| 1. ≤25 | (1)[a] | (8) | | | |
| $\bar{X}$ | 25.00 | 22.75 | 7 | 1.16 | 0.29* |
| s.d. | 0.00 | 1.83 | | | |
| 2. >25, ≤35 | (14) | (16) | | | |
| $\bar{X}$ | 31.07 | 30.19 | 28 | 0.79 | 0.44* |
| s.d. | 2.81 | 3.27 | | | |
| 3. >35, ≤45 | (27) | (24) | | | |
| $\bar{X}$ | 40.52 | 41.50 | 49 | -1.31 | 0.20* |
| s.d. | 2.77 | 2.55 | | | |
| 4. >45, ≤55 | (19) | (20) | | | |
| $\bar{X}$ | 49.63 | 50.60 | 37 | -1.15 | 0.26* |
| s.d. | 2.54 | 2.72 | | | |
| 5. >55, ≤65 | (4) | (8) | | | |
| $\bar{X}$ | 57.75 | 58.13 | 10 | -0.26 | 0.80* |
| s.d. | 1.26 | 2.70 | | | |

[a] figures in parentheses are the number of subjects falling into each age group by respective outcome category

* $\alpha = 0.05$

TABLE 3

MATRIX OF OBSERVED AND EXPECTED FREQUENCIES ($\chi^2$)
OF MALE ALCOHOLICS ON VARIABLE MARITAL STATUS

| Groups | Single | Married | Divorced | Separated | Widowed | Row Total |
|---|---|---|---|---|---|---|
| Success | 22(24)[a] | 12(9) | 12(13) | 16(17) | 3(2) | 65 |
| Failure | 31(29) | 8(11) | 16(15) | 20(19) | 1(2) | 76 |
| Column total | 53 | 20 | 28 | 36 | 4 | 141 |

[a] figures in parentheses are the calculated expected frequencies

$\chi^2 = 3.51$ with 4 df $p = 0.48$ ($\alpha = 0.05$)

TABLE 4

MATRIX OF OBSERVED AND EXPECTED FREQUENCIES ($\chi^2$)
OF MALE ALCOHOLICS ON VARIABLE MARITAL STATUS: COLLAPSED GROUPS

| Groups | 1. Single, Married, Widowed | 2. Divorced, Separated | Row total |
|---|---|---|---|
| Success | 37(36)[a] | 28(29) | 65 |
| Failure | 40(41) | 36(35) | 76 |
| Column total | 77 | 64 | 141 |

[a] figures in parentheses are the calculated expected frequencies

$\chi^2 = 0.12$ with 1 df $p = 0.73$ ($\alpha = 0.05$)

## Duration of Treatment

There was a wide range in the time spent in treatment by the subjects (13 to 698 days). However, the *t*-test (two-tailed, $\alpha = .05$) for significance of difference between the means of the two groups on the outcome variable did not reveal a statistically significant difference (*t*-value of 0.38 associated with a probability of 0.71). The results are reported in Table 5.

TABLE 5

DESCRIPTIVE STATISTICS AND *t*-TEST RESULTS FOR VARIABLE DURATION OF TREATMENT

| Variable | | Duration of Treatment $\bar{X}$ | Duration of Treatment s.d. |
|---|---|---|---|
| Outcome Groups | Success (65)[a] | 133.72 | 119.22 |
| | Failure (76) | 126.80 | 98.40 |
| *t*-Test | *df* | 139 | |
| | *t*-value | 0.38 | |
| | 2-tail Prob. | 0.71* | |

[a] figures in parentheses are the numbers of subjects classified into the respective outcome categories

* $\alpha = 0.05$

## Psychological Test Data

The data which was generated through the use of each psychological instrument was recorded in raw score form.

(Raw scores were used for analysis of the demographic data, the variable Duration of Treatment, and for the Pearson correlations.) However, in order to make stepwise discriminant function analysis of this data meaningful, each scale score was transformed into a proportion (because the majority of the scales had different score ranges). That is, this transformation was made necessary in order to be able to make comparisons among the amounts of total unique variance contributed by each scale (variable), to the total system variance (of all independent variables considered together). Changing the raw scores into meaningful proportions was accomplished by means of the ArcSin transformation ($x_i' = 2[\text{ArcSin}(\sqrt{x_i})]$), so that one of the underlying assumptions made when using parametric tests (that of a normal distribution) was not violated. Means and standard deviations are reported in proportional form in the sections which follow.

Discriminant analysis, step one. A discriminant analysis was performed on each of the five psychological tests. This was done to improve the ratio of independent variables to the sample N for the purpose of increasing the ability of the statistical analyses to detect real differences where they truly existed (avoiding Type I error). The F-value to enter a variable into the linear combination of the set of variables discriminating between outcome groups was set at 3.92 ($\alpha = .05$, df 1 and 140).

There were no variables found to contribute significantly to discrimination between outcome groups for three of the five

psychological tests: (a) the Alcohol Addiction Test (ALCADD); (b) the Edwards Personal Preference Schedule (EPPS); and (c) the Shipley-Institute of Living Scale (SILS). The means and standard deviations of the two outcome groups for each variable within these three tests are reported in Table 6, 7, and 8. These descriptive statistics illustrate how similar the outcome groups are, throughout the subscales of the tests, and therefore why discriminant analysis did not reveal any variable(s) contributing to statistically significant discrimination between outcome groups ($\alpha = 0.05$).

TABLE 6

MEANS AND STANDARD DEVIATIONS FOR 141 SUBJECTS ON EACH SUBSCALE (VARIABLE) OF THE ALCADD

| Groups | Means | | Standard Deviations | |
|---|---|---|---|---|
| | Success | Failure | Success | Failure |
| Subscales | | | | |
| 1. Total | 0.63[a] | 0.62 | 0.16 | 0.15 |
| 2. A | 0.64 | 0.65 | 0.24 | 0.22 |
| 3. B | 0.66 | 0.66 | 0.22 | 0.21 |
| 4. C | 0.67 | 0.65 | 0.16 | 0.16 |
| 5. D | 0.56 | 0.57 | 0.22 | 0.20 |
| 6. E | 0.57 | 0.59 | 0.21 | 0.17 |
| N | 65 | 76 | 65 | 76 |

[a] figures for the means and standard deviations are expressed in proportional form

TABLE 7

MEANS AND STANDARD DEVIATIONS FOR 141 SUBJECTS ON EACH SUBSCALE (VARIABLE) OF THE EPPS

| Groups | Means | | Standard Deviations | |
|---|---|---|---|---|
| | Success | Failure | Success | Failure |
| Subscales | | | | |
| 1. Achievement | 0.52[a] | 0.51 | 0.15 | 0.15 |
| 2. Deference | 0.44 | 0.46 | 0.13 | 0.13 |
| 3. Order | 0.41 | 0.43 | 0.16 | 0.17 |
| 4. Exhibition | 0.46 | 0.44 | 0.14 | 0.14 |
| 5. Autonomy | 0.53 | 0.56 | 0.17 | 0.15 |
| 6. Affiliation | 0.43 | 0.44 | 0.15 | 0.15 |
| 7. Intraception | 0.56 | 0.52 | 0.16 | 0.18 |
| 8. Succorance | 0.37 | 0.37 | 0.18 | 0.16 |
| 9. Dominance | 0.48 | 0.43 | 0.20 | 0.17 |
| 10. Abasement | 0.52 | 0.56 | 0.20 | 0.16 |
| 11. Nurturance | 0.54 | 0.53 | 0.18 | 0.20 |
| 12. Change | 0.55 | 0.57 | 0.18 | 0.15 |
| 13. Endurance | 0.56 | 0.58 | 0.17 | 0.20 |
| 14. Heterosexuality | 0.64 | 0.58 | 0.20 | 0.22 |
| 15. Aggression | 0.46 | 0.49 | 0.17 | 0.17 |
| 16. Consistency Score | 0.76 | 0.76 | 0.16 | 0.13 |
| N | 65 | 76 | 65 | 76 |

[a] figures for the means and standard deviations are expressed in proportional form

TABLE 8

MEANS AND STANDARD DEVIATIONS FOR 141 SUBJECTS ON EACH SUBSCALE (VARIABLE) OF THE SILS

| Groups | Means | | Standard Deviation | |
|---|---|---|---|---|
| | Success | Failure | Success | Failure |
| Subscales | | | | |
| 1. Vocabulary | 0.76[a] | 0.73 | 0.13 | 0.17 |
| 2. Abstractions | 0.55 | 0.50 | 0.24 | 0.26 |
| 3. Wechsler IQ | 0.75 | 0.71 | 0.12 | 0.16 |
| 4. Conceptual Quotient | 0.47 | 0.45 | 0.08 | 0.12 |
| N | 65 | 76 | 65 | 76 |

[a] figures for the means and standard deviations are expressed in proportional form

The discriminant analysis performed on the Minnesota Multiphasic Personality Inventory (MMPI) allowed three of the thirteen variables to enter the discriminant function (equation). That is, three variables (subscales) were found to contribute significantly ($\alpha = 0.05$) to discrimination between the two outcome groups on the criterion variable. They were: (a) 'PA' - Paranoia; (b) 'MA' - Hypomania; and (c) 'SI' - Social Introversion. Table 9 reports the means and standard deviations of the outcome groups on all the subscales of this test. The results of the discriminant analysis are reported in Table 10, with the three variables chosen by the

TABLE 9

MEANS AND STANDARD DEVIATIONS FOR 141 SUBJECTS ON EACH SUBSCALE (VARIABLE) OF THE MMPI

| Groups | Means | | Standard Deviation | |
|---|---|---|---|---|
| | Success | Failure | Success | Failure |
| Subscales | | | | |
| 1. L | 0.42[a] | 0.40 | 0.07 | 0.06 |
| 2. F | 0.56 | 0.59 | 0.12 | 0.14 |
| 3. K | 0.38 | 0.37 | 0.07 | 0.06 |
| 4. Hypochondriasis | 0.50 | 0.51 | 0.13 | 0.14 |
| 5. Depression | 0.58 | 0.59 | 0.14 | 0.13 |
| 6. Conversion Hysteria | 0.54 | 0.51 | 0.09 | 0.10 |
| 7. Psychopathic Deviate | 0.61 | 0.61 | 0.10 | 0.09 |
| 8. Masculinity-Femininity | 0.53 | 0.52 | 0.08 | 0.08 |
| 9. Paranoia | 0.53 | 0.52 | 0.11 | 0.11 |
| 10. Psychasthenia | 0.52 | 0.54 | 0.14 | 0.14 |
| 11. Schizophrenia | 0.54 | 0.57 | 0.17 | 0.17 |
| 12. Hypomania | 0.53 | 0.58 | 0.09 | 0.09 |
| 13. Social Introversion | 0.46 | 0.49 | 0.10 | 0.11 |
| N | 65 | 76 | 65 | 76 |

[a] figures for the means and standard deviations are expressed in proportional form

discriminant analysis listed in the order of their discriminatory power. The U-statistics (Wilk's Lambda) are also reported in this Table, to clarify the relationship between the independent variables considered concurrently, and the criterion measure. These figures represent the residual variance ($1-R^2$). A classification matrix indicating the percent of cases correctly identified (on the basis of these three variables) when originally assigned an outcome "score", is reported in Table 11.

TABLE 10

ORDER OF ENTRY OF INDEPENDENT VARIABLES
INTO DISCRIMINANT FUNCTION: MMPI (STEP ONE)

| Step Number | Variable Entered | U-statistic | Approximate F-statistic* | df |
|---|---|---|---|---|
| 1. | (12) MA | 0.92 | 12.07 | 1, 139 |
| 2. | (13) SI | 0.89 | 8.75 | 2, 138 |
| 3. | (9) PA | 0.83 | 9.19 | 3, 137 |

* An F-value of 3.92 ($\alpha = 0.05$) was required to enter (or remove) a variable into (or from) the discriminant function.

The discriminant analysis performed on the Sixteen Personality Factors Questionnaire (16 PF) allowed one of the sixteen variables to enter the discriminant function (equation). That is, one variable (subscale) was found to contribute significantly ($\alpha = 0.05$) to discrimination between the

TABLE 11

MMPI CLASSIFICATION MATRIX FROM
STEP ONE DISCRIMINANT ANALYSIS

| Group | % correctly identified | No. of cases classified into group - Success | Failure |
|---|---|---|---|
| Success | 60.0 | 39 | 26 |
| Failure | 73.7 | 20 | 56 |
| Total | 67.4 | 59 | 82 |

two outcome groups on the criterion variable. It was: 'N' - Forthrightness vs. Shrewdness. Table 12 reports the means and standard deviations of the outcome groups on each variable in this test. The results of the discriminant analysis are reported in Table 13 (the U-statistic is included again). Table 14 is the classification matrix based on the discriminatory power of variable 'N' from this test.

Discriminant analysis, step two. In this second step of the discriminant analysis, a more parsimonious solution was sought. That is, discriminant analysis was performed on the four variables entered through the Step One discriminant analysis (MMPI: PA, MA, and SI; 16 PF : N) to see which of the four variables (if not all four) were retained as

TABLE 12

MEANS AND STANDARD DEVIATIONS FOR 141 SUBJECTS ON EACH SUBSCALE (VARIABLE) OF THE 16 PF

| Groups | | Means | | Standard Deviations | |
|---|---|---|---|---|---|
| | | Success | Failure | Success | Failure |
| Subscales | | | | | |
| 1. | A | 0.58[a] | 0.58 | 0.23 | 0.25 |
| 2. | B | 0.63 | 0.62 | 0.20 | 0.19 |
| 3. | C | 0.38 | 0.37 | 0.20 | 0.20 |
| 4. | E | 0.56 | 0.59 | 0.22 | 0.22 |
| 5. | F | 0.48 | 0.56 | 0.22 | 0.24 |
| 6. | G | 0.57 | 0.57 | 0.21 | 0.22 |
| 7. | H | 0.48 | 0.47 | 0.22 | 0.26 |
| 8. | I | 0.74 | 0.70 | 0.17 | 0.19 |
| 9. | L | 0.70 | 0.75 | 0.22 | 0.20 |
| 10. | M | 0.60 | 0.55 | 0.22 | 0.22 |
| 11. | N | 0.67 | 0.58 | 0.19 | 0.20 |
| 12. | O | 0.77 | 0.78 | 0.22 | 0.22 |
| 13. | $Q_1$ | 0.64 | 0.66 | 0.23 | 0.20 |
| 14. | $Q_2$ | 0.77 | 0.78 | 0.22 | 0.18 |
| 15. | $Q_3$ | 0.60 | 0.54 | 0.19 | 0.21 |
| 16. | $Q_4$ | 0.79 | 0.84 | 0.20 | 0.17 |
| | N | 65 | 76 | 65 | 76 |

[a] figures for the means and standard deviations are expressed in proportional form

TABLE 13

VARIABLE ENTERED INTO DISCRIMINANT FUNCTION
FROM THE 16 PF (STEP ONE)

| Step Number | Variable Entered | U-statistic | Approximate F-statistic* | df |
|---|---|---|---|---|
| 1. | (11) N | 0.95 | 7.41 | 1, 139 |

* An F-value of 3.92 ($\alpha = 0.05$) was required to enter (or remove) a variable into (or from) the discriminant function.

TABLE 14

16 PF CLASSIFICATION MATRIX FROM
STEP ONE DISCRIMINANT ANALYSIS

| Group | % correctly identified | No. of cases classified into group - Success | Failure |
|---|---|---|---|
| Success | 35.4 | 23 | 42 |
| Failure | 76.3 | 18 | 58 |
| Total | 57.4 | 41 | 100 |

contributing to statistically significant ($\alpha = 0.05$) discrimination between the two outcome groups. All four variables were in fact retained (entered). Results of this analysis are reported in Table 15, with the four independent variables chosen by the analysis listed in the order of their

discriminatory power. Note that the U-statistics indicate that when the four independent variables are considered concurrently, they explain 19.4% of the total variance on the criterion measure. Finally, Table 16 is the classification matrix of the percent of cases correctly classified based on the discriminatory power of these four variables.

TABLE 15

ORDER OF ENTRY OF INDEPENDENT VARIABLES INTO DISCRIMINANT FUNCTION: MMPI & 16 PF (STEP TWO)

| Step Number | Variable Entered | U-statistics | Approximate F-statistic* | df |
|---|---|---|---|---|
| 1. | (MMPI:12)MA | 0.92 | 12.07 | 1, 139 |
| 2. | (16 PF:11) N | 0.89 | 8.80 | 2, 138 |
| 3. | (MMPI:13)SI | 0.85 | 7.90 | 3, 137 |
| 4. | (MMPI: 9) PA | 0.81 | 8.17 | 4, 136 |

* An F-value of 3.92 ($\alpha = 0.05$) was required to enter (or remove) a variable into (or from) the discriminant function.

Pearson correlation matrix. Pearson correlation coefficients were computed among the four variables (subscales) entered into the discriminant function (equation). These coefficients were based on the obtained raw scores of the 141 subjects. The results of the correlation - reported in Table 17 - illustrate the nature of the relationships of one scale to another. Three of the correlations are significant,

TABLE 16

CLASSIFICATION MATRIX BASED ON VARIABLES CHOSEN THROUGH DISCRIMINANT ANALYSIS: STEP TWO (FROM THE MMPI & 16 PF)

| Group | % correctly identified | No. of cases classified into group - Success | Failure |
|---|---|---|---|
| Success | 64.6 | 42 | 23 |
| Failure | 71.1 | 22 | 54 |
| Total | 68.1 | 64 | 77 |

but not strong (one of which is in a negative direction), while the remaining three correlations are not significant ($\alpha = 0.05$).

TABLE 17

PEARSON CORRELATION COEFFICIENTS OF VARIABLES ENTERED INTO DISCRIMINANT FUNCTION THROUGH DISCRIMINANT ANALYSIS: STEP TWO

| Variables | PA | MA | SI | N |
|---|---|---|---|---|
| PA | | | | |
| MA | 0.37* | | | |
| SI | 0.30* | -0.06 | | |
| N | 0.04 | -0.16* | 0.03 | |

* Statistically significant ($\alpha = 0.05$).

Summary

None of the demographic (independent) variables revealed any statistical significance with regard to the criterion variable. That is, the variables of Age, and Level of Education, did not indicate any significant differences between the means of the outcome groups through use of t-tests. In addition, the Chi-square analysis of the variable Marital Status, revealed that there was insufficient evidence to suggest that the observed frequencies were significantly different from the expected frequencies. Similar to the results of analysis of the demographic data, was the result of the t-test for significance of the difference between the means, performed on the variable Duration of Treatment. That is, no significant difference between the means was discovered.

Discriminant analysis of the psychological tests revealed that 4 of the 55 variables were significantly related to treatment success, as measured by alcohol drinking behaviour 1 year after treatment. That is, four variables (Paranoia, Hypomania, and Social Introversion - from the MMPI; and Forthrightness vs. Shrewdness - from the 16 PF ) contributed to statistically significant ($\alpha = 0.05$) discrimination between the outcome groups on the criterion variable. These four variables, considered together, explained approximately 20% of the total variance on the criterion measure. They were also able to correctly identify approximately 65% and 71% of the successes and failures respectively.

Pearson correlation of the four variables entered into the discriminant function (equation) illustrated the nature of the relationships among these scales. Two of the correlations were "low with a definite [significant] but small relationship", and a third was "slight with almost negligible relationship" (Guilford, 1956, p. 145). The remaining three correlations were not significant.

# CHAPTER V

## Summary

It is the purpose of this final chapter to present a brief overview of the study conducted by restating the purpose and the research questions, and by describing the statistical procedures used. The results of the study as reported in the previous chapter will then be summarized, accompanied by an interpretive discussion. Recommendations for further related research or action conclude the chapter.

## Restatement of the Purpose and Research Questions

The purpose of this study was to determine the relationship of client pretreatment characteristics to treatment outcome (measured in terms of alcohol drinking behaviour 1 year after treatment) of male alcoholics who were admitted to a British Columbia alcoholism treatment center over the past 3 years. The data gathered prior to treatment were the following:

(a) Demographic data: (i) Age, (ii) Marital Status, (iii) Level of Education;

(b) Psychological test data: (i) the Minnesota Multiphasic Personality Inventory, (ii) the Edwards Personal Preference Schedule, (iii) the Sixteen Personality Factors Questionnaire; (iv) the Alcohol Addiction Test, (v) the

Shipley-Institute of Living Scale; and

(c) Duration of Treatment data.

The outcome data were derived from alcoholism treatment center staff consultations about clients' alcohol drinking behaviour for a period of 1 year after leaving treatment. It was hoped that the information resulting from statistical analysis of the data could be used as the basis for development of a prediction system for the Center.

The research questions investigated by means of statistical analyses were:

1. Which demographic and psychological variables, that is, pretreatment characteristics, significantly relate to treatment success as determined 1 year after treatment?

2. What is the nature of the correlation among the variables chosen through step-wise discriminant analysis?

3. What is the nature of the relationship between 'duration of treatment' and treatment outcome?

4. Do the findings from research question 3 support Heilbrun's (1971) belief that time in treatment is highly related to quality of outcome, that is, subsequent drinking behaviour?

5. Will the demographic and/or the psychological data provide the basis for the development of a system of prediction of treatment effectiveness?

Summary of Statistical Procedures Used

The relationship of client pretreatment characteristics to alcohol drinking behaviour 1 year after treatment was determined by conducting the following statistical analyses. The t-test statistic (for significance of differences between means) was calculated for the variables Age, Level of Education, and Duration of Treatment. The Chi-square test of independence was conducted on the variable Marital Status, since this was in the form of frequency data. An ArcSin transformation was performed on the psychological test data due to differing score ranges (so that the unique amounts of variance contributed by each variable to the total could be properly compared). Step-wise discriminant analysis was then carried out on the five psychological tests. This was done in two steps in order to improve the ratio of number of variables to number of subjects. Step One discriminant analyses were conducted on the data from each psychological test individually, to see which variables (if any) would be found to be contributing to statistically significant ($\alpha = 0.05$) discrimination between outcome groups. Any variables found to relate to the outcome measure in this way (there were four) were then analysed in a second discriminant analysis (Step Two) seeking the most parsimonious solution. Finally, Pearson correlation coefficients were calculated among the variables that were entered into the discriminant function by means of the second step discriminant analysis.

## Interpretive Summary of Results

The first research question was:

> Which demographic and psychological variables, that is, pretreatment characteristics, significantly relate to treatment success as determined 1 year after treatment?

On the basis of the Chi-square and *t*-tests performed on the demographic data, none of the demographic variables were found to have a significant relationship with the outcome measure (alcohol drinking behaviour). This was somewhat surprising when the literature cited in Chapter II is considered. While none of the reported studies found client's age to be significantly related to outcome, being married was found to relate significantly to outcome (Mindlin, 1959; and Zimberg, 1974), as was level of education (Heilbrun, 1971).

The discriminant analyses carried out on the results of the psychological tests give the answer to the second half of the research question. Only four psychological variables were found to significantly relate to the outcome measure, and in fact, were able to discriminate significantly between the outcome groups. Three of these variables were from the MMPI (MA, PA, & SI) and one from the 16 PF (N). None of the data from the three other tests (the EPPS, ALCADD, or the SILS) revealed any subscales relating signficantly to the outcome measure.

This latter outcome may seem reasonable in the case of

the EPPS, since it is a test designed for use on normal populations, not for populations that may be manifesting some sort of personality dysfunction. While attempts have been made to establish norms for alcoholic populations with this test (Fitzgerald, Pasewark, & Tanner, 1967; Goss, Morosko, & Sheldon, 1968; Manaugh & Scott, 1976; and Pryer & Distefano, 1970), accomplishing this does not necessarily mean that the EPPS scales will be able to predict treatment outcome for alcoholics. On the basis of the use of the EPPS in this study, it can be stated that alcoholics who are successes or failures with regard to their alcohol drinking behaviour after treatment, do not differ significantly in terms of their motivations for behaviour.

It is interesting then to consider the finding that scale 'N' (Forthright vs. Shrewd) from the 16 PF was found to aid in discriminating between the outcome groups. Like the EPPS, the 16 PF is intended for use with a normal population. When Table 17 is looked at , it can be seen that scale 'N' correlates significantly, but with a virtually negligible relationship ($\underline{r} = -0.16$, $p < .05$), with only one of the three MMPI scales (MA) that are significantly related to the outcome measure. It is possible that this is a chance result. Note too, that it is a negative correlation, which might properly be expected when comparing the kinds of populations the two tests were designed for (16 PF - normal population; MMPI - pathological population).

In addition, the descriptions of scale 'N' (I.P.A.T., 1972) do not seem to be the kind of descriptors that are applicable to an alcoholic population. For example, on one end of the scale, a 'Forthright' individual may be described as unsophisticated, natural, sentimental, simple, spontaneous and easily contented; while at the other end of the scale, a 'Shrewd' individual may be described as calculating, socially aware, experienced, worldly, analytical, unsentimental, and almost cynical. With the exception of scale 'N' then, the results of this study indicate that alcoholics who are successes or failures in terms of alcohol drinking behaviour after treatment, do not differ significantly on measures of unique personality characteristics that are usually employed to describe a "normal" person.

None of the subscales (variables) from the ALCADD were found to relate significantly to the outcome measure. While this test was specifically designed to be able to identify alcoholics, there is no evidence from Buros' Mental Measurements Yearbooks that attempts have been made, successfully or otherwise, to determine whether or not this test can be used effectively to predict treatment outcomes. The results of this study regarding the inability of the ALCADD to discriminate between outcome groups, that is, to predict treatment outcome in terms of alcohol drinking behaviour, must then be taken as representative of the current state of knowledge in this area.

None of the subscales of the SILS were found to relate

significantly to the outcome measure either. This test was designed to provide an index of intellectual impairment resulting from a particular disturbance in question (in this case, alcoholism). Therefore, on the basis of the findings of this study, it can be stated that alcoholics who are successes or failures in terms of their alcohol drinking behaviour after treatment, do not differ significantly on the measures of intellectual impairment.

The findings of this study regarding the SILS can be compared with those of Heilbrun's study (1971), in which he found the Wechsler IQ equivalent associated with the SILS test scores to be predictive of outcome. This IQ estimate assesses abstraction and vocabulary abilities, on the basis of comparing an ability (abstraction) assumed to disintegrate seriously and rapidly in the face of mental deterioration, with an ability (vocabulary) believed to be but slightly affected. Since the present study shows that the outcome groups do not differ significantly in terms of intellectual impairment, this result may simply be supportive of the fact that the MMPI (a test designed to assess intrapsychic pathology, and not intellectual impairment) does have several scales that successfully discriminate between the outcome groups. (In other words, if the outcome groups in this study are differing in terms of intrapsychic pathology, that is, personality dysfunction, then it is probably true that they would not differ in terms of intellectual functioning.) The fact that

these results differ from Heilbrun's findings may therefore be due to his population differing in terms of intellectual functioning.

Three scales of the MMPI were found to be contributing to significant ($\alpha = 0.05$) discrimination between the outcome groups. These scales were: (a) 'MA' - Hypomania; (b) 'PA' - Paranoia; and (c) 'SI' - Social Introversion. They are described as follows: (a) Hypomania - characterized by overactivity, emotional excitement, and flight of ideas; the activity is frequently inefficient and unproductive; these people can be emotionally euphoric or irritable, and temper outbursts are frequent; the enthusiasm and overoptimism leads to taking on more than they can handle; (b) Paranoia - involves a set of delusional beliefs, showing misperceptions or misinterpretations of their life situations that are markedly out of keeping with their ability and intelligence; and (c) Social Introverion - descriptive of a person's ease or uneasiness in social situations or interpersonal relations, covering a variety of sensitivities, insecurities, and worries; high scores tend to be made up of social isolation components and/or maladjustment and self-depreciatory components (introversion).

In support of the findings of this study with regard to the MMPI, Heilbrun (1971) also found that the MMPI scale, Hypomania, was predictive of outcome. However, all the other sources cited in the review of the literature relevant to this study (Straus & Bacon, 1951; Mindlin, 1959; Gatschenberger,

1973; Lowe & Thomas, 1973; and Zimberg, 1974), revealed that indices of social stability (built on demographic data) were more commonly the best prognostic indicators of treatment outcome, rather than psychological test data. This study has found just the opposite. This is probably due to the fact that the other studies set out in the first instance to discover variables that would be predictive of outcome, and therefore likely built their systems, which they then tested, based on those variables which the literature suggested to them would most likely have predictive capabilities. This study on the other hand, took a pre-existing set of data which was being used for therapeutic purposes, and examined it to determine whether or not predictive capabilities were inherent in the data.

The data reported in Table 15 of Chapter IV, reveals that these four psychological test variables (MA, N, SI, and PA), considered together, explain 19% of the total variance of the criterion measure. This seems to be supported by the data reported in Table 16, which indicates that altogether, approximately 68% of the subjects were correctly classified on the basis of the discriminatory power of these four variables. Since it could be expected that 50% of the subjects would have been correctly classified on the basis of chance alone, the 19% of variance explained by these variables fits with the improved percentage of correct classifications of approximately 18% over the 50% expectation by chance. It should be further noted that when the Table 16 data is more

closely examined, it is seen that these four variables were able to correctly classify the failure group on the criterion variable, slightly more often than the successes (71.1% vs. 64.6% respectively).

The second research question was:

> What is the nature of the correlation among the variables chosen through step-wise discriminant analysis?

There were six Pearson correlation coefficients which resulted from correlating the four variables with one another (PA, MA, SI, N). Three of the six correlations were significant but the relationship was not strong (Table 17, Chapter IV). This indicated that the variables were ranking the subjects differently and may involve the measuring at divergent or different constructs.

From the MMPI, the scales 'MA' and 'PA' correlated with a value of 0.37 ($p < .001$). This is supported by Marks, Seeman and Haller (1974), and Good and Brantner (1974) who have reported that these two scales are often associated with one another in clinical profiles. Scales 'PA' and 'SI' correlated with a value of 0.30 ($p < .001$). These are not reported as associated with one another in clinical profiles, but there is no real evidence on the matter since the SI scale was not included in early code frequency tabulations sufficiently often to enable clinicians to gain an appreciation of its occurrence in various populations (Dahlstrom, Welsh & Dahlstrom, 1972). However, subjective thought may easily conceptualize a relationship, though not necessarily a strong

one (as per the present data), between social introversion and paranoia. The scales 'MA' (from the MMPI) and 'N' (from the 16 PF ) also correlated. The correlation coefficient was -0.16($p < .026$). It was suggested earlier that this significant, though virtually negligible relationship, may in reality be a significant correlation by chance. In other words, it was felt that this scale (N), as with the others from the 16 PF would be more effective when applied to a normal population such as it was originally intended.

The other three correlations were not significant. The correlation coefficient ($r$) between 'N' and 'PA' was 0.04 ($p < .315$); between 'SI' and 'MA', -0.06($p < .234$); and between 'N' and 'SI', 0.03 ($p < .339$). A few moments consideration of the descriptions of persons who score highly on these pairs of scales, does not readily suggest reasons why these scales might have been expected to correlate significantly. In other words, it appears fully reasonable that they might not correlate significantly with one another.

The Pearson correlations should not be expected to add support to the findings which resulted from the discriminant analyses. That is, these correlation coefficients do not necessarily support the results of the discriminant analyses. It is only possible to state what the nature of the relationships are.

The third and fourth research questions were:

> What is the nature of the relationship between 'duration of treatment' and treatment outcome? and, Do the findings from research question 3 support Heilbrun's (1971) belief that time in

treatment is highly related to quality of outcome, that is, subsequent drinking behaviour?

The t-test for significance of difference between the means of the outcome groups on the Duration of Treatment variable, revealed no significant relationship. This finding was investigated further by means of a hand-check of the raw data, with the purpose of determining whether or not extreme scores at either end of the distribution may have affected the t-test results (the range was 13 to 698 days, and the means of the two groups were 134, and 127 days). This search proved negative as it became clear that the various amounts of time spent in treatment were fairly evenly distributed. While the finding of no significant difference between the means of the two outcome groups for the variable, Duration of Treatment, do not lend support to Heilbrun's belief that time in treatment is highly related to quality of outcome (in this case, subsequent drinking behaviour), it does not negate his belief either. It is possible that both the early drop-outs from treatment at the alcoholism treatment center ( < 60 days) as well as the long term remainers ( > 200 days) are self-selecting on some other basis, such as differences in some pathological sense (as compared to being differentiated on the basis of quality of outcome). In other words then, extreme scorers in this sample may be pathologically different from those who clustered closer to the means of time spent in treatment by the two outcome groups.

The final research question was:

> Will the demographic and/or the psychological data provide the basis for the development of a system of prediction of treatment effectiveness?

It is difficult to answer this question with an unqualified yes or no. The statistical procedures conducted on the data did in fact reveal four psychological variables contributing to significant ($\alpha = 0.05$) discrimination between outcome groups. Therefore it can be stated that a basis for the development of a system of prediction may exist. But a caveat must accompany this statement. The staff at the alcoholism treatment center must carefully consider how good a basis these four variables do in fact provide when it is known that the four variables together can only explain 19% of the total variance on the criterion measure.

## Recommendations

The results of this study are important in that they have shown that it is possible to find pretreatment characteristics of male alcoholics that are capable of discriminating between groups of successes and failures in terms of their alcohol drinking behaviour, 1 year after treatment. These characteristics can be employed for the purpose of developing a system of prediction of the likelihood of future candidates for treatment being successfully rehabilitated from their dependency or alcohol, or not. The results of this study then, are supportive of the findings of other studies that

have attempted to develop systems of prediction (Straus & Bacon, 1951; Mindlin, 1959; Heilbrun, 1971; Gatschenberger, 1973; Lowe & Thomas, 1973; and Zimberg, 1974), although they may have differed in the specific characteristics found to be most predictive of posttreatment adjustment.

At the same time, the results of this study are important in that they suggest areas for further research or action. These include the following recommendations. (The purpose of the first two research recommendations which follow is to discover pretreatment characteristics, that when used in a system of prediction, will be able to explain a substantially increased proportion of the total variance on the outcome measure.)

Research:

(a) expand the pretreatment information gathering process to include a broader spectrum of indices of social, familial, and economic functioning (in interaction with literature which have shown other items to be predictively useful), in order to discover demographic characteristics that have power to discriminate between outcome groups, and which therefore could be included in the development of a system of prediction for use with the population of alcoholics being served by the alcoholism treatment center. (A decision must be made by the staff at the Center as to the utility of the information from the present demographic and psychological test data being gathered. If the purpose of gathering information prior to treatment is to be focused on the development of a system of

prediction, then this study has shown 4 of the total of 59 variables that may be useful to that end, and therefore time need not be spent in gathering data on the remaining 55 variables.)

(b) repetition of this study using other psychological instruments which might possibly have power to discriminate between outcome groups.

(c) the designing of a study to include both short and long term treatments of predicted successes, where clients are randomly assigned to one of the treatments, in order to further investigate Heilbrun's (1971) belief that time in treatment is highly related to quality of outcome.

(d) whereas this study has used a compensatory model of step-wise discriminant analysis (that allowed any two individuals to vary greatly in their raw scores on the four variables which contributed maximally to discrimination between outcome groups, and yet both be predicted as successes or failures), further research designed to produce specific cut-off points (conjunctive model) on these variables (above or below which a person is considered a success or failure) is desirable.

Action:

(a) consider changing the criteria of successful alcoholism treatment outcome from the present one based on the amount and manner of alcohol consumed, to one that will also include measures of social, familial, and economic functioning.

(b) Consider changing the follow-up procedures in order to improve the method of assigning outcome scores.

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