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Timothy Richard Cefai

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**CHARACTERISTICS OF DWI OFFENDERS IN
TREATMENT FOR ALCOHOL-RELATED PROBLEMS**

By

Timothy Richard Cefai

A DISSERTATION

**Submitted to
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Abstract

The purpose of this study was to investigate differences in risk factor profiles of four groups of treatment-seeking male volunteers subdivided by their total number of self-reported, lifetime drinking-driving arrests (i.e., zero arrests, one arrest, two arrests, and three-or-more arrests). In total, 926 men recruited from 37 randomly-selected, publicly-funded substance abuse treatment programs throughout the state of Michigan were utilized for the study.

Comparisons were made across five empirically established risk-factor domains. These included: (1) Demographic characteristics; (2) drinking-related characteristics; (3) drug-related characteristics; (4) legal characteristics; and (5) psychological characteristics. It was hypothesized that multiple DWI offenders would display significantly greater levels of problem severity in each of these domains when compared to non-offenders and low-level offenders.

Results of linear trend analyses revealed significant, positive associations between alcohol-related problems and increasing numbers of DWI arrests. Moving violations were also significantly and positively associated with increasing numbers of arrests. Significant negative associations with DWI arrests were revealed for drug-related, and psychological variables. Other than age, few socio-demographic characteristics were significantly related to DWI arrest status. Attempts to understand and explain these findings revealed the existence of a masking variable in the form of admission status (i.e., court-ordered vs. voluntary entry into treatment).

A second series of analyses, undertaken to control for the effects of age and

admission status, revealed that voluntary subjects obtained substantially higher scores than their court-ordered counterparts in nearly every risk factor domain examined. On a measure of alcohol dependence, voluntary subjects obtained scores that were significantly higher (i.e., approximately 10 points), than those of their court-ordered counterparts, ($F=61.01$, $p<.001$, $Eta=0.26$). Likewise, on a measure of drug dependence, voluntary subjects obtained scores that were significantly higher than those of court-ordered subjects ($F=18.42$, $p<.001$, $Eta=0.18$). Speculation regarding the reason(s) for these differences was offered.

In a final analysis, multiple regression was conducted to identify those variables which would predict increasing numbers of DWI arrests while holding other predictor variables constant. Four variables emerged as significant predictors, including admission status, alcohol-related problems, drug-related problems, and age. Multiple offenders were more likely to be court-ordered into treatment, to be more alcohol-dependent, to have fewer drug-related problems, and to be slightly older than non- or low-level offenders. The full model resulted in a Multiple R of .435, an R^2 of 0.19, and was statistically significant ($F = 9.48$, $p <.001$)

These results were discussed in terms of their contributions to an understanding of risk factors related to DWI within a sample of male, treatment-seeking volunteers. In addition, treatment implications and suggestions for future research were discussed, particularly as they relate to various contingencies surrounding admission, and their possible effects on treatment outcome.

To Angela, Brian, Chris, and Jeremy

**When we believe in ourselves,
we can make anything happen.**

I believe in you.

-Flavia-

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Chapter 1

INTRODUCTION

Driving while intoxicated (DWI) is a public safety hazard of considerable magnitude (Fell, 1990; Jacobs, 1989; U.S. Department of Health and Human Services, 1989). Drinking and driving has been implicated in one-half of all traffic-related deaths in the United States, (National Center for Statistics and Analysis, 1988; Perrine, Peck, & Fell, 1989). In addition, alcohol-related automobile accidents left 1.19 million people injured in 1990, including 43,140 persons with permanent partial disabilities (Randall, 1992).

Progress has been made in the identification of risk factors associated with problem drinking and driving as a basis for intervention. For the most part, identified risk factors span five distinct domains of life functioning, including alcohol involvement (Selzer & Barton, 1977; Kelleher, 1971; Miller & Windle, 1990; Wilson & Jonah, 1985); drug use (Elliott, 1987; Wilson & Jonah, 1988); nature and extent of criminal activity (Argeriou, McCarty, & Blacker, 1985; Clay, 1972; Gould & MacKenzie, 1990); demographic characteristics (Perrine, 1970; 1975; 1987; Perrine et al., 1989); and psychological characteristics, (Donovan & Marlatt, 1982; Jonah, 1990; Zylman, 1976).

While this research has been useful in identifying characteristics associated with persons at risk for drinking and driving, it has not been particularly useful as

a basis for predicting and/or reducing recidivism (Hagen, Williams, & McConnell, 1979; Mann, Leigh, Vingilis, & DeGenova, 1983; Mann, Vingilis, & Stewart, 1988; Nichols, Weinstein, Ellingstad, Struckman-Johnson, & Reis, 1980). This is due, in part, to an historical disregard to important differences existing between discrete sub-groups of offenders (Clay, 1972; Zelhart, 1972; Zylman, 1974; 1976).

Traditionally, investigators have combined first-time offenders, second-time offenders, and multiple offenders into homogenous groups for purposes of correlational analyses and/or comparisons with other groups of drivers. This practice has resulted in the development of "average" DWI-offender profiles which are of limited use in assisting treatment and/or criminal justice personnel in making practical decisions regarding the recidivist potential of a DWI offender. Potentially more useful would be comparative risk-factor profiles of non-offenders, first-time offenders, and recidivist offenders. With such data, informed decisions regarding recidivist potential –and thus, more timely and appropriate recommendations for intervention– could be made.

Work in this direction has, in fact, begun, and several investigators have found significant differences to exist between groups of recidivists and non-recidivists on a number of important risk factors (Argeriou, McCarty, Potter & Holt, 1986; Beerman, Smith & Hall, 1988; Lucker, Kruzich, Holt & Gold, 1991; MacDonald & Pederson, 1990). This research is in its infancy, however, and has its own set of methodological limitations. These limitations include difficulties in

obtaining large and representative samples of offenders with varying numbers of DWI arrests (Luckner et al., 1991; MacDonald & Pederson, 1990). Insufficient sample size has limited the number of sub-groups that can be compared at any one time, the statistical power available to detect differences between groups, and the generalizability of research findings.

While some studies have been able to overcome sample-size restrictions by utilizing large, state-maintained data bases, they have sacrificed consideration of many important risk factors that were not available to them (Argeriou et al., 1986; Beerman et al., 1988). Thus, it has not been possible to investigate hypothetical relationships between risk factors and/or to develop comprehensive models to predict arrest status.

Additional research is needed to determine if significant differences exist between large, representative groups of drinking drivers --defined by total numbers of DWI arrests-- on a more complete complement of identified risk factors. Furthermore, theoretically meaningful relationships between risk-factor variables should be more adequately explored.

To address these research needs, a study is proposed that will compare risk-factor profiles of approximately 926 men grouped by their total number of lifetime DWI arrests, ranging from none to three or more. This range is consistent with previous research, and parallels existing divisions set forth by Michigan law (Charney, 1991).

All subjects involved in this study were recruited from one of 37 different

alcohol treatment programs throughout the state of Michigan as part of a long-term Health Care Study Project (HCSP). The purpose of the HCSP was to assess the feasibility of matching substance abusing clients to various forms of treatment.

The rationale for using a treatment sample was based upon the need for large groups of individuals who differed with respect to alcohol-use problems and to DWI arrest status. Because subjects were recruited from programs ranging from short-term outpatient to long-term residential treatment, it was believed that a continuum of both alcohol-related problems and DWI arrests could be adequately represented.

The rationale for using an all-male sample was based upon the fact that men are significantly more likely than women to be apprehended for DWI and, thus, are available in the large numbers necessary for meaningful comparisons to be made (Perrine, 1975; Perrine et al., 1989).

This research was intended to contribute to the prediction of recidivism in individuals who are significantly at risk. If early identification of recidivist potential were possible, judicial and treatment personnel could incorporate this information as an aid in its reduction.

Chapter 2

REVIEW OF THE LITERATURE

Introduction

Intensive research has resulted in the identification of important risk factors associated with drinking and driving. A review of the literature indicates that DWI offenders differ significantly from other groups of drivers in at least five domains of life functioning. Relevant research for each of these five domains will be reviewed in chapter 2.

It is important to point out that most studies have combined single- and multiple-offenders into homogenous groups prior to correlational or comparative analyses. This practice has limited the potential to detect significant differences between non-offenders and/or discrete groups of drinking driving offenders on one or more variables of interest. A handful of investigators have attempted to explore differences in risk factor profiles of discrete groups, however, and contributions from these studies will be reviewed under appropriate domain headings.

In addition to providing a context for the proposed study, this review will serve as a basis for the selection of variables to be used in comparisons among DWI offender groups, and in the development of a model to predict multiple DWI-arrests.

Demographic Characteristics of DWI Offenders

In this sub-section of the review, the DWI offender will be characterized with respect to age, gender, marital status, educational attainment, and occupational status.

Age

On average, convicted DWI offenders tend to be between 30–45 years of age (Jonah, 1990; Perrine, et al., 1989). Variations in age do exist, however, with some studies reporting means as low as 25 (Hoffman, Ninonuevo, Mozey, & Luxenberg, 1987). Aside from the possibility of selection bias, discrepancies in age characteristics may be due to differential trends in arrest rates for recent years. Greenfeld (1988) reported that drivers between the ages of 18 and 29 experienced rates of arrest in 1986 more than double the rates of arrest in 1975. This increase was most likely due to legislative changes between 1971 and 1983 which lowered the minimum drinking age, and presumably increased the prevalence of drinking among younger drivers (Greenfeld, 1988).

Recent legislation has increased the drinking age to 21 in nearly all states. This legislation has contributed to a decrease in the prevalence of drinking and driving among younger age groups (O'Malley & Wagenaar, 1991). A decrease in the number of fatal crashes experienced by youthful drivers has also been attributed to this legislation (O'Malley & Wagenaar, 1991).

Gender

The great majority of convicted DWI offenders are male (Argeriou & Manohar, 1977; Hoffman, et al., 1987; Perrine, 1975; Perrine et al., 1989). According to Perrine (1975): "...males comprise a larger proportion of: licensed drivers (about two-thirds), drivers sampled during roadside surveys (about 80%), fatally injured drivers (about 90%), as well as virtually all convicted DWIs (about 98%)."

Although the proportions of female drivers in each of these categories has increased over the past 20 years (Argerious et al., 1986; Popkin, Rudisill, Waller, & Beissinger, 1988; Perrine et al., 1989), Perrine's original commentary regarding the preponderance of males remains accurate.

Marital Status

DWI offenders are much more likely to be divorced, separated, or widowed than are non-DWI control populations. Consistent with this finding are studies indicating that DWI offenders experience significantly greater family-related distress than controls (Selzer & Barton, 1977; Yoder, 1975).

Yoder (1975) found that 31% of DWI offenders taking part in a rehabilitation course experienced some form of chronic stress; the most common source being interpersonal conflict.

Selzer and Barton (1977) asked groups of identified alcoholics, DWI offenders, and general, licensed drivers to rate family relatedness, the frequency of family and job problems, and the level of distress experienced from these

problems. Alcoholics reported poorer family relationships, more family and vocational problems, and greater levels of distress than DWI offenders or controls. DWI offenders, in turn, reported significantly greater family-related distress than controls.

Education

Convicted DWI offenders are less likely to have completed high-school and generally have fewer years of education than the general driving population (Argeriou & Manohar, 1977; Donovan, Queisser, Salzberg, & Umlauf, 1985; Selzer, Vinokur, & Wilson, 1977). Consistent with these findings is a study by Farrow (1985) in which high school students who reported driving under the influence of alcohol had significantly poorer academic records than did students who did not report such behavior.

Occupational Status

Convicted DWI offenders are more likely to have lower status occupations or to be unemployed than the general driving population (Argeriou & Manohar, 1977; Donovan, Marlatt, & Salzberg, 1983).

Demographic Characteristics of Repeat DWI Offenders

A number of studies have compared the socio-demographic characteristics of DWI offenders distinguished by total number of drinking-driving convictions (Argeriou et al., 1986; Beerman et al., 1988; Landrum & Windham, 1981; MacDonald & Pederson, 1990).

The characteristics of 520 DWI offenders who attended a 10-hour alcohol safety education program between 10/72 and 6/74 were examined by Landrum and Windham (1981). Of this total sample, 15.8% (N=82) were rearrested for another DWI offense before 1/75. The single- and multiple-offender groups were compared on demographic variables drawn from personal data questionnaires. Comparative analyses revealed no significant differences between groups with respect to age, gender, race, marital-, or occupational-status. Although interesting, these findings should be interpreted with caution, due to the limited time-frame of the study, the failure to take into account prior history of DWIs, and the use of unequal follow-up periods (i.e., from 6-26 months).

In a large-scale study utilizing a state-wide management information system, Argeriou et al., (1986) examined characteristics of all persons arrested for a DWI offense in the state of Massachusetts in 1984. The study followed legislation establishing specific minimum mandatory sentencing alternatives for offenders, thus requiring courts to sort incoming offenders into groups based upon the number of previous DWI offenses incurred.

First-offenders were ordered to participate in an 8-week driver education

program (N=18,981). Second-time offenders were participants in a 14-day residential alcohol treatment program chosen in lieu of 7 days incarceration (N=2,411). In addition, data on 2,440 three-or-more-time DWI offenders who had been incarcerated in 1983 was obtained for purposes of comparing one- and two-time offenders, with multiple recidivist offenders on various demographic variables of interest. Argeriou et al., (1986) did not report significance levels of obtained socio-demographic differences, and, therefore, only trends can be reported.

Bearing this in mind, findings revealed that the proportion of women in each subgroup decreased as the number of DWI offenses increased. Women comprised 13% of first offenders, 9% of second offenders, and 3% of multiple offenders. Second-time and multiple-offender women were similar to each other in age ($M=32.0$), but were older than first-time female offenders (30.3). There were essentially no differences in age between first-time, second-time, or multiple-offender males (30.5, 30.6, and 30.1, respectively).

Comparisons of mean educational levels revealed little difference between men and women within offender subgroups. Across subgroups, however, educational attainment appeared to decrease as DWI offenses increased.

Employment data was available for first- and second-offender groups only. These data indicated that unemployment among male and female offenders was highly similar, with 5% of first-time and 11% of second-time offenders being unemployed. With respect to marital status, males and females were similar in

that increasing number of offenses was associated with increasing rates of divorce and separation. This trend was more pronounced for women (32% - 41%) than for men (17% - 22%), although this differential may have been due, in part, to the effects of age.

Beerman et al., (1988) also utilized official state records to identify 397 individuals who were convicted at least once of a DWI offense in Orange County, Oregon during 1983. The sample consisted of 338 males and 59 females. For each offender, a 10-year driving history was compiled. A driver receiving more than one citation for DWI during the study period was classified as a recidivist. Recidivists were then sub-grouped by the total number of DWI arrests on record.

Comparative analyses revealed no significant differences between groups with respect to gender. Proportionally, women were as likely as men to be arrested more than once for drinking and driving. Regarding age characteristics, the mean age of non-recidivist drinking drivers was 29 compared to 30 years for offenders with 2 convictions, 31 for offenders with three convictions, and 34 for offenders with 4 or more. Statistically, drivers with 4 or more arrests were significantly older than non-recidivists. Significant differences were also observed between groups with respect to occupational status. In general, as the number of DWI's increased, so too did the rate of unemployment.

To summarize, a number of investigators have compared demographic characteristics of groups of recidivist DWI offenders. Although variability exists

with respect to sources of data, sampling characteristics, and time-frames used to establish group membership, a number of consistencies have emerged. In general, these studies indicate that demographic variables used to distinguish DWI offenders from the general driving population, are also useful for differentiating amongst groups of drinking drivers defined by arrest status. Apart from age, increasing numbers of offenses are associated with higher rates of unemployment and divorce/separation, and lower levels of educational attainment.

Drinking-Related Characteristics of DWI Offenders

In this section of the review, two separate series of studies examining the incidence of alcohol-related problems in DWI offenders will be discussed. The first series will examine DWI offenders in isolation, gauging the incidence and severity of alcohol-related problems via clinical interview, quantity and frequency of alcohol consumption, and standardized indices of alcohol abuse and dependence.

The second series will focus on quantity and frequency (Q/F) studies, comparing DWI offenders with other sub-populations, such as general, licensed drivers, high-risk drivers, and identified alcoholics. By utilizing comparison groups, the latter set of studies will allow for a more meaningful exploration of variables associated with drinking and driving. As discussed earlier, few of these studies differentiated between groups of single and/or recidivist drinking drivers, however.

Incidence of Alcohol-Related Problems in DWI Offenders

Selzer, Payne, Gifford, and Kelly (1963) sought to determine the incidence of alcoholism in 67 Michigan drivers apprehended for DWI and referred by a municipal court judge for a substance abuse evaluation prior to sentencing. For their purposes, a driver was deemed alcoholic if he or she manifested "repeated suspicion-arousing drinking so as to cause injury to the drinker's health or to his social or economic functioning," (p.327).

Results of substance abuse evaluations revealed that 57% of the sample were alcoholic and 15% were probable alcoholics. The probable group could not be designated alcoholic because of incomplete information obtained from the driver. An additional 5% of the drivers were considered to be "pre-alcoholic" or "problem drinkers", and 22% were designated as "non-alcoholic." In sum, no less than 78% of the total sample were determined to have pathologically serious drinking problems. This finding led Selzer et al. (1963) to conclude that the vast majority of DWI offenders were alcohol-dependent.

In a similar study, Kelleher (1971) surveyed 250 Illinois drivers referred for a substance abuse evaluation as a requirement of probation after conviction for DWI. Subjects were interviewed by trained personnel in the order in which their cases were closed. In addition to the substance abuse evaluation, driving records were examined for each subject.

Results revealed that 20% of the sample were "alcoholic," while the remaining 80% were "social drinkers." In addition, the 18% of the sample who

had a prior arrest for DWI were more likely to be members of the alcoholic group than they were to be members of the "social drinker" group. From these results, Kelleher (1971) concluded that the great majority of DWI offenders were social drinkers only, and that the recidivist offender was the "true alcoholic."

While Kelleher's (1971) results appear to contradict Selzer et. al's (1963) findings, serious limitations exist in both studies that make comparisons and general conclusions difficult to draw. The first problem involves the definition of terms. Selzer et al. (1963) offered only a vague definition of "alcoholic", and no definition for "probable alcoholic," or "pre-alcoholic." Kelleher (1971), on the other hand, offered no definition of "alcoholic" or "social drinker" at all. It is likely that this lack of definitional clarity contributed to discrepancies in the proportion of DWI offenders reported to have serious alcohol-related problems.

Disparities may also be due to differences in sampling characteristics. Kelleher's (1971) sample was more randomized, and was further distinguished by the fact that it consisted of 18% known multiple offenders. Because referral was left up to the discretion of a municipal-court judge in Selzer et al.'s (1963) study, selection bias cannot be ruled out. It is possible that a larger proportion of offenders with serious alcohol-related problems may have been included in this sample.

A further dilemma making comparisons between these studies difficult is the fact that neither investigator utilized blinded interviews. This is especially problematic given the apparent subjectivity involved in differentiating between

alcoholic and non-alcoholic DWI offenders in both studies. Given these overall limitations, neither of these studies can be considered definitive in terms of estimating the incidence of alcohol-related problems among DWI offenders.

Recognizing the difficulties involved in investigating the incidence of alcohol-related problems in DWI offenders without a valid means of measuring this construct, investigators began to develop and utilize consistent and quantifiable methods for the detection of alcohol-related problems. In the late 1960's, Selzer (1971) developed the Michigan Alcoholism Screening Test (MAST) in order to detect alcoholism among drivers involved in alcohol-related collisions.

The MAST consists of 25 questions on various alcohol-related experiences. Selzer (1971) regarded a score of 4 as "suggestive of alcoholism," and a score of 5 or more as "presumptive evidence of alcoholism." The validity of the MAST has been substantiated by comparisons with record data and other diagnostic tests (Selzer, 1971).

In an effort to determine whether non-professional personnel could effectively use the MAST to detect alcoholism in an agency setting, Selzer, Vanosdall, and Chapman (1971) administered the instrument to a group of 838 problem drivers. These drivers were summoned by the Michigan Department of State for driver improvement interviews as a result of accumulating 12 or more points for traffic violations, or for involvement in multiple accidents within a two-year period. In addition to the MAST, driving records were obtained for each driver.

Using a criterion of four or more points on the MAST as indicative of a

substantial problem with alcohol, Selzer et al. (1971) found that 22% of the entire problem-driver sample were at least "probable alcoholics."

In further analyses, Selzer et al. (1971) isolated those subjects who had at least one prior conviction for DWI (N=144). Compared to the total sample, a significantly greater proportion of these drivers scored in the alcoholic range on the MAST (i.e., 69%).

Yoder and Moore (1973) also conducted an early study in which attempts were made to distinguish first offenders from recidivist offenders. Their sample consisted of 201 consecutive men and women remanded to a rehabilitation course for first-time DWI offenders, and 68 consecutive men and women court-ordered to attend a rehabilitation course for repeat offenders. In addition to the MAST, demographic profiles and subjective measures of alcohol-related problems were also gathered. The mean age of first-offenders was 37.3, compared to 40.3 for repeat-offenders. This difference was reportedly non-significant.

Results revealed significantly higher MAST scores for repeat-offenders than for first-offenders. Additionally, significantly more repeat-offenders than first-offenders were considered alcoholic at a discriminate score of 5 on the MAST (87% vs. 69%, respectively).

From these results, Yoder and Moore (1973) concluded that a majority of first-time and repeat DWI offenders were alcohol dependent, although the incidence of alcoholism appeared to be significantly greater among recidivist

drinking drivers. Although this statement is consistent with Kelleher's (1971) conclusions regarding recidivist offenders, caution must be exercised in interpreting the results of this and any other study utilizing the MAST to estimate alcohol-related problems in DWI-offender populations. According to Vingilis (1983):

Two [MAST] questions, worth two points each, query frequency of arrest because of drunk behavior and drunk driving or driving after drinking. A first-time offender, feeling badly about his drinking and endorsing none of the of the other questions, could obtain a total score of 5... Consequently, researchers using the MAST as a definition of alcoholism for drinking-driving populations may be plagued with a high proportion of falsely positive identifications (p.303).

This apparent confound is especially problematic for Yoder and Moore (1973) who found significantly more repeat offenders to be alcoholic according to the MAST. Because of its design, repeat offenders would be expected to obtain higher MAST scores simply by virtue of the fact that they had been charged more frequently with a DWI offense. This also applies to Selzer et al.'s (1971) study.

Similar problems exist with the Mortimer-Filkins Inventory (MFI), another instrument used to detect alcohol problems among drinking drivers (Filkins, Mortimer, Post, & Chapman, 1973). Fewer studies have employed this instrument, however, due to its length, difficulty in scoring, and questionable validity (Miller, & Windle, 1990; Vingilis, 1983).

Considering the limitations in using instruments such as the MAST and the MFI with DWI samples, several researchers have included more direct,

behavioral measures of drinking, such as quantity and frequency of alcohol consumption. In addition, researchers began incorporating non-offender control groups in their studies to better understand the risk factors associated with DWI.

Quantity-Frequency of Alcohol Consumption

Before reviewing studies that have utilized quantity and frequency (Q/F) measures for determining the incidence and severity of alcohol-related problems in DWI offenders, 2 large-scale surveys of alcohol consumption among the general public will be described. These surveys will provide a context within which to assess the relationship between quantity and frequency of alcohol consumption, and the experience of alcohol-related problems.

Hilton (1987) presented results of a 1984 general survey of alcohol use of 5,000 adults over the age of 18 living in households within the contiguous United States.

From quantity, frequency, and pattern of alcohol use data, respondents were assigned to various categories on an alcohol consumption continuum, ranging from abstainers to frequent heavy drinkers (i.e., consumption of five or more drinks in a single day at least once a week). Additional data collected in a one-hour structured interview allowed researchers to compute two scores for drinking problems: one for problematic drinking, and one for tangible consequences of drinking.

Problematic drinking was characterized by drinking behavior indicative of

alcohol dependence. These behaviors included unsuccessful attempts to cut down on drinking, experience of memory loss or tremors after drinking, morning or binge drinking, etc.

Tangible consequences of drinking consisted of specific problems that often arise because of alcohol consumption. These included interpersonal problems, vocational problems, legal problems, and health problems. Both problematic drinking and tangible consequence scores ranged from minimal to severe.

Results revealed that individuals who drank 5 or more drinks in a single day at least once per week reported significantly more problems in all areas than drinkers in any other consumption category. These findings were similar for both males and females. Of men identified as being frequent heavy drinkers, 75% reported a moderate degree of problematic drinking, and 63% reported a moderate level of tangible consequences. The corresponding figures for women were 53% and 54%, respectively.

In another large-scale study, Knupfer (1984) combined data from nine population samples in order to compare different subgroups as to the prevalence of drinking problems among high "frequency of intoxication" drinkers. One aim of Knupfer's study was to ascertain a general consumption cutoff above which individuals reported the experience of intoxication and/or the experience of social disapproval. From collected data, several indicators of consumption and frequency of intoxication were constructed. In addition, indicators of social disapproval and personal concern over drinking were utilized.

With respect to consumption cutoffs, results indicated that eight or more drinks per drinking occasion was the minimum intake level most likely to lead to intoxication with the highest risk of encountering social disapproval. In addition, 73% of those individuals who drank eight or more drinks once per week or more reported being personally concerned about their own drinking.

In sum, results reported by Hilton (1987) suggest that consumption of 5 or more drinks per day at least once per week is a useful indicator of problematic drinking and/or the experience of tangible consequences of one's drinking. Knupfer's (1984) findings suggest that the consumption of 8 or more drinks per day at least once per week is associated with drinking problems severe enough to warrant both social disapproval and personal concern.

While these studies are not directly related to drinking and driving, they are included here because they establish empirically-derived guidelines by which to assess studies utilizing Q/F measures in investigations of alcohol-related problems in DWI offenders.

Comparing DWI Offenders With Other Populations on Q/F Measures

Wilson and Jonah (1985) surveyed 2,000 households in an attempt to identify characteristics of impaired drivers amongst the general driving population.

All respondents were classified into one of three groups. The 52% of drinkers who stated that they had not driven after drinking any alcohol within the past month were classified as "non-drink-drive" (NDD). The 35% of drinkers who

indicated that they had driven after drinking on one or more occasions, but had not driven impaired were classified as "drink drive" (DD). The 13% of drinkers who admitted to driving on one or more occasions when they thought they may have been legally impaired were classified as "driving while impaired" (DWI).

Results of comparative analyses revealed that the DWI group consumed significantly more alcohol in the past 7 days than either the NDD or DD groups. In a regression analysis, alcohol consumption was found to be the single most powerful predictor of impaired driving. It alone accounted for more of the 36% explained variance than the remaining variables combined.

Amount of alcohol consumed was also shown to be an important variable in distinguishing DWI offenders from general, licensed drivers in a later study conducted by these investigators. Jonah and Wilson (1986) examined the drinking patterns of convicted DWI offenders, admitted but never convicted impaired drivers, and a group of general, licensed drivers. DWI offenders reported drinking almost twice as many drinks on the last drinking occasion as the other two groups. In addition, the convicted DWI offenders reported more alcohol-related problems (e.g., employment, family), and more physiological symptoms of alcohol dependence (e.g., blackouts, delirium tremens), than did drivers in the other groups. Significantly, the admitted impaired drivers reported consumption of more drinks per drinking occasion and more alcohol-related problems than the non-impaired group.

Selzer and Barton (1977) attempted to depict precisely how often and how

much alcohol DWI offenders consumed in comparison to a group of general, licensed drivers and a group of identified alcoholics. The drinking-driver group (Group D) consisted of 306 individuals who were convicted of a DWI offense and required to participate in counseling programs as a function of their probation. The 294 subjects who comprised the alcoholic sample (Group A) were drawn equally from in-patient and out-patient alcoholism treatment programs in several Michigan cities. All clients admitted to these programs during a four-month period were required to fill out the questionnaire. There were no significant differences between the in-patient and out-patient groups on any of the variables measured. The control group (Group L) consisted of 253 drivers from several Michigan counties who were offered \$3.00 to fill out the questionnaire after routine renewal of their license. Fifty percent of those drivers approached agreed to participate.

Results revealed significant differences between groups on measures of quantity and frequency of alcohol consumption. On a twenty-one point scale measuring frequency of consumption that ranged from "never" to "almost every day," DWI offenders ($M=11.27$) scored only slightly higher than licensed drivers (10.62). Both groups drank significantly less frequently than the alcoholic group ($M=13.16$).

Significant differences were also observed between groups with respect to amount of alcohol consumed per drinking occasion. DWI offenders drank less hard liquor per occasion ($M=4.55$ ounces) than the alcoholics ($M=8.83$ ounces),

but significantly more than the licensed drivers ($M=2.53$ ounces). The same pattern was observed in beer consumption, with DWI offenders drinking less beer ($M=5.00$ glasses) than the alcoholic sample ($M=8.13$ glasses), but more so than the licensed drivers ($M=2.73$ glasses). Thus, while the DWI and general, licensed groups were similar with respect to their frequency of drinking, DWI offenders consumed significantly greater quantities of alcohol per drinking occasion.

In a more recent study, Gruenwald, Stewart, and Klitzner (1990) examined the drinking patterns of first-time DWI offenders using two separate Q/F dimensions. The first, drinking frequency, measured the number of occasions during the past month and the past year on which a respondent consumed one or more, four or more, or eight or more alcoholic drinks. The second dimension, continuation, measured the proportion of times the respondent went on to drink four or more drinks whenever he or she started drinking. For each dimension, subjects were asked to make direct magnitude estimates of their alcohol use.

In addition to Q/F scores, the 25-item Alcohol Dependence Scale (ADS; Skinner & Allen, 1982) was administered to all offenders. The ADS measures impairment due to the use of alcohol in social, psychological, and physical domains of life functioning.

Data for Gruenwald et al.'s (1990) study came from a state-wide survey of first-time DWI offenders in California who were court-ordered into educational and/or rehabilitative treatment as a condition of probation. Each participant was

asked to fill out a brief battery of questionnaires during their first treatment session. Each battery contained the alcohol measures described above, as well as questions concerning socio-demographic status. A total of 4, 487 offenders (75% of all participants approached) agreed to fill out the questionnaire.

In comparison to Skinner and Horn's (1984) alcohol-treatment samples, first-time offenders in the present study demonstrated far fewer alcohol-related problems. Whereas median scores for Skinner and Horn's (1984) samples ranged from 14 to 28, the median score of first-offenders was 4.

Additional analyses revealed that both frequency of consumption and continuation of consumption were independently and significantly related to scores on the ADS. Those subjects who drank more often and those subjects who exhibited higher continuation ratios reported more alcohol-related problems. The interaction of the two measures was significant as well, indicating a synergistic effect of the two consumption measures upon the appearance of alcohol problems.

Although a positive association was found between frequency and continuation scores, only 0.2% of the variance in ADS scores was shared between the two measures, an indication that the two dimensions were independent of one another. It was discovered that similar levels of alcohol problems could be produced by disparate patterns of alcohol consumption. For example, subjects who drank infrequently (37 times per year), but who drank heavily, were likely to obtain scores on the ADS that were similar to subjects

who drank frequently (183 times per year), but with less likelihood of continuation.

Another interesting relationship revealed was that drinkers with high continuation ratios were unlikely to have higher levels of alcohol problems unless they also reported higher frequency. Conversely, frequent drinkers were not likely to obtain high levels of alcohol problems unless their continuation ratios were also high. Higher scores on the ADS were obtained by individuals who had substantial scores on both dimensions.

Finally, the full range of ADS scores were not predictable from self-reported alcohol use patterns. Although 14% of all subjects scored 11 points or above on the ADS, the measures of alcohol consumption alone were not sufficient to predict these more severe levels of alcohol problems.

Summary of Alcohol-related Characteristics of DWI Offenders

To summarize, DWI offenders appear to suffer more severe and a greater range of alcohol-related problems than groups of control drivers and admitted but never convicted impaired drivers, but less so than groups of identified alcoholics. Comparative studies reveal that amount and frequency of alcohol consumption, indices of alcohol dependence, and negative consequences of drinking are important variables to consider when differentiating amongst groups of DWI offenders and/or other groups of drivers. Although frequency of consumption was comparable between a homogenous group of DWI offenders

and a group of control drivers (Selzer & Barton, 1977), significant differences were found on this variable when discrete groups of offenders were compared (Argeriou et al., 1986).

The few early studies that differentiated between first-time and multiple offenders generally found the latter to have more severe alcohol-related problems (Kelleher, 1971; Selzer et al., 1977; Yoder & Moore, 1973). Although measures used in these investigations confounded alcohol dependence with drinking and driving offenses, more recent recidivist studies utilizing behavioral indices of alcohol abuse, lend support to their conclusions.

Argeriou, et al., (1986) utilized quantity/frequency measures to examine characteristics of male and female first- and second-time DWI offenders adjudicated in the state of Massachusetts between July, 1983 and June, 1984.

Results revealed significant differences between first- and second-time male and female offenders on most variables studied. In particular, second-time, male offenders were found to drink more days per month ($M=10.6$) than first-time male offenders ($M=8.9$), and to consume more drinks per drinking occasion ($M=6.3$) than first-time offenders ($M=4.4$). Similar trends were found for females, with second-time offenders drinking 8.5 times per month and consuming an average of 5.3 drinks, compared to 6.9 times per month and 3.8 drinks per drinking occasion for first-time offenders.

Perrine (1990) reported generally similar findings derived from a large-scale research program aimed at determining the rates of drunken driving among the

U.S. public. The study compared both first- and multiple-DWI-offender males with male drivers from the general population. All subjects participated in an extensive 2-hour interview consisting of items that focused on drinking and driving information and attitudes.

Results revealed that convicted DWI offenders were heavy drinkers compared to the general driving population. Perrine defined heavy drinking as the consumption of 5 or more drinks at one sitting. Approximately 10 percent of the general drivers reported consuming 5 or more drinks per drinking occasion, whereas 40% of first-time DWI offenders, and 60% of multiple DWI offenders reported drinking at this level.

In comparing groups of treatment-seeking male volunteers subdivided into groups of 0, 1, and 2-or-more-time DWI offenders, MacDonald and Pederson (1990) found that increases in DWI arrests occurred with increases in typical number of drinks consumed per drinking day (i.e., 12.8 vs. 12.4 vs. 15.2, respectively). Furthermore, increases in total number of DWI arrests was associated with decreases in frequency of drinking. Although the authors interpreted these findings as an indicator that multiple DWI offenders are more likely to be "binge" drinkers, examination of actual mean drinking days for each group suggests that this conclusion is questionable. In effect, zero-time offenders reported drinking 5.94 days per week, as compared to 5.63 and 5.28 days for one- and two-or-more-time offenders, respectively.

Drug Use Characteristics Among DWI Offenders

Nature and degree of drug involvement has also been associated with risk of DWI (Argeriou et al., 1986; Elliott, 1987; Wilson and Jonah, 1988). Elliott (1987) examined the relationship between drug use and DWI in a cohort of individuals between the ages of 18-24. Data were obtained from the National Youth Survey (NYS), an ongoing, prospective study of delinquency, crime, and other forms of problem behavior in American youth.

The original NYS sample included 1,725 11-17 year olds who were drawn from a probability sample of households in the U.S. in 1976. Comprehensive measures of delinquent behavior, substance use, and problems related to substance use were obtained annually over an eight year period for each subject. In each survey, questions were asked about the personal use of 7 substances during the past year including, alcohol, marijuana, hallucinogens, amphetamines, barbiturates, cocaine, and heroin.

Results of the 1983 follow-up revealed that both frequency and prevalence rates of DWI varied by type of drug user. The self-reported prevalence rate for DWI was twice as great for multiple illicit drug users as for persons who used alcohol only (69.8% vs. 34.7%). Additionally, multiple illicit drug users reported drinking and driving over four times more frequently than subjects who used only alcohol.

These findings are consistent with those of Selzer and Barton (1977), and Selzer et al., (1977) who examined the relationship between DWI and illicit drug

use in two studies described earlier. In these two investigations, convicted impaired drivers were found to be intermediate between alcoholics and general licensed drivers with respect to prescription drug use, but were significantly more likely than either of the other groups to use illicit drugs.

Argeriou, et al., (1986) also indirectly examined characteristics of drug "use" in male and female first- and second-time DWI offenders, by analyzing frequencies of drug-related arrests. Results revealed that the proportion of second-time male and female DWI offenders who "abused" drugs was three times greater than the proportion of drug abusers among first-time male and female offenders. Caution must be used in interpreting these findings, however, as drug-related arrests cannot be directly translated into an index of drug use problems.

Legal Involvement and DWI Offenders

Numerous studies have linked history of prior legal involvement with DWI arrests as well. This history, which includes charges of both major and minor criminal conduct, will now be reviewed.

Traffic Violations and DWI Offenders

Research indicates that persons convicted of DWI have more moving violations and traffic collisions than non-offenders (Farrow, 1985; Perrine, 1975; Wilson & Jonah, 1985). Examining actual driving records, Perrine (1975) found

that during a 3-year period, convicted impaired drivers had more license suspensions, more crashes, and more traffic violations on record than did a group of drivers from the general population. Likewise, Tashima and Peck (1986) evaluated the 30-month pretreatment driving records of nearly 30,000 first-time, and 7,797 repeat DWI offenders. For first offenders, the mean number of moving violations was 1.3; for second offenders it was 1.4. These rates were more than twice the rates expected for a similarly stratified population of control drivers.

Wilson and Jonah (1985) found that self-admitted impaired drivers (DWI) reported considerably more traffic violations per miles driven than did drivers who drove after drinking but not while impaired (DD), and/or those who never drove after drinking (NDD). While the NDD and DD groups had similar violation rates, (0.24 and 0.20, respectively), the DWI group had a violation rate of 0.54, more than double that of the others. A similar trend was found for reported accident involvement. Within the previous year, 12.15% of the DWI group had been involved in at least one accident, compared to 5% of the DD group, and 3.7% of the NDD group.

Consistent with these findings are the results of a study by Farrow (1985). Using self-report measures, he found that young drivers (aged 16-19) who drove after drinking were more likely to report traffic citations such as speeding than non-impaired drivers.

In sum, individuals arrested for DWI often have a history of license

suspensions, traffic crashes, and serious traffic-related offenses other than arrests involving drinking and driving. The driving records of DWI offenders include more overall violations (speeding, reckless driving, and driving with a suspended or revoked license), and more traffic accidents than are found in the general driving population.

Criminal Offenses and DWI Offenders

In addition to increased traffic-related violations and collisions, the presence of prior and often marked criminal involvement has been established as a stable descriptor of individuals arrested for DWI (Argeriou et al., 1985; Beerman, et al., 1988; Gould & MacKenzie, 1990; Hoffman et al., 1987; Lucker et al., 1991; Waller, 1967).

Results of a demographic analysis of 13,089 DWI offenders serving time in U.S. jails in 1983 revealed that approximately 75% of incarcerated DWI offenders had previous convictions for a variety of crimes, including DWI (Greenfeld, 1988). Furthermore, about 48% of jailed offenders had one or more previous convictions for DWI.

In an in-depth, descriptive study, Argeriou et al. (1985) investigated the nature and extent of criminal behavior among 1,406 randomly selected DWI offenders who were residents of Massachusetts during 1976 and 1977. Arraignment histories were obtained from official records during 1980 and 1981 to allow a minimum 3-year follow-up period after the target DWI arrest.

Six major categories of offense were identified in the background histories of the DWI offenders. These included crimes against persons, crimes against property, sex crimes, drug crimes, public order offenses, and traffic offenses. DWI offenses were categorized separately.

Results revealed that approximately three-quarters of the DWI offender sample (76.5%) had some prior involvement with the legal system, and over half had been arraigned for offenses other than or in addition to traffic or DWI.

The most frequently cited offenses involved serious traffic violations (59.0%), which included driving without a license, operating to endanger, speeding, etc. Over one-third (34.4%) of the sample had been arraigned for public order offenses. Property offense arraignments were found in 29.3% of the subject's criminal histories. Most often the specific offense was theft (18.1%), or vandalism (14.5%). Just over one-quarter (27.7%) of the sample had been previously arraigned for DWI.

Arraignments for offenses against persons were found among 19.1% of the DWI offenders. Most frequently the offense involved physical assaults (12.5%). Arraignment for possession or use of drugs was found in 12.3% of the sample.

With the exception of traffic offenders (27.9%), there were few "pure type" offenders. In general, criminality of one type tended to be associated with criminality of another. For instance, only 4.5% of those arraigned for a person-type offense had not been arraigned for another type of offense.

Significantly, the more extensive the history of prior criminal involvement, the

greater the rate of DWI recidivism over 3 years of follow-up. Although individuals with no priors of any kind were similar in age to individuals with criminal, traffic, and DWI priors combined (32.7 vs. 32.8), subjects in the latter group were 3 times more likely to be recidivists.

A number of investigators have compared DWI offenders to other sub-populations, allowing for a better understanding of the nature and degree of criminal involvement. Waller (1967) compared criminal histories of 150 DWI offenders with equal numbers of sober drivers involved in accidents, drivers with moving violations only, and incident-free drivers.

Results revealed that 78% of the DWI offenders had been arrested for a non-traffic related offense compared to 33.3% of the sober drivers involved in accidents; 28.2% of drivers with moving violations; and 14.7% of incident-free drivers. In terms of specific crimes, DWI offenders were more likely to be arrested for crimes involving violence, theft, drug use, and non-support of family than were members of the other three groups.

Hoffman, et al., (1987) compared the characteristics of 543 court-referred DWI offenders with 827 non-DWI and non-court-referred clients in the same outpatient substance abuse treatment program. Both groups were examined on demographic variables, prior legal involvement, and several other variables for the year prior to treatment via a self-report questionnaire.

Results revealed that the DWI offenders were more likely than non-DWI substance abuse clients to be male, single and young. Seven percent of

Hoffman et al.'s (1987) DWI sample were female compared to 29% of the non-DWI treatment sample. DWI offenders were almost twice as likely to be single as the non-DWI clients (41% vs. 22%). Finally, the greatest proportion (39%) of the DWI sample was under 25 years of age as opposed to 22% of the non-DWI group.

In the legal domain, the DWI group had far more total arrests than the non-DWI group. The 543 DWI subjects had 933 arrests, compared to 197 arrests reported for the approximately 123 non-DWI subjects in the year prior to treatment.

More revealing was the finding that the DWI group as a whole had a higher percentage (23%) of arrests for non-chemically-related, misdemeanor offenses than the non-DWI group (10%). On more serious offenses, there were no significant differences, with 1% of both groups reporting a felony charge in the year prior to treatment.

It should be pointed out that both gender and age may have contributed to Hoffman et al.'s (1987) findings. There was a disproportionate number of young men in the DWI sample in comparison to the non-DWI sample. Thus, the higher percentage of arrests for DWI offenders may have been due to the greater proportion of young males in this group. A more informative analysis would require controlling for the effects of age and gender, either through restriction of sample or through special analyses.

In a more recent study, Gould and MacKenzie (1990) compared the criminal

histories of 723 male DWI offenders arrested in Louisiana in 1985, with 723 general, licensed drivers. Arrests for a period of 6 years prior to 1985 were examined. Initial comparisons found DWI offenders to be significantly younger than controls (32.8 years vs. 34.4 years). Gould and MacKenzie (1990) viewed this as a non-meaningful difference and did not control for age in subsequent analyses.

Results revealed that a greater proportion of DWI offenders had had prior involvement with the criminal justice system for offenses other than DWI's or traffic violations than controls (63.4% vs. 10.8%). During the six-year period for which data was collected, there were 1,447 arrests recorded for both groups. Of this number, the DWI sample accounted for 1,307 arrests. A breakdown by type of crime revealed that DWI offenders were more likely to commit violent crimes than general, licensed drivers. The reported ratio between DWI offenders and general drivers for violent crimes was 18 to 1, while the ratio for non-violent crimes was 6 to 1.

Thus far, descriptive studies and studies employing a variety of comparison groups indicate that, as a whole, DWI offenders are more likely than any other group to commit both serious and misdemeanor offenses. Furthermore, it has been shown that crime of one type is usually associated with crime of another, and that there are few "pure type" offenders, aside from traffic violators. Finally, there is evidence to suggest that multiple offenders are more likely to be involved in more extensive criminal activity than non-recidivist drinking drivers.

With the exception of Argeriou et al. (1985), few attempts have been made to distinguish between type or degree of criminal involvement and DWI arrest status. Thus, it is difficult to determine whether or not particular risk factors are associated with different categories of drinking drivers based upon arrest status.

This issue has been addressed in two recent studies, however. Beerman et al., (1988) attempted to identify biographical variables and factors of arrest circumstances that differentiated between drinking drivers according to their total number of DWI offenses.

Their sample consisted of 338 male and 59 female offenders who received a DWI citation in Benton County, Oregon in 1983. Driving records and arrest histories were obtained and examined retrospectively for a 10 year period, and followed for two years thereafter. A total of 174 subjects had only one DWI offense; 96 subjects had two; 43 subjects had 3 drinking and driving offenses, and 35 subjects had 4 or more.

An examination of criminal histories revealed a linear relationship between number of major and minor violations committed and group membership, with drivers convicted four or more times with DWI committing the greatest proportion of major and minor crimes.

Minor violations included public order offenses, destruction of property, resisting arrest, trespass, shoplifting, and false identification. Major offenses included theft, forgery, assault, parole violations, auto theft, writing bad checks, homicide, arson, illegal alien, and assault with a deadly weapon. With respect to

driving history, the group of drivers with the least number of moving and non-moving violations was the group with four-or-more DWI's. The group with a correspondingly larger number of moving and non-moving violations was the group with two DWI offenses. Although contradictory, one explanation for this finding is that offenders with three and four or more DWI convictions are more likely to have had driving privileges revoked, and thus, either drive less frequently and/or drive more carefully than drivers with a valid license.

Results of multivariate analyses revealed that six variables were significant with respect to predicting group membership. In order, these variables were number of minor criminal offenses, number of major criminal offenses, total number of moving violations, refusal of BAL test at time of arrest, possession of a controlled substance, and time of arrest. Together these variables accounted for 37.75% of the total variance in predicting number of DWI offenses.

Beerman et al.'s (1988) work supports the growing notion that the population of drinking drivers is a heterogeneous one, and that it is useful to differentiate DWI offenders by the number of prior DWI convictions. This contention was given further support in a recent study by Luckner et al., (1991), who compared the arrest records of three groups of male, U.S. army soldiers matched for ethnicity and military rank.

The first group consisted of 76 soldiers who had been apprehended for DWI, completed a 5-day residential treatment program, and were subsequently re-arrested between January, 1985 and December, 1987. Their mean age was 24.8

years. The second group was composed of 76 soldiers arrested once for DWI who also completed the residential treatment program. The mean age for this group was also 24.8 years. The third group consisted of randomly selected soldiers with no previous history of DWI. Their mean age was 25.4 years.

For all soldiers, arrest histories were obtained from military police files. Arrest categories were established similar to those used by Argeriou et al. (1985), and comparisons were made across groups. Results revealed that DWI offenders in general had significantly more arrests than non-offenders, and that two-time offenders had significantly more arrests than one-time offenders.

Other analyses revealed that as a group, DWI offenders were significantly more likely than controls to be multiple criminal offenders, and to have arrests involving traffic violations, crimes against persons, property, and public order offenses, in that order. Two-time offenders were significantly more likely than one-time offenders to have been arrested for crimes against persons and property, sex crimes, and possession of a controlled substance, in that order. Differences in the number of traffic violations and public order offenses between these two groups were not significant.

Together, these two studies corroborate earlier findings, indicating that individuals arrested for DWI are at greater risk for deviant, criminal behaviors than are non-DWI control groups. Additionally, these investigators extended earlier work by revealing the existence of a linear relationship between number of DWI offenses and nature and extent of criminal involvement. In effect, a

greater proportion of crimes and more serious crimes are committed by offenders with multiple DWI offenses.

Psychological Characteristics of DWI Offenders

The psychological variables that appear most generally related to DWI will be described in this section of the review. Several variables found to be associated with DWI are representative of an aggressive, antisocial personality. Other variables commonly identified include depression, and low self-esteem.

Psychological Correlates of DWI

Multiple psychological characteristics associated with DWI were investigated in a study by Donovan et al., (1985), who compared three groups of male drivers in the state of Washington. Group one was composed of 172 individuals arrested for DWI. Group two consisted of 193 high-risk drivers (HRD) who had received multiple non-alcohol-related violations and/or who had been involved in traffic accidents. Group three consisted of 154 men representing the general driving population (GDP) who were recruited during routine renewal of their driver's license. Mean ages for the three groups were 36.9, 28.1, and 45.1, respectively. All subjects completed a questionnaire assessing demographic, drinking, driving, and personality features.

Results revealed that DWI offenders and high-risk drivers were very similar with respect to psychological profiles, with both groups exhibiting significantly

more maladaptive features than the general driving population. GDP group members were significantly less depressed, better adjusted emotionally, less sensation-seeking and less external in their perception of control than either the HRD or DWI subjects. In addition, the GDP group had significantly lower scores on measures of verbal hostility, assaultiveness, and resentment than the other two groups. On all of the above measures, the DWI and HRD groups did not differ significantly from each other.

Given the similarities between the high-risk and DWI-offender groups, Donovan et al. (1985) concluded that they may represent subsets of a larger population of high-risk drivers who share a constellation of traits that enhance driving risk with or without the presence of alcohol.

Although this is a reasonable conclusion, it should be pointed out that the HRD group was significantly younger than the DWI group, and youthfulness alone has been identified as a risk factor for high-risk driving (Moskowitz, 1987; Wilson & Jonah, 1988). Thus, while these groups shared personality characteristics that appeared to enhance driving risk, it remains to be seen whether or not they experienced them for the same or for different reasons.

In an earlier study, Selzer and Barton (1977) utilized a self-administered questionnaire to compare the psychological profiles of a group of 306 men convicted of a DWI offense with 294 identified alcoholic men in treatment, and 253 control drivers. Utilizing a variety of established personality measures, scores were derived for neuroticism, self-esteem, self-control, responsibility,

paranoid thinking, depression, and aggression.

Results revealed significant differences between all three groups with respect to neuroticism, self-esteem, self-control, and depression. In all cases, mean scores for the DWI offender group fell between the other two groups' mean scores. With respect to aggression and responsibility, DWI offenders and alcoholics were very similar to each other, with both showing significantly more aggressive features and significantly lower levels of expressed responsibility than general, licensed drivers.

In a similar study, Selzer, et al., (1977) explored differences and similarities in the psychological profiles of groups of convicted DWI offenders (N=306), general, licensed drivers (N=269), and identified alcoholics in treatment (N=289). A self-developed questionnaire was administered to all subjects that included measures of self-esteem, depressed mood and frequency of associated symptoms, paranoid thinking, and aggression.

Results revealed significant mean differences between all three groups on all of the above personality characteristics. In effect, the DWI offenders were more depressed than the controls, but less so than the alcoholics. They had lower self-esteem and more paranoid and aggressive tendencies than the controls, but were less extreme on all three measures than the alcoholics.

As with most investigations of DWI offenders, the studies reviewed thus far have combined subjects with varying numbers of DWI arrests into homogenous groups for comparisons with other non-differentiated, special populations.

Implicit in this practice is the suggestion that the individuals comprising groups of identified alcoholics, high-risk drivers, and DWI offenders are essentially alike with respect to the variables of interest.

It is conceivable that identified alcoholics with and without prior DWI's differ with respect to scores on important psychological variables of interest. Likewise, multiple DWI offenders may have significantly higher scores on particular variables of interest than both non-offenders and many first-time offenders. These findings would have implications for the assessment and treatment of discrete groups of offenders as well as for the prediction of recidivism.

Only one study has been identified that attempted to explore relationships between various psychological characteristics and drinking drivers grouped by arrest status (MacDonald and Pederson, 1990). The sample utilized by these investigators consisted of 258 hospitalized male alcoholics subdivided into three groups based upon number of DWI arrests within the past 10 years. Group one consisted of 120 men with no DWI arrests; group 2 consisted of 56 men with one DWI arrest; and group 3 consisted of 62 men with 2 or more arrests.

Each subject completed a questionnaire measuring a number of psychological characteristics including aggression, harm avoidance, impulsivity, responsibility, depression, self-esteem, disrespect for authority, and undesirable life events.

Results of comparisons between groups revealed that subjects with two or more arrests had higher scores on "Disrespect for Authority" than subjects with

one arrest, and subjects with two or more arrests had higher "Undesirable Life Events" scores than subjects with zero arrests. Additionally, subjects with one arrest scored higher on Responsibility than subjects with zero arrests or multiple arrests. None of the remaining psychological variables were significantly related to DWI arrest status.

Aside from the few significant differences obtained, the results of this study were inconsistent with the notion that multiple offenders suffer more personal and social maladjustment than non-offenders and one-time offenders. However, the lack of significant differences may have resulted from inadequate sampling. Although the investigators attempted to achieve broad representation by recruiting subjects from both an out-patient and an in-patient treatment facility, MacDonald and Pederson's (1990) study was characterized by a relatively small number of recidivist DWI offenders. Furthermore, regardless of group membership, all subjects appeared to be relatively heavy drinkers. The effect of these methodological issues on obtained results is unknown, and merits further investigation.

Chapter 3

STATEMENT OF THE PROBLEM

A significant amount of research has been directed toward the identification of risk factors associated with dangerous drinking and driving. Studies have ranged from simple descriptive efforts to rather complex investigations of this population. While a good deal of variability exists with respect to sampling, to research designs, data collection procedures, and to the treatment of confounding variables, research findings have generally been consistent with respect to the identification of several important risk factors associated with drinking and driving.

In terms of socio-demographic characteristics, DWI offenders tend to be predominantly male, high-school educated or less, who are either employed in blue-collar occupations, or not employed at all (Perrine, 1975; Perrine et al., 1989). In addition, they are more likely to be separated or divorced than are samples of general, licensed drivers (Selzer and Barton, 1977; Yoder, 1975).

In terms of substance abuse, risk factors include problematic amount and frequency of alcohol consumption, as well as indices of alcohol dependence. Furthermore, DWI offenders are also more likely to use illicit drugs than are groups of general, licensed drivers (Elliott, 1987; Kelleher, 1971; Miller & Windle, 1990; Wilson & Jonah, 1985).

Prior criminal involvement has also been established as a stable descriptor of DWI offenders. Risk factors in this domain include numerous moving violations, as well as a history of arrests for major and minor criminal offenses (Argeriou, McCarty, & Blacker, 1985; Clay, 1972; Donovan et al. 1983; Donovan et al., 1985; Gould & MacKenzie, 1990).

Finally, DWI offenders are more likely than general, licensed drivers to possess psychological characteristics indicative of personal maladjustment. These characteristics include: (1) emotional instability, (2) hostility, (3) depression, (4) feelings of inadequacy, and (5) paranoid ideation (Donovan & Marlatt, 1982; Selzer & Barton, 1977; Selzer et al., 1977).

Taken together, the above characteristics establish a picture of what may be viewed as the "average" DWI offender. It has been quite common for researchers in this field to combine offenders with varied arrest histories into homogenous groups prior to correlational and/or comparative analyses. Unfortunately, this widespread practice has limited the understanding of recidivism by blurring meaningful distinctions that may have existed between offenders with different arrest histories.

In more recent years, investigators have begun to compare risk-factor profiles of discrete groups of DWI offenders distinguished by total number of arrests, (Argeriou et al., 1986; Beerman et al., 1988; Lucker et al., 1991; MacDonald & Pederson, 1990), and important differences have emerged. In particular, when compared to one-time offenders, multiple DWI offenders tend to be less well

educated, are more likely to be divorced/separated, have greater alcohol-related problems, use multiple illicit drugs, and are more likely to have arrest histories reflecting major and minor criminal involvement.

The one study that investigated differences in psychological characteristics between groups of non-offenders, single offenders, and multiple offenders found few significant differences between the groups on variables of interest (MacDonald & Pederson, 1990). Results of this study require confirmation, however, as the sample employed was small and rather extreme in terms of age and drinking-related characteristics.

Ultimately, the convergence of evidence calls into question the representativeness of the "average" DWI offender profile for all drinking-driving offenders. Results of recent recidivist studies seem to suggest that it is the repeat offender who is most likely to be characterized by alcohol-related problems, personal maladjustment and social deviance (Argeriou et al., 1986; Beerman et al., 1988; Lucker et al., 1991). Nevertheless, methodological problems exert constraints upon these studies as well.

For instance, a thorough investigation of the relationship between alcohol consumption, personal maladjustment, social deviance, and arrest status requires simultaneous assessment of multiple domains of life functioning. Most multiple-offender studies have been limited in terms of variable representation by the nature of pre-existing data bases that have been employed (Argeriou et al., 1986; Beerman et al., 1988).

It is also noteworthy that reliance upon official data bases often distorts true group membership due to the dynamic process through which records are kept (Gould & MacKenzie, 1990). In effect, even though a DWI may be officially recorded, it is not kept on a driver's record indefinitely. Rather, violations are removed after a specified period of time, and this period may vary from state to state.

Furthermore, the common practice of plea bargaining affects the viability of official sources of data, (Yu & Willinford, 1991). To expedite the handling of cases, drinking-driving charges are often reduced to lesser offenses during the hearing process, and the lesser-offense convictions appear on official records

Inadequate sample size is another issue that has plagued a number of recidivist studies (Luckner et al., 1991; MacDonald & Pederson, 1990). There are inherent difficulties in obtaining large, representative samples of multiple DWI offenders. In general, they are fewer in number than first-time offenders, and they are less likely to be remanded to easily accessible educational and/or therapeutic programs

The proposed research will attempt to overcome some of these limitations by investigating differences in risk-factor profiles of a large group of DWI offenders, differentiated by arrest status. Furthermore, several relevant domains of life functioning will be considered simultaneously, including demographic characteristics, alcohol-related problems, drug-related problems, psychosocial issues, and social deviance. By addressing several important research

questions, it is hoped that the present investigation will contribute to the prediction of recidivism within the drinking-driving population, and augment current assessment and referral practices with this population.

Research Question 1:

What is the strength of the relationship between DWI arrest status and demographic characteristics indicative of personal instability, indices of alcohol-related problems, indices of drug-related problems, indices of psychological distress, and indices of social deviance?

In the present study, indices of alcohol-related problems include quantity of consumption, degree of alcohol dependence, and severity of recent alcohol-related problems. Drug-related problems are defined in terms of recent drug-problem severity and in degree of dependence. Indices of psychological problems include difficulties in interpersonal relations, and degree of general psychological distress. Indices of social deviance include traffic-related violations, crimes against persons, and crimes against property. Finally, demographic variables of interest include educational attainment, employment stability, and relationship status.

To address Research Question 1, five hypotheses were posed and tested.

Hypothesis 1

There will be a negative association between DWI arrest status and demographic variables of interest, including educational attainment, marital status, and employment stability.

Hypothesis 2

There will be a positive association between DWI arrest status and indices of alcohol-related problems, including recent problem severity, quantity of consumption, and degree of alcohol dependence.

Hypothesis 3

There will be a positive association between DWI arrest status and indices of drug-related problems, including recent problem severity, and degree of drug dependence.

Hypothesis 4

There will be a positive association between DWI arrest status and indices of psychological problems, including recent severity of interpersonal conflicts, and overall general distress.

Hypothesis 5

There will be a positive association between DWI arrest status and indices of social deviance, including numbers of traffic-related violations, crimes committed against persons, and crimes committed against property.

Research Question 2:

Does the relationship between DWI arrest status and respondent's demographic characteristics indicative of personal instability, indices of alcohol-related problems, indices of drug-related problems, indices of psychological distress, and indices of social deviance vary by respondent's admission status (i.e., court-ordered vs. voluntary)?

Research Question 3:

To what extent does a combination of demographic, alcohol, drug, psychological, social deviance, and admission status variables predict total number of DWI arrests?

In order to address Research Question 3, a sixth hypothesis was posed and tested.

Hypothesis 6

A combination of admission status, alcohol-, and drug-related problems, psychological, social deviance, and socio-demographic characteristics indicative of poor stability will predict total number of DWI arrests amongst a group of treatment -seeking males.

Chapter 4

METHODOLOGY

Background

Reported data were obtained from a longitudinal Health Care Study Project (HCSP) conducted at Michigan State University. Although, the primary objective of the HCSP was to evaluate the potential for adopting a wide-scale program of client-treatment matching in the state of Michigan, the design and implementation of the study appeared to allow for adequate investigation of the questions posed in the present study.

MSU Health Care Study Project (HCSP)

In order to address the viability of matching substance-abusing clients to differential treatment modalities, a total of 37 publicly-funded substance abuse treatment agencies within the state of Michigan were randomly selected to participate in the HCSP. From these agencies, 1,300 men and women were recruited for ongoing assessments of general functioning conducted at intake, and at 6, 12, and 18 month follow-up intervals.

Recruitment efforts required trained field assessors to personally contact eligible participants at the time of their intake or first treatment appointment. The HCSP attempted to obtain a cluster sample of clients at each program. The

cluster sample is a method of obtaining N number of participants within a specific time period, versus a randomized procedure. In practice, HCSP assessors contacted all eligible clients admitted to a particular program until the targeted number of clients was reached.

To be eligible for the HCSP, participants had to be 18 years of age or older, and have had alcohol as one of their primary substances of abuse. As an incentive to participate, participants received \$10.00 for the initial assessment, and \$20.00 for each of 3 follow-ups. Clients who agreed to participate were asked to sign an informed consent form, and arrangements were made to conduct the initial assessment within two weeks of their entry into treatment. The assessment involved the administration of a battery of instruments that required approximately one-hour of the client's time to complete.

Participants

Participants were 926 men recruited for involvement in the HCSP. To determine the number of drinking-driving offenses for each subject, self-report items from two separate instruments were utilized. Based upon the total number of self-reported, lifetime DWI arrests, participants were assigned to either a non-offender, first-offender, second-offender, or third-or-more-time offender group.

Instruments

As noted previously, all clients were assessed with a variety of measures upon intake into the HCSP. The assessment battery consisted of the Addiction Severity Index (ASI; McClellan, Luborsky, Woody, & O'Brien, 1980), a Quantity/Frequency measure of alcohol use within the past 30 days, the Alcohol Dependence Scale (ADS; Skinner & Allen, 1982), the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983), and the Drug Abuse Screening Test (DAST; Skinner, 1982).

Addiction Severity Index - The ASI is a structured, 45 minute interview designed to assess problem severity in seven domains of life functioning that are commonly affected by substance abuse. These include: medical status, employment status, drug use, alcohol use, legal involvement, family/social relations, and psychiatric status. In each of these domains, objective questions are asked intended to assess the nature and extent of problems experienced in both the client's lifetime, and in the past 30 days. The client also supplies two subjective scores for each problem area assessing recent (past 30 day) severity of problems, and the importance of additional treatment.

Two types of measures result from the data collected in each problem area of the ASI: (a) interviewer severity ratings, and (b) composite scores (McClellan, et al., 1980; McGahan, Griffith, Parente, & McLellan, 1986). Severity ratings are derived by the interviewer after each section, and are based upon a ten-point

continuum of problem severity. Within the ASI, severity is defined as the "need for additional treatment," and is measured by the number, duration, and intensity of problem symptoms. Although the severity ratings are subjective, the ASI is designed so that maximal use is made of the objective information provided by the client in formulating these ratings. In practice, the assessor first develops a three-point preliminary rating of problem severity for each objective section. The assessor then modifies his/her preliminary rating based upon the subjective scores obtained from the client. Thus, the rating method and the data upon which the rating is based are both standardized, thereby reducing inter-rater variation.

Composite scores are derived from sets of interrelated items capable of showing change within each problem area. The selected items are standardized and summed to estimate the client's status in each of the ASI problem areas. The composite scores are well related to the severity ratings ($r = .88$), and offer a more empirical evaluation of client status (McClellan et al., 1980).

Reliability and Validity of the ASI

In 1985, McLellan, Luborsky, Cacciola, Griffith, Evans, Barr, and O'Brien conducted a comprehensive assessment of the reliability and validity of the ASI. Three substance abuse treatment centers approved by the Joint Commission on Accreditation of Hospitals were selected to participate in the research based upon their diversity in patient populations. A total of 181 voluntary subjects were

recruited from these three centers at the time of their admission.

Concurrent Reliability

Concurrent reliability is the extent of agreement among different judges using the same information at the same time. To test the concurrent reliability of the ASI, McLellan et al., (1985) employed eight research technicians and treatment counselors as judges. Four of these judges had prior experience with the ASI, while the other four received a 4-day training and supervision course to instruct them in the use of the instrument.

For this study, 30 subjects (10 from each center) were randomly selected for interview by one of three randomly selected judges. Each interview was videotaped and subsequently viewed by the remaining 7 judges. The severity ratings for each of the seven problem areas were then compared among the judges and across all patients.

Concurrent reliability coefficients were calculated by using two methods. The Spearman-Brown formula assesses the ratio of variability within the judges' ratings, to the variability across all patients. With this method, the coefficients were very high, ranging from .94 (family) to .99 (drug). Since there were extreme differences among the substance abuse patients on status measures, McLellan et al., (1985) could not be certain that the obtained coefficients were not artificially elevated due to the low inter-judge variability relative to the high inter-patient variability.

To test this possibility, a second reliability calculation was performed which

entailed intercorrelating the ratings of the eight judges across all 30 patients on each of the ASI scales. These intercorrelations were then averaged to produce the mean product-moment correlations of the eight judges on each of the seven scales. Coefficients resulting from this method were lower and less uniform across the scales than the Spearman-Brown coefficients, and ranged from .74 (employment) to .91 (drug). Still, they indicated satisfactory reliability.

Test-retest reliability

Test-retest reliability measures the agreement on information collected at two separate times. The test-retest reliability of the ASI was assessed on a sample of 40 patients (McLellan et al., 1985). An initial ASI interview was performed on a subject, and then the subject was recontacted 3 days later for a second interview. In 15 of the cases the same judge conducted both interviews, while in the remaining 25 interviews a different judge performed the second interview. The 3-day interval was chosen because it was thought to be long enough to reduce the likelihood of a subject repeating answers from memory, but short enough to reduce the possibility of real changes in the patient's life-situations. The severity ratings as well as the information from the individual questions were compared between interviews, across patients, and across scales.

Results revealed very little discrepancy between interviews across all 40 presentations. No single item showed a discrepancy on more than 25% of the interviews and no single repeated interview showed a discrepancy on more than 10% of the items. Severity ratings produced from the data were nearly identical

with all coefficients of concordance equal to .92 or above. In addition, a paired comparison of composite scores revealed no significant differences between interviews on any composite score. This was true for both the same-interviewer and different interviewer conditions.

Discriminant Validity

Following the ASI interview conducted at time of admission, all 181 subjects completed a battery of comparison tests which were used to determine discriminant validity. The battery of tests was as follows: medical problem area, Cornell Medical Index (Dudley, 1976); employment problem area, Estes Employability scale (Estes, 1976), and the employment subscale of the Social Adjustment Scale (SAS; Weissman & Bothwell, 1976); alcohol problem area, the Michigan Alcoholism Screening Test (MAST; Selzer, 1971), and the Quantitative Inventory of Drinking Behavior (QIDB; Hayashida, 1981); drug problem area, Cohen and Klein Drug Use Scale (Cohen & Klein, 1971), and the Gunderson Drug Scale (Gunderson, Russell, & Nail, 1973); family/social problem area, Family and Social subscales of the SAS (Weissman & Bothwell, 1976); psychiatric problem area, Beck Depression Inventory (Beck, Ward, Mendelson, et al., 1961), and the Hopkins Symptom Checklist-90 Item (Derogatis, Lipman, & Rickels, 1974).

No appropriate validating instrument was found for the ASI legal problem area; thus total number of arrests and the total months incarcerated were used as validity indices.

For all comparison measures except the Estes Employability Scale, higher scores indicated worse problem status. Since the Estes Employability Scale was designed as a measure of employment assets, higher scores were indicative of better status.

According to Campbell and Fiske (1959), the following three conditions must be met to establish an instrument's discriminant validity: (1) Each problem measure should be correlated in the appropriate direction with its designated comparison test; (2) each problem measure should be more highly correlated with its designated comparison test than with any of the other tests; and (3) a comparison test should be more highly correlated with its paired problem measure than with any of the other problem measures.

In McLellan et al., (1985), general evidence of good discriminant validity was reported. In essence, the average correlation coefficients between ASI problem measures and their designated comparison test(s), and between comparison test(s) and paired ASI problem measures, were significantly higher than correlations with other tests and problem measures, respectively. These findings were true for both the ASI severity ratings and the ASI composite scores in each problem area.

In sum, the ASI has been shown to be quite reliable, with trained interviewers estimating the severity of patient's problems with an average reliability of .89. Consistency of patient self-report data over a 3-day test-retest interval was also shown to be reliable with no significant differences found between composite or

severity ratings, even with different interviewers conducting the repeat interviews. Finally, favorable comparisons with previously validated tests indicated that both the severity ratings and composite scores were valid general measures of patient status in each of the seven problem areas.

Alcohol Dependence Scale (ADS) - Skinner and Allen (1982) developed the 25-item ADS as a unidimensional, theoretically-based self-report instrument for the assessment of alcohol dependence as defined by the World Health Organization, (i.e., loss of behavioral control, psychophysical withdrawal symptoms, increased tolerance, obsessive-compulsive drinking style, etc.). The time-frame assessed with the ADS is the previous 12 months, and raw scores can range from 0 to 47, yielding a quantitative index of the level of alcohol dependence. Based upon validation research, Skinner and Horn (1984) divided the range of scores into 4 quartiles for interpretive purposes.

Scores between 1-13 (1st quartile), suggest a low level of alcohol dependence. Scores between 14-21 (2nd quartile), are suggestive of a moderate level of alcohol dependence in which psychosocial problems related to drinking are likely. Psychological dependence may be characteristics, but the authors suggested that evaluators look for evidence of physiological dependence and withdrawal symptoms as well. Scores ranging from 22-30 (3rd quartile), suggest a substantial level of alcohol dependence in which physical disorders and/or psychosocial problems related to alcohol abuse are probable. Raw scores of 31-

47 (4th quartile), suggest a severe level of alcohol dependence, where physiological dependence is highly likely, and is accompanied by serious physical disorders related to drinking.

Normative data for the ADS were gathered from four clinical samples of clients seeking treatment at the Clinical Institute of Addiction Research Foundation in Toronto (Skinner and Horn, 1984). Adequate concurrent validity was established, with the ADS correlating .69 with scores on the MAST. In addition, internal consistency (alpha) reliability was reported to be .92, and test-retest reliability was .92.

In a more recent study, Ross, Gavin, and Skinner (1990) found the ADS to correlate highly with two measures of alcohol abuse, including the MAST (.79), and .73 with the number of alcohol-related symptoms in the previous month as determined by the Diagnostic Interview Schedule (DIS; Robins, Helzer, Croughan, & Ratcliff, 1981).

Kivlahan, Sher, and Donovan (1989) found the ADS to have acceptable concurrent validity, but limited predictive validity in a sample of 268 men admitted to an inpatient treatment program at the Seattle VA Medical Center. The subjects were randomly assigned to either a 2- or 7-week hospitalization course, after which all of them agreed to participate in 9 months of weekly outpatient aftercare. No differences were found between the groups assigned to the 2 lengths of stay with respect to demographic characteristics or pretreatment drinking history variables, including ADS scores (mean =17.2 vs. 17.1).

The concurrent validity measures used were comparable or identical to those used by Skinner and Allen (1982). In addition, three predictive validity criteria were employed, including completion of treatment, duration of aftercare involvement, and functioning at a 9-month follow-up interval.

Mean ADS scores for Kivlahan et al.'s (1989) sample of VA inpatients were found to be significantly lower than in Skinner and Allen's (1982) sample of outpatients. Furthermore, the variance in scores in Kivlahan et al.'s sample was significantly less than in Skinner and Allen's sample. Despite these differences, however, the inpatient VA sample yielded psychometric findings that were comparable to those reported by Skinner and Allen. In effect, internal consistency was high ($\alpha=.85$), and scale dimensionality, assessed using a principal components analysis, indicated a predominantly unidimensional scale.

Correlations of the ADS with concurrent measures of demographic, drinking behavior, somatic symptoms, and psychopathology were smaller than those obtained by Skinner and Allen, but were in the same direction. The smaller correlations were consistent, however, with the greater homogeneity of ADS scores in the VA inpatient sample.

With respect to predictive validity, no differences were found on ADS scores between subjects who completed treatment vs. those who dropped out, nor between those completing versus those dropping out of aftercare. Finally, a weak, but significant association was found between ADS scores and drinking relapse status at the 9-month follow-up, with relapsing individuals obtaining

higher ADS scores at admission.

Interestingly, among those subjects who completed treatment, there was a large difference between the mean ADS scores of the 82 patients who identified legal problems or court pressure (typically for DWI) as their primary reason for entering treatment, and the 160 patients who identified other reasons. Coerced patients obtained significantly lower ADS scores than those who did not report being coerced into treatment.

Brief Symptom Inventory (BSI) - An abbreviated version of the SCL-90-R (Derogatis & Cleary, 1977), the BSI was developed to be a multi-dimensional, self-report measure designed to reflect the psychological symptom patterns of psychiatric and medical patients, as well as non-patient individuals. For 53 symptoms, clients report their current level of distress, ranging from "not at all distressed," to "extremely distressed."

A global severity score is obtained from the results, as well as individual symptom scores for somatization, obsessive-compulsive behavior, anxiety, phobias, psychoticism, interpersonal sensitivity, depression, hostility, and paranoia.

The nine primary dimensions are purported to provide a profile of the client's psychological status in psychopathological terms. These dimensions were designed to communicate information about the nature and intensity of a client's distress, and to provide data concerning the pattern of the client's

symptomatology (Derogatis & Melisaratos, 1983).

Validity and Reliability

Test-retest reliability of the BSI was evaluated on a sample of 60 non-patient subjects who were tested at 2-week intervals (Derogatis & Melisaratos, 1983). Values ranged from a low of 0.68 for somatization to a maximum of 0.91 for phobic anxiety. The stability coefficient for the global severity measure was 0.90, which indicated that the BSI was a reliable measure over time.

Derogatis, Rickels, and Rock (1976) demonstrated the convergent validity of the SCL-90-R by comparing it with the MMPI on a sample of 209 symptomatic volunteers. Since the 53 items on the BSI were contained within the SCL-90-R, the data set was re-analyzed, scoring for the BSI instead of the SCL-90-R (Derogatis & Melisaratos, 1983).

Results of the re-analysis revealed adequate convergence, although in the case of several dimensions the overall magnitudes of correlations were somewhat reduced. Interpersonal sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation and Psychoticism all demonstrated adequate correlations with MMPI scales that were convergent (Derogatis et al., 1976). Correlations ranged from .45 on phobic anxiety to .72 for depression.

More recent research has failed to replicate the findings of Derogatis and his colleagues, however (Brophy, Norvell, & Kiluk, 1988; Cyr, McKenna-Foley, & Peacock, 1985). Brophy et al., (1988) investigated the factor structure of the SCL-90-R by administering it to 368 adults as part of a pretreatment screening

process at a university-based outpatient clinic. The Beck Depression Inventory (Beck, 1967), and the MMPI were also administered during this screening evaluation.

SCL-90-R scores were subjected to both principal component and factor analyses. Although 6 relatively homogenous factors were identified, correlations among the 6 factors ranged from 0.48 to 0.70, suggesting that the factors were measuring a single dimension. This finding was supported by results of the principal component analysis which revealed that the first factor accounted for a large percentage of variance (27%). The next largest factor accounted for only 5.1% of the variance. Furthermore, correlational analyses between the SCL-90-R, the BDI, and the MMPI revealed that both the BDI and almost all scales of the MMPI—with the exception of scales *Mf* and *Ma*— correlated significantly with the nine dimensions of the SCL-90-R.

Cyr et al. (1985) reviewed a number of studies reporting on the factor stability of the SCL-90-R, as well as its immediate predecessors, the SCL-90 (Derogatis, Lipman, & Covi, 1973), the Hopkins Symptom Check List-90 (HSCL-90; Lipman, Covi, & Shapiro, 1979), and the Hopkins Symptom Check List-58 (HCSL-58; Matsson, Williams, Rickels, Lipman, & Uhlenhuth, 1969). Despite considerable overlap in item content and in the postulated factor structures of these instruments, these authors were frequently unable to replicate factors across studies. Furthermore, in cases where factors did replicate, poor item consistency emerged amongst the factors.

The proportion of variance accounted for by the first unrotated factor in the validation studies listed above, lends further support to Cyr et. al.'s (1985), contention that the parent instruments of the BSI were more unidimensional measures of general distress than they were multidimensional measures of distinct psychiatric phenomena. Upon reviewing both original and later validation studies of the SCL-90, Cyr et. al. (1985) reported that the first, unrotated factor accounted for anywhere between 6.5 to 9.2 times as much variance as the second factor. Cyr et. al. (1985) also noted that several investigators obtained average intercorrelations of .67 among the various symptom dimensions of the SCL-90. These findings cast further doubt on the multidimensionality of the SCL-90, and thus the BSI.

In sum, the bulk of evidence reviewed indicates that use of the SCL-90 or the BSI as multidimensional instruments is highly questionable. Ultimately, Cyr et al. (1985) advised that the instruments should be used and interpreted only as measures of general distress.

Drug Abuse Screening Test (DAST) - This 20-item measure gathers information about a variety of problems associated with drug use, and results in an overall numerical index of drug dependence (Skinner, 1982). The total score can range from zero to twenty. According to Skinner (1982), scores between 1-5 are suggestive of a low level of problems related to drug abuse, whereas scores between 6-10 are suggestive of a moderate level. Scores between 11-15

suggest a substantial level of problems, and scores between 16-20 are suggestive of very serious problems related to drug abuse. Skinner suggests that a cutoff of 5 should be used in clinical settings to indicate the presence of a drug use disorder.

Measurement properties of the DAST were evaluated upon a sample of 256 substance abusing clients in a clinical setting (Skinner, 1982). Internal consistency reliability was estimated to be .92 for quantifying involvement with drugs of abuse (other than alcohol), and a factor analysis of item intercorrelations indicated a unidimensional scale.

Concurrent validity was examined by correlating the DAST with background variables, frequency of drug use, and psychopathology. Results revealed that a greater range of problems associated with drug abuse was related to the more frequent use of cannabis, barbiturates, and opiates. With respect to psychopathology, large correlations were found to exist with the sociopathic scales of Impulse Expression and Social Deviation. High scorers on the DAST tended to engage in reckless actions and express attitudes that were markedly different from common social mores.

Finally, the DAST successfully differentiated amongst clients with drug problems only, versus mixed drug/alcohol problems, versus alcohol problems only (Skinner, 1982). Most clients with alcohol problems only scored 5 or below on the DAST, whereas the majority of clients with drug problems or mixed drug/alcohol problems scored 6 or above.

Quantity/Frequency Subsection of the Alcohol Use Interview (AUI) - The quantity/frequency subsection of the AUI is a 13-item measure designed to assess style of alcohol use within the past year, and amount of alcohol consumption within the past month. Style of use refers to regularity, periodicity, or abstinence of alcohol use. Amount of alcohol is a breakdown of the number of days an individual drank in the past 30 days, and how much he or she drank on any given day. From the alcohol consumption items of the AUI, number of drinks per drinking day can be calculated and represented as an average score.

Data collection

Independent variables used in this study were selected because of their known association to the incidence of DWI. These variables are listed below.

Demographic Variables

- a. **Age**
 (treated as interval data)
- b. **Employment Stability**
 1-Full-time
 2-Part-time
 3-Unemployed
 4-Other
- c. **Relationship Status**
 (treated as categorical data)
 1-Never Married
 2-Married, Remarried, Widowed
 3-Divorced/Separated
- d. **Educational Status**
 (treated as interval data)

Drinking-Related Variables

- a. Drinks per drinking day - past 30 days (DRINKS)
- b. Alcohol Dependence Scale score (ADS)
- c. ASI Alcohol problem severity composite score (ASI ALCOHOL)

Drug-Related Variables

- a. Drug Dependence Scale score (DAST)
- b. ASI Drug problem severity composite score (ASI DRUG)

Psychological Variables

- a. BSI General Distress Index (GSI)
- b. ASI Psychological problem severity composite score (PSYCH)
- c. ASI Family/social problem severity composite score (FAM/SOC)

Social Deviance Variables

- a. Number of Moving Violations
- b. Crimes Against Persons (PERSON; i.e., Assault, Robbery, Rape, Homicide)
- c. Crimes Against Property (PROPERTY; i.e., shoplifting/vandalism, forgery, burglary, larceny, breaking & entering, arson)

Limitations of the Study

Before proceeding to a discussion of the analyses to be employed, a review of the limitations inherent in this study will be presented. One limitation resulting from use of the HCSP data base is a restricted sample of DWI offenders who were beginning some form of treatment for substance abuse at the time of their assessment. Findings, therefore, cannot be generalized to any other population of DWI offenders (i.e., offenders not in treatment, female offenders, etc.). It

should be noted, however, that because participants were recruited from 37 different treatment programs with wide-ranging treatment formats, findings may be generalized to a fairly large proportion of male offenders receiving treatment.

Another limitation results from the nature of the data collected for use in the HCSP. The battery of instruments administered to participants was designed to maximize information regarding life-functioning problems that may contribute to and/or result from the abuse of substances. As such, certain measures specific to drinking and driving are lacking, such as detailed driving histories.

In this case, the potential effects of differential driving exposure are of concern since data on this variable could not be obtained. To partially compensate for this, the sample was restricted to automobile drivers, as indicated by either the report of a valid driver's license; at least one accident or traffic violation; and/or current possession of an automobile for personal use. This procedure helped to avoid the inclusion of non-driving individuals in the non-DWI comparison group.

Another limitation concerns the measures of quantity and frequency of alcohol consumption utilized for this study (i.e., the quantity/frequency subsection of the AUI). The AUI reliably captures information regarding quantity and frequency of alcohol consumed within the past 30 days which allows for the examination of recent drinking across a variety of consumption levels (i.e., from zero to 8 or more drinks in a day).

Information regarding quantity and frequency of alcohol consumption beyond

the past 30 days was not available, however. To compensate for this, clients were not accepted into the study unless assessments could be completed within two weeks of their entering treatment. This requirement allowed for a more accurate representation of a client's average alcoholic-drink consumption per drinking day. Nevertheless, typical, long-term drinking patterns may have been influenced before the 30-day period by extraneous factors (e.g., anticipation of treatment; guilt over a recent DWI or other criminal charges, etc.).

A related limitation revolves around the limited time-frame captured by the instruments used to measure psychological distress. The two ASI measures (i.e., psychological severity, and family/social severity), reflected problems experienced within the past 30 days, and the BSI captured information reflective of one's experience within the past. This limited time frame may make it difficult to distinguish between state- and trait-related phenomena.

Another limitation inherent in this study was that all data were self-report. The validity of self-report data in alcohol research is an area of on-going debate, with some researchers contending that broadly based self-report measures are not likely to be significantly biased (Polich, 1982; Sobell & Sobell, 1978), while others contend that they are (Watson, Tilleskjor, Hoodecheck-Schow, Pucel, & Jacobs, 1984).

Validity of self-report was especially important in the present investigation given the fact that group membership was based upon an accurate report of the number of DWI offenses a driver had accumulated in his life-time. Recent

research pertaining to this issue indicates that when clients are assured of confidentiality and voluntarily agree to participate in research, self-reported DWI arrests are generally accurate and reliable (MacDonald & Pederson, 1990).

MacDonald and Pederson (1990) compared the frequencies of self-reported and officially recorded DWI arrests for participants with zero, one, and more than one DWI arrest. For cases where both the driving record and self-reported information on DWI arrests were available (i.e., 90.7% of the cases), 83.5 percent of the cases had perfect agreement, while self-reported under-reporting occurred for 6.4 percent, and over-reporting for 10.1 percent.

The over-representation may have resulted from problems inherent in utilization of official driving or criminal-conviction records for determining an individual's actual number of DWI arrests (Gould & MacKenzie, 1990). First, DWI charges are often dropped or plea-bargained to a lesser offense during the hearing process. Thus, what began as a legitimate DWI arrest may appear as a lesser or non-alcohol related infraction on an official driving record, (e.g., reckless driving).

Apart from these issues, additional efforts were made to improve reliability of self-report material. In particular, every assessment was administered by a field assessor who received extensive training in interview techniques aimed at gathering reliable data (e.g., resolution of discrepancies through clarification and additional probing; use of structuring techniques to help clients recall historical material, etc.).

Analysis of the Data

Statistical analyses for the research objectives in this study were as follows. All drivers receiving none, one, two, or three or more DWI arrests were identified, and group means for indices of each variable were calculated.

For the first research question, five hypotheses were tested. For these hypotheses, the probability value associated with a linear trend analysis across the four groups was examined, except in the case of one categorical variable, where Chi Square analysis was utilized. Linear trend analysis is appropriate for testing hypotheses where questions are related primarily to the association between an independent and dependent variable (Keppel, 1982). In order to determine the strength of the obtained F associated with a particular trend, each F value was converted into an r value using Hunter's (1991) Package Program.

To address research question 2, an analysis of covariance (ANCOVA) model was employed, where each predictor variable was treated as an outcome. Admission status and group membership were used as factors in the ANCOVA models, and age was treated as a covariate.

To address research question 3, a multiple regression analysis was performed to identify the set of weighted predictor variables that would best predict total number of DWI arrests. The advantage of multiple regression is that it reveals the combined effects of a set of predictor variables, as well as the separate effects of each predictor, while holding the effects of others constant. Categorical variables were used in the model as dummy predictor variables.

Chapter 5

RESULTS

Treatment of the Raw Data

As data were collected, they were coded and entered into a FoxPro data base. An initial computer run was conducted to insure that all values for each variable were within the proper ranges. Recoding of the variables and data transformations were verified by running frequencies to insure the changes were correct. Data transformation and all statistical analyses were conducted with the Statistical Package for the Social Sciences (Nie, Hall, Jenkins, Steinbrenner, & Bent, 1975), unless otherwise specified.

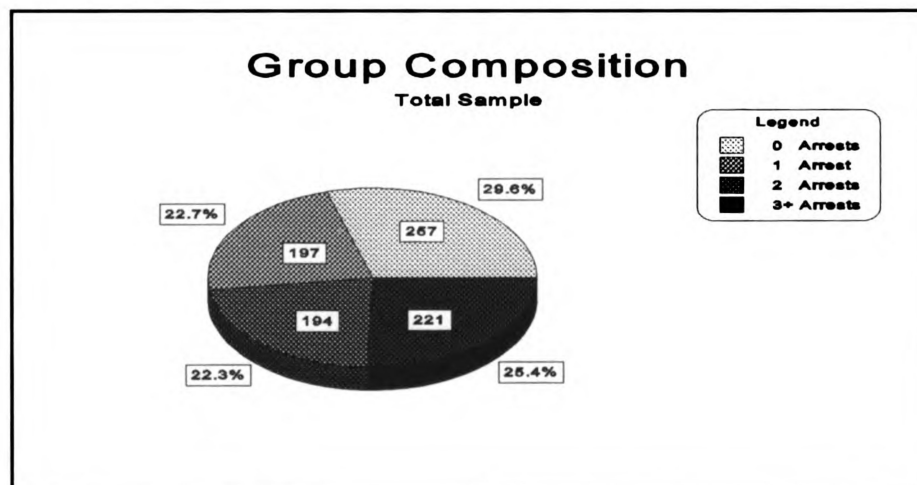
Description of the Total Sample

Nine-hundred-and-twenty-six male volunteers participating in a substance abuse treatment-outcome study were divided into 4 groups based upon their total number of self-reported lifetime arrests for drinking and driving. Group 0 consisted of 425 men with no previous arrests for drinking and driving. Potential sampling bias was reduced in this group by removing participants who used only "dry" drugs (e.g., marijuana, cocaine, heroin), and who reported no lifetime history of regular alcohol use. One-hundred-and-one men who met these criteria were removed from Group 0.

Participants were also removed from consideration if they did not possess a valid driver's license at the time of the study, and if they reported no lifetime history of even a minor traffic violation. This was done to insure that "non-drivers" were not included in the non-offender control group. An additional 67 men were removed from Group 0 based upon these criteria. In total, then, Group 0 contained 257 participants. The one-time DWI arrest group contained 197 participants, the two-time DWI arrest group contained 194 participants, and the three-or-more- time DWI arrest group contained 221 participants. In total, the research sample consisted of 869 participants.

Figure 1 graphically illustrates the proportion of the total sample represented by each of the four discrete groups of drinking and non-drinking drivers. As can be seen, group size was fairly evenly distributed, with no one group containing more than 30% nor less than 20% of the entire sample population.

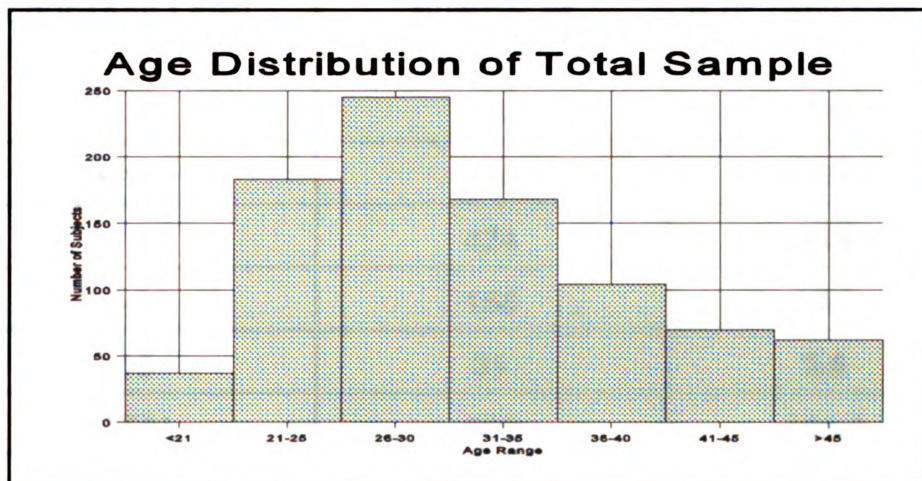
Figure 1



Distribution of Sample Participants by Age

Figure 2 illustrates the age distribution for the entire sample. Participants ranged in age from 18 to 68 years, with a mean age of 31.64 years, and a standard deviation of 8.37 years.

Figure 2



Distribution of Sample Participants by Level of Education

Table 1 illustrates the educational distribution of the total sample.

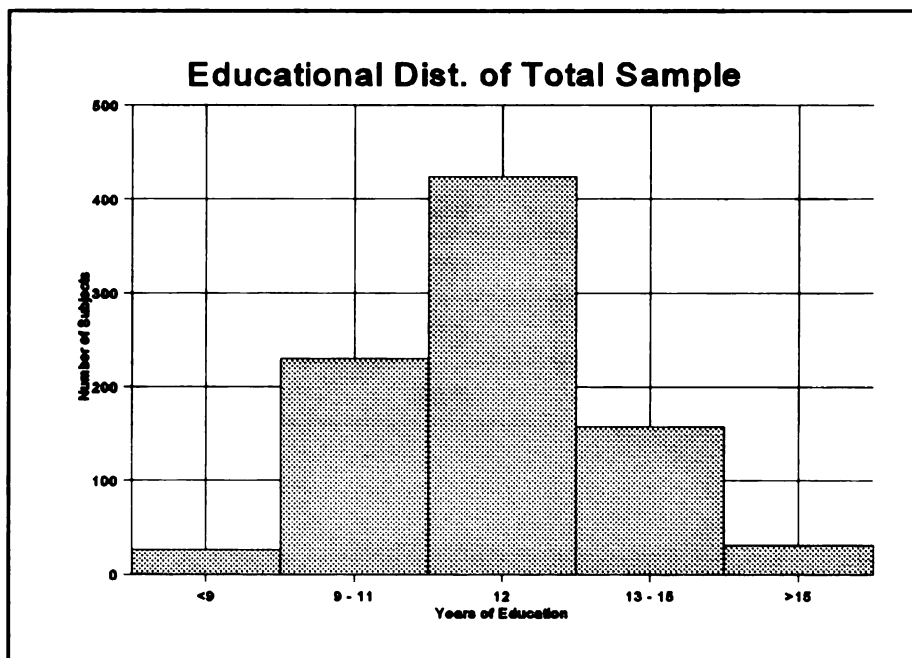
Educational attainment ranged from 6 to 17.5 years, with a mean of 11.8 years, and a standard deviation of 1.68 years.

TABLE 1
Educational Distribution of Total Sample

Education Level	Number of Participants	% of Total Sample
<9	26	3.0
9-11	230	26.5
12	424	48.8
13-15	158	18.1
>15	31	3.6
TOTAL	869	100.0

Figure 3 illustrates the fact that educational attainment was generally normally distributed throughout the research population, with a majority of participants having attained at least a high-school degree, and relatively few participants having had less than 9 years of education or greater than 15 years of education.

Figure 3



Distribution of Sample Participants by Relationship Status

Table 2 illustrates the overall relationship status for the total sample. As can be seen, nearly one-half of the participants comprising the research population were single and had never been married (49.4%), while approximately one-third had been separated or divorced (31%).

TABLE 2
Distribution of Total Sample by Relationship Status

Relationship Status	Number of Participants	Percent of Sample
Single	429	49.4
Married	170	19.5
Divorced/Separated	270	31.1
TOTAL	869	100.0

Distribution of Sample Participants by Employment Stability

Table 3 illustrates the distribution of participants in terms of their typical employment status for the 3-year period prior to their participation in the study.

TABLE 3
Employment Stability of Total Sample

Employment Status	Number of Participants	Percent of Sample
Full-time	573	65.9
Part-time	118	13.6
Unemployed	135	15.5
Other	38	4.4
Missing	5	.6
TOTAL	869	100.0

As can be seen, the vast majority of participants were employed on a full-time basis for most of the three years prior to their voluntary induction into the study. Slightly over 15% of the total sample had been unemployed, while 13.6% had been employed on a part-time basis.

Research Question 1:

What is the strength of the relationship between DWI arrest status and respondent's demographic characteristics indicative of personal instability, indices of alcohol-related problems, indices of drug-related problems, indices of psychological distress, and indices of social deviance?

Five hypotheses were posed and tested to address this question. For each hypothesis, associations between DWI arrest status and the particular variable of interest were investigated. For continuous variables, Linear Trend analyses was employed. For categorical variables, Chi Square analysis was employed. Results of these analyses are presented by each hypothesis.

Hypothesis 1

There will be a negative association between DWI arrest status and demographic variables of interest, including educational attainment, relationship status, and employment stability. In effect, it is predicted that multiple DWI offenders will have lower levels of education, higher rates of separation and divorce, and less employment stability than non- or low-level offenders.

From the existing literature, it was difficult to arrive at a specific hypothesis regarding the relationship of age to DWI recidivism, but it stood to reason that increasing age might be associated with increasing numbers of DWI arrests simply because of greater driving exposure. Therefore, age was included in the analyses to determine whether or not its effects would need to be controlled for in future analyses.

Age

Table 4 depicts the results of a linear trend analysis between age and DWI arrest status. As is illustrated, a significant positive association was found between age and number of lifetime DWI arrests. To determine the actual strength of this association, a conversion from F to r was performed using Hunter's (1991) FTOR.BAS Program. The resulting correlation coefficient was .129 which, according to Lipsey and Wilson (1993), is a small to moderate association.

TABLE 4
Linear Trend Analysis of Age and DWI Arrests

Group	Mean Age	Std.Dev.	F	p	r	St. Error
0	30.7	8.24	14.6	.0001	0.129	.0011
1	30.9	8.29				
2	31.0	8.61				
3	33.7	8.37				

Education

It was hypothesized that educational attainment would decrease as arrest status increased. To test this hypothesis, a linear trend analysis was performed on group means, and the results are presented in Table 5. As can be seen, while the relationship was in the predicted direction, the probability value for linear trend was .17, with 1 degree of freedom, ($p > .05$), indicating no significant association between arrest status and educational attainment.

TABLE 5
Linear Trend Analysis of Educational Attainment and
DWI Arrest Status

Group	Education	Std. Dev.	F	p	r	St. Error
0	11.92 years	1.74	1.69	0.17	-.04	.001
1	11.81 years	1.59				
2	11.95 years	1.67				
3	11.67 years	1.77				

Relationship Status

To investigate the association between number of drinking-driving arrests and relationship status, a Chi Square analysis was performed. It was hypothesized that rates of separation and divorce would increase as arrest status increased. As is illustrated in Table 6, this hypothesis was not confirmed, (Chi square = 9.45; df = 6; $p > .05$). The findings indicated that one-time and non-offenders were as likely to be divorced and/or separated as were multiple offenders.

TABLE 6
Relationship Status by Group

	Group 0		Group 1		Group 2		Group 3		Chi Square		
Status	n	%	n	%	n	%	n	%	χ^2	d.f.	p
Single	137	53	97	49	101	52	94	43	9.45	6	0.15
Married	47	18	44	22	37	19	42	19			
Sep/Div	73	28	56	28	56	29	85	39			

Employment Stability

A linear trend analysis investigated the association between drinking-driving arrests and employment stability. It was hypothesized that a negative association would exist between these variables, such that multiple offenders would be more likely than non- and one-time-offenders to be unemployed, and/or employed on a part-time basis. Because of coding conventions, greater employment stability was actually reflected in lower scores (i.e., 1=full-time; 2=part-time; 3=unemployed). Thus, the predicted relationship should ultimately have been reflected in a positive association.

The results presented in Table 7 illustrate the fact that this hypothesis was not supported. The relationship between employment stability and group membership was in the opposite direction of that predicted ($r = -.1010$), and the association was found to be significant ($F = 8.93$; $p < .01$).

TABLE 7
Linear Trend Analysis of Employment Stability
and DWI Arrest Status

Group	Employ. Stability	St. Dev.	F	p	r	St. Error
0	1.85	1.19	8.93	.001	-.10	0.034
1	1.79	1.15				
2	1.46	0.91				
3	1.63	1.10				

These results indicated that multiple offenders were more likely than non- and one-time offenders to be employed on a full-time basis prior to their induction into the study.

Hypothesis 2

There will be a positive association between DWI arrest status and indices of alcohol-related problems, including ASI alcohol-severity scores, alcohol dependence, and quantity of consumption.

Trend analyses were employed to examine the associations between arrest status and Alcohol Dependence (ADS), ASI Alcohol Problem Severity (ASI Alcohol), and average number of Drinks consumed per Drinking Day (DRINKS).

Table 8 illustrates the mean group score for each variable, as well as the F value associated with the linear trend analysis. In addition, Hunter's (1991) FTOR.BAS program was utilized to convert F values to r values to illustrate the actual strength of the obtained associations. The standard error (SE) is also represented in the final column.

As can be seen in Table 8, only Alcohol Dependence was positively and significantly associated with drinking-driving arrest status. Upon converting F to r , the obtained association was revealed to be .09, which, according to Lipsey and Wilson (1993), is a mild association. Neither ASI Alcohol Severity, nor Drinks per Drinking Day were significantly associated with DWI arrest status.

TABLE 8
Group Scores on Alcohol-related Variables and F Values
Associated with Linear Trend Analyses

	GROUPS					Trend		F-to-r	
Variable	Group 0	Group 1	Group 2	Group 3	Total	F	p	r	SE
ADS	18.82	21.11	20.94	22.5	20.76	6.5	.01	.09	.002
St. Dev.	14.28	14.85	14.54	15.2	14.75				
Cases	245	191	186	214	836				
ASI Alc.	0.37	0.36	0.34	0.4	0.37	0.51	.50	.03	.001
St. Dev.	0.26	0.25	0.25	0.27	0.26				
Cases	251	181	181	205	818				
Drinks	5.62	6.11	5.51	6.24	5.87	1.47	.20	0.07	.003
St. Dev.	2.29	2.05	2.33	2.11	2.21				
Cases	93	79	63	72	307				

As can be seen in Table 8, data regarding Drinks per Drinking Day could not be recorded for a large number of participants who reported no alcohol use for the 30-day period prior to their induction into the study. This fact suggests that caution should be exercised when interpreting these results.

Hypothesis 3

There will be a positive association between DWI arrest status and indices of drug-related problems, including degree of Drug Dependence (DAST), and ASI Drug Severity (ASI DRUG).

Table 9 illustrates the mean group score for each drug-related variable, the F value associated with a linear trend analysis, the r value resulting from a conversion of F to r (Hunter, 1991), and the standard error. As can be seen, both associations were significant, but in the opposite directions of those predicted. In each case, the relationship was of moderate strength as determined by the obtained correlation coefficient (Lipsey & Wilson, 1993).

TABLE 9
Mean Group Scores on Drug-related Variables and
F Values Associated with Linear Trend Analyses

	GROUPS					Linear Trend		F-to-r	
Variable	Group 0	Group 1	Group 2	Group 3	Total	F	p	r	St. Error
DAST	9.16	6.98	4.27	4.69	6.57	49.2	.001	-.29	.039
St. Dev.	6.44	6.53	6.07	6.05	6.6				
Cases	174	124	110	131	539				
ASI Drug	0.17	0.1	.07	0.08	0.11	63.5	.001	-.27	.033
St. Dev.	0.15	0.11	.09	0.12	0.13				
Cases	241	177	172	201	791				

Hypothesis 4

There will be a positive association between DWI arrest status and indices of psychological distress, including ASI Family/Social problem severity, ASI Psychological problem severity, and General distress (GSI) scores, as measured by the Brief Symptom Inventory.

Table 10 illustrates the mean group score for each maladjustment variable, the F value associated with a linear trend analysis and its significance, and the results of a conversion of $\bar{E}$ to $\bar{r}$ (Hunter, 1991). Once again, all associations were significant, but in the opposite directions of those predicted.

Table 10
Group Scores on Psychological Distress Variables and F Values
Associated with Linear Trend Analyses

	GROUPS					Linear Trend		F-to-r	
Variable	Grp 0	Grp 1	Grp 2	Grp 3	Total	F	p	r	St. Error
Fam/Soc	0.30	0.22	0.17	0.22	0.23	17.9	.001	-.15	.0011
St. Dev.	0.24	0.23	0.2	0.22	0.23				
Cases	256	185	182	201	828				
Psych.	0.28	0.25	0.18	0.22	0.24	14.0	.001	-.13	.0011
St. Dev.	0.23	0.22	0.2	0.19	0.21				
Cases	255	183	179	204	821				
GSI	0.98	0.88	0.74	0.85	0.87	6.33	.012	-.09	.0011
St. Dev.	0.76	0.72	0.72	0.65	0.72				
Cases	245	191	186	213	835				

Hypothesis 5

There will be a positive association between DWI arrest status and indices of social deviance, including numbers of Moving Violations, Crimes against Persons, and Crimes against Property.

Table 11 illustrates the mean group score for each variable, the F value associated with a linear trend analysis, and the results of a conversion from F to r (Hunter, 1991). As can be seen, the number of Moving Violations acquired in one's lifetime was the only variable positively and significantly associated with DWI arrest status. The associations between DWI arrest status and Crimes against Persons, and DWI arrest status and Crimes against Property were non-significant.

Table 11
Group Scores on Social Deviance Variables and F Values
Associated with Linear Trend Analyses

	GROUPS					Linear Trend		F-to-r	
Variable	Grp 0	Grp 1	Grp 2	Grp 3	Total	F	p	r	St. Error
Moving Violation	2.62	3.17	3.18	4.48	3.33	10.6	.001	0.11	0.001
St. Dev.	4.49	5.99	4.68	7.53	5.78				
Cases	257	182	183	206	828				
Person Crimes	0.43	0.48	0.34	0.43	0.42	0.13	.720	-0.01	0.04
St. Deviation	1.04	0.973	1.06	1.04	1.05				
Cases	257	185	183	207	832				
Property Crimes	0.99	0.98	1.22	1.14	1.08	0.21	.65	0.02	0.04
St. Deviation	2.13	2.34	7.59	5.63	4.81				
Cases	257	184	183	207	831				

Summary of Findings for Research Question 1

For the most part, results obtained from statistical analyses of the data supported few of the hypotheses postulated for this study. Ultimately, the unexpected findings encountered in this first series of analyses raised important questions, and prompted further investigation of the data. The most compelling question was why the recidivist groups—found to be more alcohol dependent than the non-recidivist groups—appeared to have fewer problems in most other domains of life functioning. In essence, participants in Groups 2 and 3 reported greater employment stability, fewer drug-related problems, less drug dependence, and lower levels of psychological distress .

Among the possibilities that could explain these findings were methodological differences in sampling. For instance, several recidivist studies presumably included incarcerated offenders in their sample populations (Argeriou et al., 1986; Beerman et al., 1988). Incarcerated populations tend to be more socially deviant than non-incarcerated populations (Greenfeld, 1988).

In addition, the presence of a masking variable could explain a selective impact upon the self-reported scores of recidivist offenders. One such variable was admission status. If, for example, a greater proportion of recidivists were found to have been court-ordered into treatment as compared to their non-recidivist counterparts, the attenuation observed in severity scores might be explained, in part, by circumstantial and/or motivational factors. This issue was

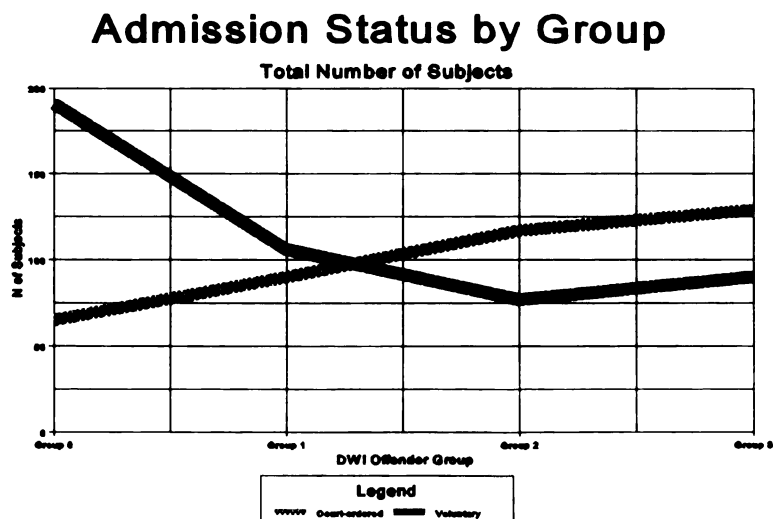
investigated through Research Question 2.

Research Question 2:

Does the relationship between DWI arrest status and respondent's demographic characteristics indicative of personal instability, indices of alcohol-, and drug-related problems, indices of psychological distress, and indices of social deviance vary by the respondent's admission status?

To determine whether or not the proportion of court-ordered vs. voluntary participants differed significantly across groups, a summary analysis was conducted, and the results are presented in Figure 4. As can be seen, admission status did vary by Group, with a higher proportion of voluntary participants represented in Group 0 and Group 1, and a higher proportion of court-ordered participants represented in Groups 2 and 3. A subsequent ANOVA revealed these differences to be significant ($F = 68.59$; $p < 0.01$).

Figure 4



Because Admission Status was identified as a potential masking variable, further analyses were required, whereby both Admission Status and Group membership could be considered simultaneously in terms of their relationship(s) to variables of interest. In order to achieve this, analysis of covariance was conducted for each variable under consideration. For these analyses, the particular variable of interest was treated as the dependent measure, Group membership and Admission Status were treated as factors, and Age was treated as a covariate. This was done in order to address the question of whether or not some of the previously observed relationships between variables of interest and DWI arrest status were confounded by age.

Table 12 presents ANCOVA results for each predictor variable, while controlling for the effects of age. In this table, Group means and standard deviations are presented for voluntary and court-ordered participants separately, followed by F and Eta values for the effect of Group, the effect of Admission Status, and the interaction effect of the two variables. Observed F values and their significance are also presented.

TABLE 12
ANCOVA Results using Group Membership and Admission Status
as Factors with Age as a Covariate

Variable	Admission	Group 0		Group 1		Group 2		Group 3		Group		Admission		Interaction	
			S.D.	X	S.D.	X	S.D.	X	S.D.	F	Eta	F	Eta	F	Eta
Education	Voluntary	12.1	1.8	11.9	1.5	11.8	1.9	11.6	1.6	1.32	0.07	1.49	0.04	1.89	0.08
	Court	11.4	1.4	11.6	1.7	11.9	1.5	11.7	1.8						
Employ. Stab.	Voluntary	1.73	1.13	1.81	1.23	1.55	0.97	1.67	1.15	7.17***	0.16	0.58	0.03	3.14*	0.10
	Court	2.17	1.29	1.76	1.05	1.39	0.87	1.60	1.08						
ASI Alcohol	Voluntary	0.40	0.27	0.41	0.28	0.40	0.25	0.50	0.27	3.33*	0.11	38.09***	0.21	0.48	0.04
	Court	0.30	0.21	0.30	0.23	0.30	0.23	0.34	0.25						
ADS	Voluntary	20	15	25	15	25	13	28	15	5.35***	0.14	61.02***	0.26	1.56	0.08
	Court	15	13	15	12	17	15	18	14						
Drinks	Voluntary	5.5	2.3	6.2	2.3	5.8	2.1	7.1	1.4	2.33	0.15	4.41*	0.12	2.03	0.14
	Court	5.9	2.1	5.8	1.8	5.3	2.4	5.6	2.3						
ASI Drug	Voluntary	0.18	0.15	0.11	0.12	0.10	0.11	0.09	0.13	14.4***	0.23	23.08***	0.17	1.69	0.08
	Court	0.14	0.13	0.09	0.09	0.05	0.08	0.07	0.10						
DAST	Voluntary	9.1	6.3	8.3	6.8	6.7	7.4	5.4	6.5	10.9***	0.24	18.4***	0.18	2.38	0.11
	Court	8.8	6.7	5.5	6.0	2.6	4.4	4.3	5.8						

TABLE 12 (continued)
ANCOVA Results using Group Membership and Admission Status
as Factors with Age as a Covariate

Variable	Admission	Group 0		Group 1		Group 2		Group 3		Group		Admission		Interaction	
		X	S.D.	X	S.D.	X	S.D.	X	S.D.	F	Eta	F	Eta	F	Eta
ASI Fam/Soc	Voluntary	.31	.24	.28	.22	.26	.22	.26	.23	6.03***	0.15	36.1***	0.21	2.35	0.09
	Court	.23	.22	.21	.18	.16	.12	.20	.18						
ASI Psych.	Voluntary	.30	.23	.31	.21	.27	.22	.28	.19	2.51	0.08	62.0***	0.27	1.15	0.06
	Court	.22	.20	.18	.19	.12	.15	.18	.17						
GSI	Voluntary	1.0	.75	1.1	.74	1.0	.75	1.0	.70	0.77	0.05	71.8***	0.28	3.37*	0.11
	Court	.83	.74	.60	.58	.51	.59	.70	.57						
Mov. Violations	Voluntary	2.8	4.6	2.5	4.9	2.9	4.9	3.1	4.1	3.50*	0.11	3.13	0.06	2.54	0.09
	Court	2.0	4.2	3.9	7.1	3.3	4.5	5.3	9.0						
Person Crime	Voluntary	.26	.80	.36	.72	.42	1.41	.69	1.37	1.64	0.08	1.13	0.03	10.59***	0.19
	Court	.92	1.6	.61	1.2	.28	.77	.24	.68						
Property Crime	Voluntary	.77	1.78	.52	1.29	2.24	12.2	1.85	8.76	0.21	0.03	0.5	0.03	3.72**	0.11
	Court	1.65	2.9	1.53	3.1	.59	1.10	.68	1.60						

* $p < .05$

** $p < .01$

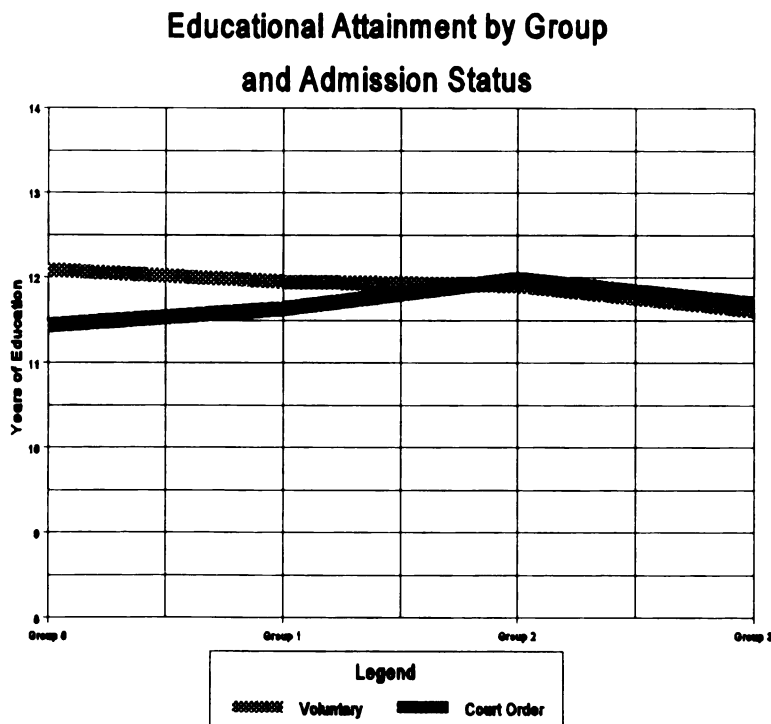
*** $p < .001$

What follows is an expanded results section for each of the individual variables presented in Table 12. This expanded results section includes graphic representations illustrating the relationships between both DWI offender groups, and between court-ordered and voluntary participants, with respect to variables of interest.

Educational Attainment

For educational attainment (Figure 5), ANCOVA results revealed that neither Group membership, ($F = 1.31$, $p > .05$, $Eta = 0.07$), Admission Status, ($F = 1.49$, $p > .05$, $Eta = 0.04$), nor the interaction of the two variables, ($F = 1.88$, $p < .05$, $Eta = 0.08$), were significant. The effect of Age, however, was significant, ($t = 3.16$, $p < .01$, $Eta = 0.35$). These results indicated that no significant differences existed between DWI offender groups, nor between court-ordered and voluntary participants, with respect to levels of educational attainment. However, increasing age was significantly associated with higher levels of educational attainment.

Figure 5

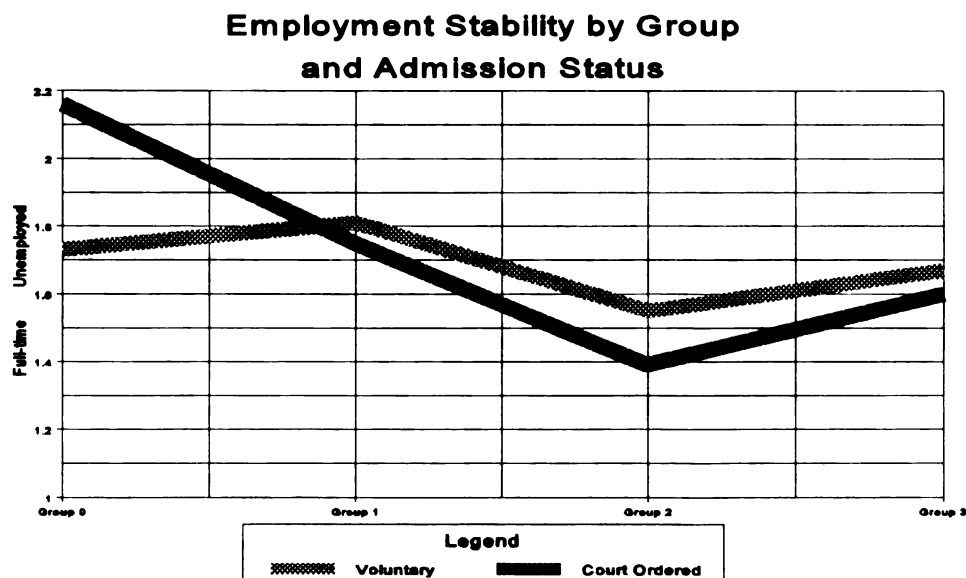


Employment Stability

For this variable, lower scores were associated with greater employment stability. As revealed in Figure 6, Group Membership was found to be significant, ($F = 7.16$, $p < .001$, $Eta = 0.16$), as was Age ($t = 2.19$, $p < .05$, $Eta = 0.08$), and the interaction effect of Group and Admission status ($F = 3.14$, $p < .05$, $Eta = 0.10$). The effect of Admission Status alone was not significant, ($F = .581$, $p > .05$, $Eta = 0.03$).

These findings indicated that the relationship between DWI arrests and Employment Stability varied depending upon a subject's admission status. For zero-time DWI-offenders, court-ordered participants exhibited less employment stability than voluntary participants. For all other Groups, the opposite was true. Furthermore, increasing age was associated with greater employment stability.

Figure 6

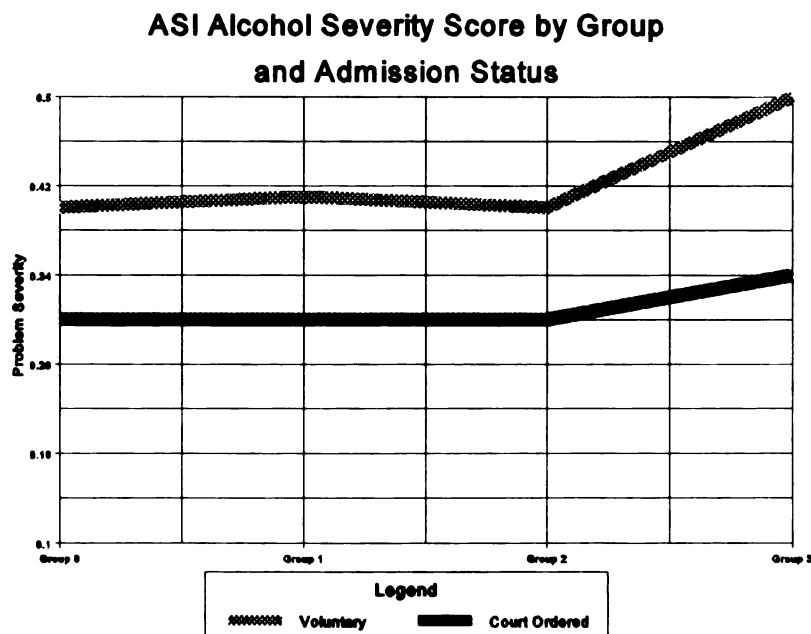


ASI Alcohol Severity

Figure 7 illustrates the ANCOVA results for ASI Alcohol Severity scores. For this variable, Group Membership, ($F = 3.33$, $p < .05$, $\eta^2 = 0.11$), and Admission Status, ($F = 38.09$, $p < .001$, $\eta^2 = 0.21$), were both found to be significant. The interaction effect of these two variables, ($F = .484$, $p > .05$, $\eta^2 = 0.04$), and Age ($t = -.897$, $p > .05$, $\eta^2 = 0.03$), were non-significant.

These results indicated that ASI Alcohol Severity Scores increased significantly with increasing numbers of DWI arrests. Furthermore, Voluntary participants consistently reported significantly higher ASI Alcohol Severity scores than their Court-Ordered counterparts.

Figure 7

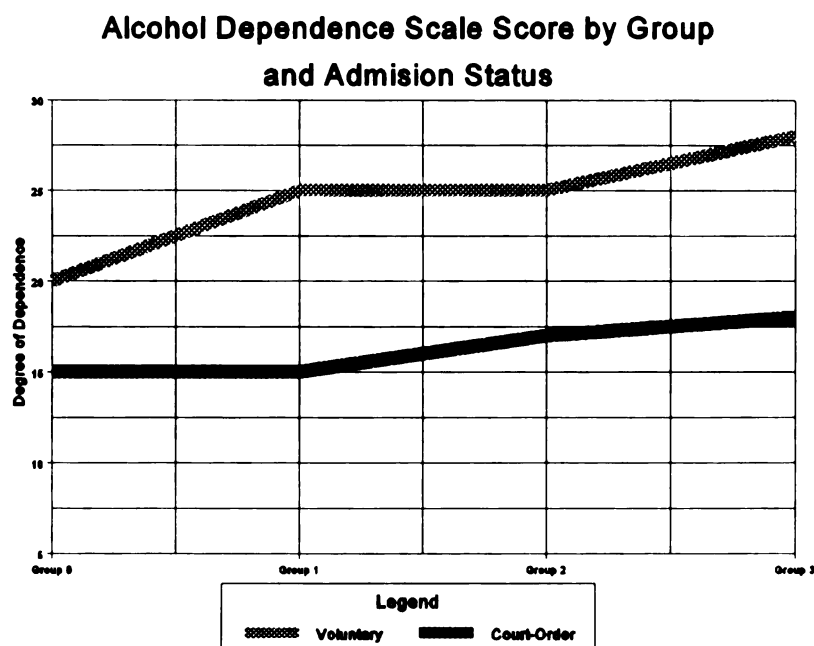


Alcohol Dependence Scale (ADS)

Figure 8 depicts the results of ANCOVA with Alcohol Dependence Scale (ADS) scores. For ADS, Group Membership ($F = 5.34$, $p < .001$, $\text{Eta} = 0.14$), and Admission Status ($F = 61.01$, $p < .001$, $\text{Eta} = 0.26$), were both found to be significant. The interaction effect of these two variables was not significant, ($F = 1.55$, $p > .05$, $\text{Eta} = .08$), nor was the effect of Age, ($t = .038$, $p > .05$, $\text{Eta} = 0.0$).

These results indicated that Alcohol Dependence Scale scores increased significantly with increasing numbers of DWI arrests. Furthermore, voluntary participants consistently reported significantly higher Alcohol Dependence Scale scores than their court-ordered counterparts.

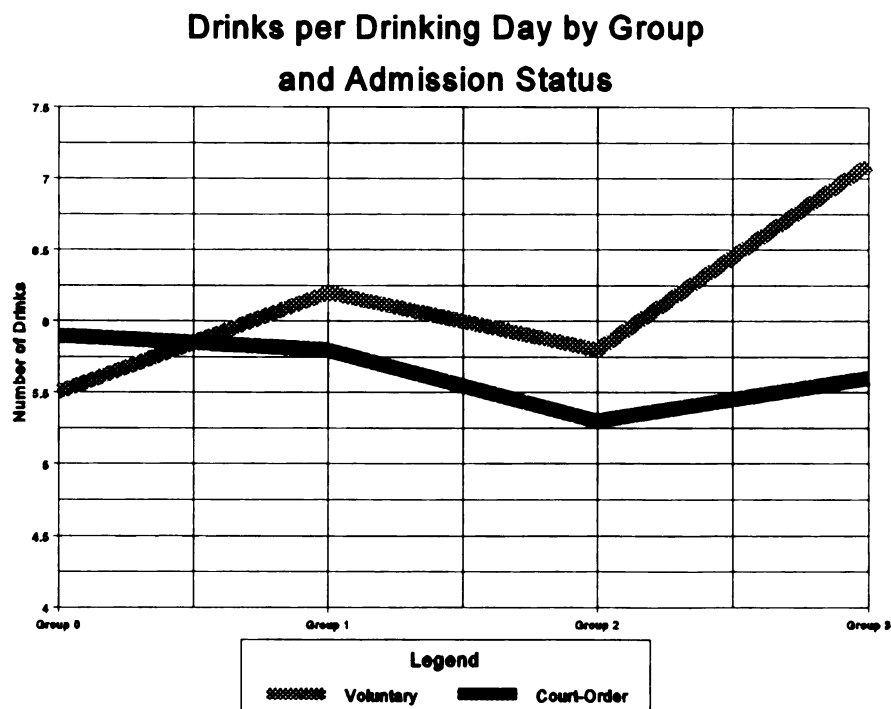
Figure 8



Drinks per Drinking Day

ANCOVA results for Drinks per Drinking Day are presented in Figure 9. These results indicated that neither Group membership, ($F = 2.33$, $p > .05$, $Eta = 0.15$), nor the interaction effect of Group and Admission status, ($F = 2.03$, $p > .05$, $Eta = 0.14$), were significant. The effect of Age was also non-significant ($t = -1.739$, $p > .05$, $Eta = 0.10$). Admission Status alone was significant, however ($F = 4.41$, $p < .05$, $Eta = 0.12$). In essence, for DWI offenders, voluntary participants consistently reported consuming more drinks per drinking day than their court-ordered counterparts.

Figure 9

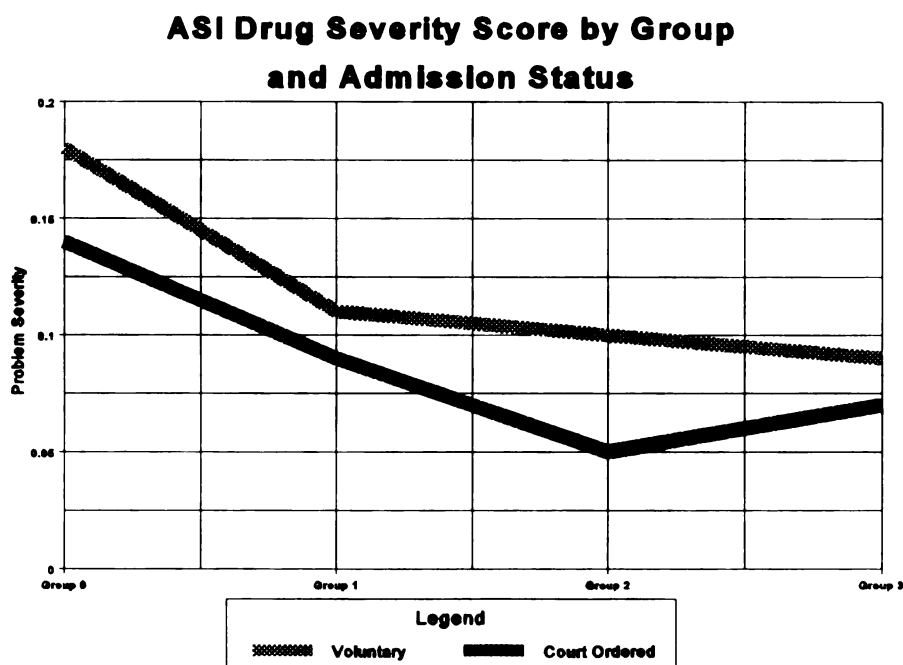


ASI Drug Severity

For ASI Drug Severity, (Figure 10), Group membership, ($F = 14.4$, $p < .001$, $Eta = 0.23$), Admission Status, ($F = 23.08$, $p < .001$, $Eta = 0.17$), and Age ($t = -6.02$, $p < .05$, $Eta = 0.21$) were found to be significant. The interaction effect of Admission Status and Group was not significant ($F = 1.69$, $p > .05$, $Eta = 0.07$).

These results indicated that increasing age and increasing numbers of DWI arrests were associated with significantly decreasing levels of ASI Drug Severity. Furthermore, voluntary participants consistently reported significantly higher ASI Drug Severity scores than court-ordered participants.

Figure 10

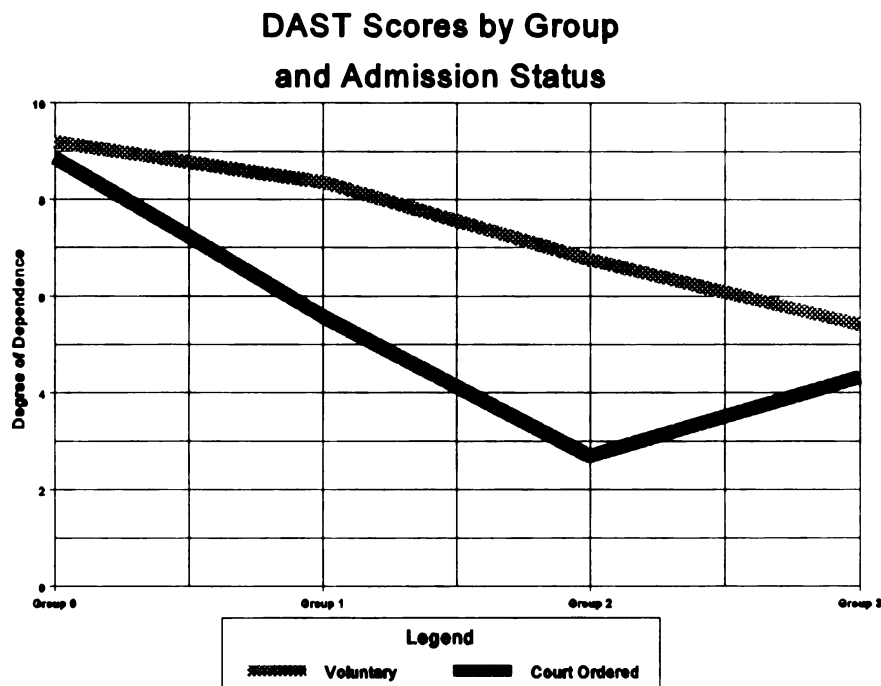


Drug Dependence (DAST)

For Drug Dependence (DAST), ANCOVA revealed that Age ($t = -4.76$, $p < .01$, $\text{Eta} = 0.20$), Group membership, ($F = 10.98$, $p < .001$, $\text{Eta} = 0.25$), and Admission Status, ($F = 18.42$, $p < .001$, $\text{Eta} = 0.18$), were significant (Figure 11). The interaction effect of these latter two variables was not, ($F = 2.38$, $p > .05$, $\text{Eta} = .11$).

These findings indicated that both increasing age and DWI arrests were significantly associated with decreasing levels of Drug Dependence. Furthermore, voluntary participants consistently reported significantly higher levels of Drug Dependence than their court-ordered counterparts.

Figure 11

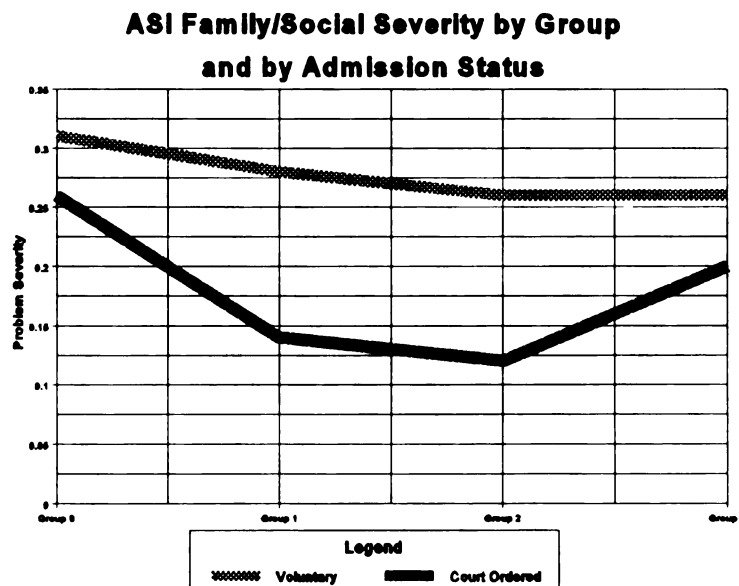


ASI Family/Social Severity

Figure 12 illustrates results of ANCOVA for ASI Family/Social Severity scores by Group membership and by Admission Status. For this variable, both Group Membership ($F = 6.02$, $p < .001$, $Eta = .15$), and Admission Status, ($F = 36.10$, $p < .001$, $Eta = 0.27$), were significant. However, the interaction effect of these two variables was non-significant, ($F = 2.35$, $p > .05$, $Eta = 0.09$). The effect of Age was also non-significant ($t = -.941$, $p > .05$, $Eta = 0.03$).

These results indicated that increasing DWI arrests were associated with significantly decreasing levels of Family/Social Severity scores. In addition, voluntary participants consistently reported significantly higher ASI Family/Social Severity scores than did court-ordered participants.

Figure 12

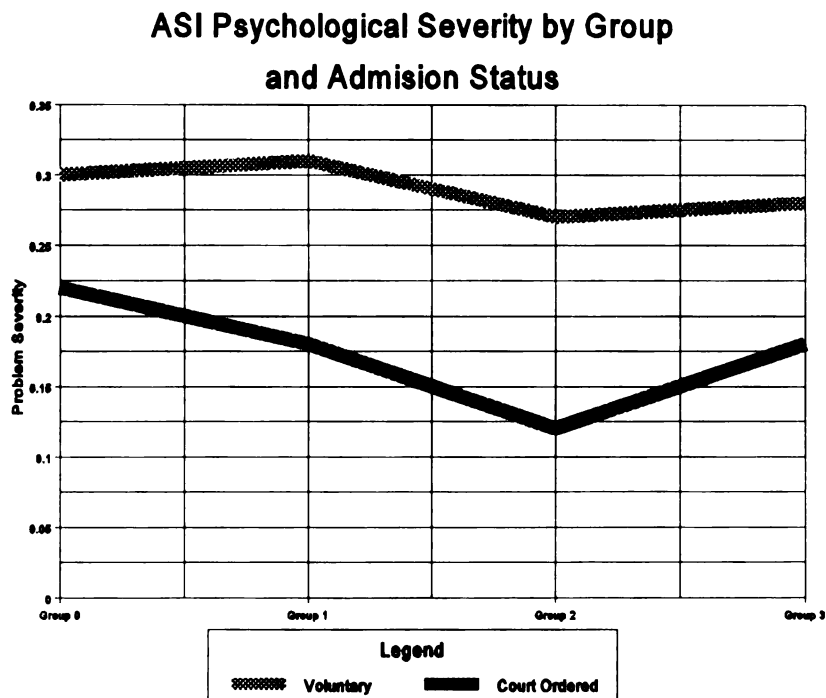


ASI Psychological Severity

For ASI Psychological Severity scores, (Figure 13), ANCOVA revealed that neither Group membership ($F = 2.51$, $p > .05$, $\eta^2 = .09$), nor the interaction effect of Group membership and Admission Status ($F = 1.15$, $p > .05$, $\eta^2 = .06$), were significant. The effect of Age was also non-significant ($t = -1.81$, $p > .05$, $\eta^2 = 0.06$). Admission status alone, however, was significant ($F = 62.08$, $p < .001$, $\eta^2 = 0.27$).

These findings indicated that increasing numbers of DWI arrests were not related to ASI Psychological Severity scores. However, voluntary participants reported significantly higher scores than their court-ordered counterparts.

Figure 13

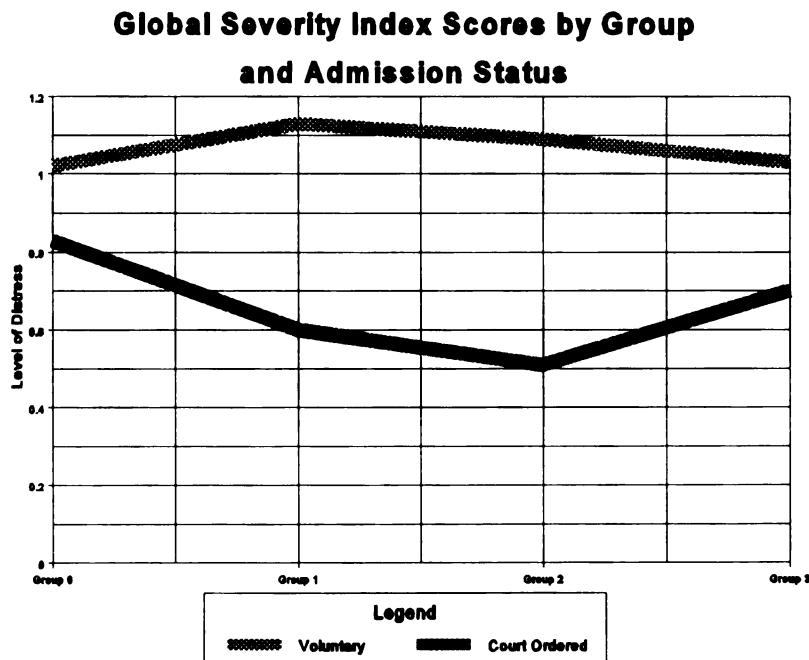


Global Severity Index

Figure 14 indicates that for GSI scores, Group membership, ($F = .767$, $p > .05$, $\eta^2 = .05$) was non-significant, while Admission Status, ($F = 71.84$, $p < .001$, $\eta^2 = 0.28$), the interaction effect of these two variables, ($F = 3.37$, $p < .05$, $\eta^2 = 0.11$), and Age were significant ($t = -2.39$, $p < .05$, $\eta^2 = 0.08$).

These results indicated that, although voluntary participants reported significantly higher GSI scores than their court-ordered counterparts, the magnitudes of these differences was less extreme for Groups 0 and 3 than they were for Groups 1 and 2. Furthermore, increasing age was associated with significant decreases in GSI scores.

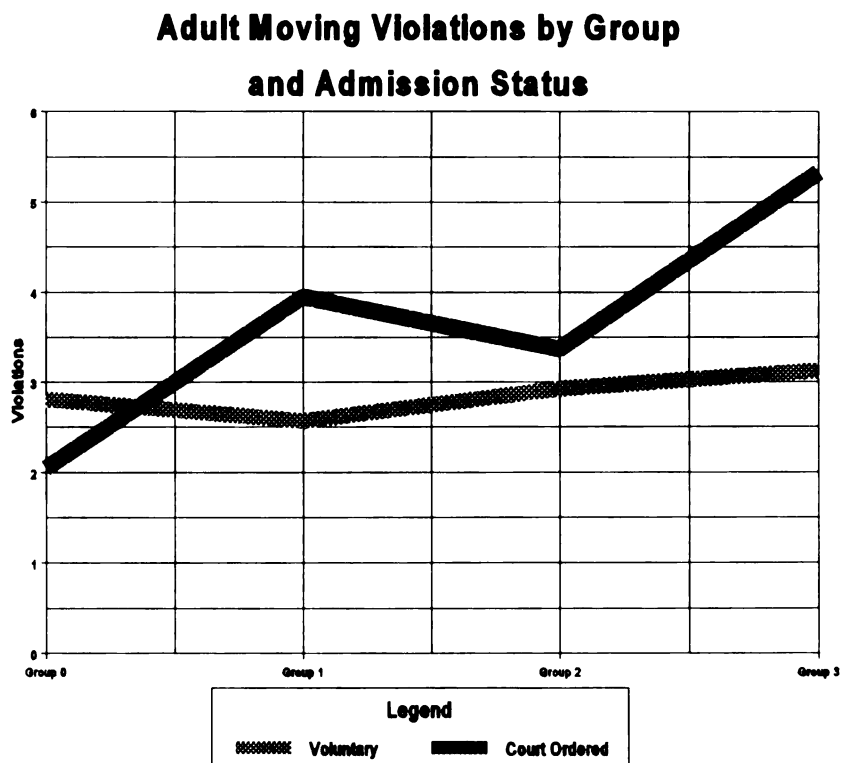
Figure 14



Moving Violations

Results of analysis of covariance for Moving Violations (Figure 15) revealed that Group Membership was significant, ($F = 3.50$, $p < .05$, $Eta = 0.11$), while Admission Status ($F = 3.13$, $p > .05$, $Eta = 0.06$), and the interaction effect of these two variables ($F = 2.54$, $p > .05$, $Eta = 0.09$) were not. The effect of Age was non-significant as well ($t = -1.02$, $p > .05$, $Eta = 0.03$). These findings indicated that recidivist DWI offenders had significantly more total adult moving violations than non-recidivist and/or non-DWI offenders.

Figure 15

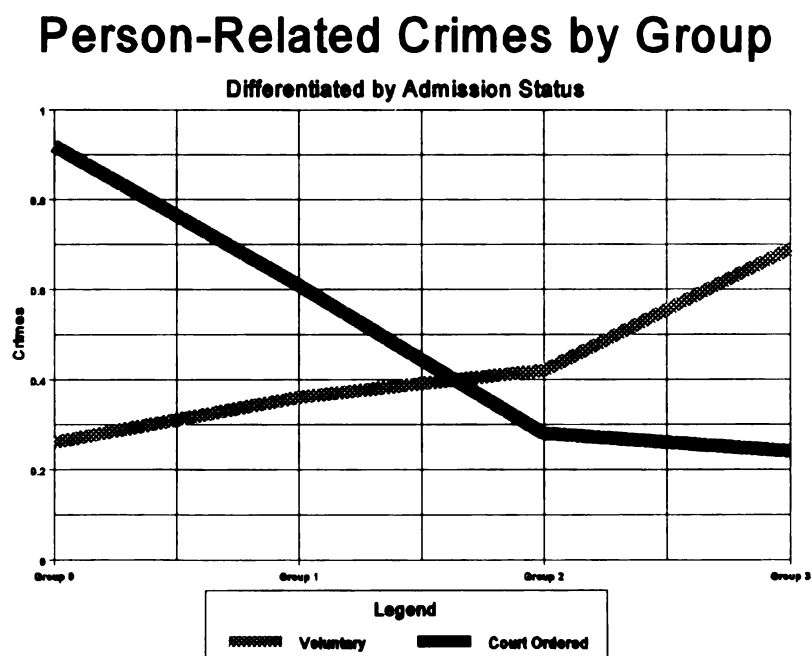


Person-related Crimes

Results of ANCOVA for Person-related Crimes revealed that Group membership, ($F = 1.64$, $p > .05$, $Eta = .08$), and Admission Status, ($F = 1.13$, $p > .05$, $Eta = .03$), were non-significant, although their interaction was ($F = 10.59$, $p < .001$, $Eta = .19$). Age was also found to be non-significant ($t = .208$, $p > .05$, $Eta = 0.0$).

In effect, charges for Person-related Crimes varied by Admission Status and by Group. Non- and one-time DWI offenders who voluntarily entered into treatment were charged significantly less often than their court-ordered counterparts. However, for recidivist offenders, those who voluntarily entered into treatment had significantly more arrests than their court-ordered counterparts.

Figure 16

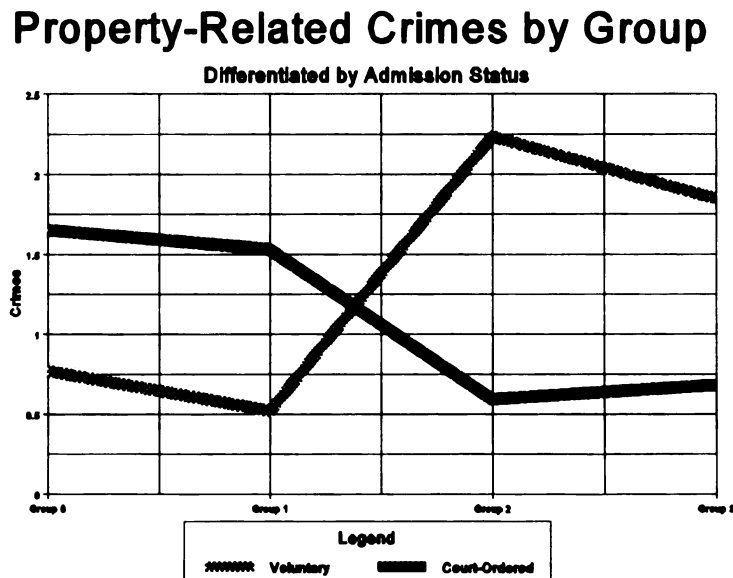


Property-related Crime

For Property-related crimes, ANCOVA revealed that Group membership, ($F = .21$, $p > .05$, $Eta = .03$), and Admission Status, ($F = .50$, $p > .05$, $Eta = .03$), were non-significant, (Figure 18), although their interaction was, ($F = 3.72$, $p < .001$, $Eta = 0.11$). The effect of Age was non-significant also ($t = -.321$, $p > .05$, $Eta = 0.0$).

These results indicated that charges for Property-related Crimes varied by both Admission Status and by group. In effect, non- and one-time offenders who voluntarily entered into treatment were charged significantly less often than their court-ordered counterparts. For recidivists, however, those who voluntarily entered into treatment reported significantly more crimes than recidivists who were court-ordered into treatment.

Figure 17



Research Question 3:

To what extent does a combination of demographic, alcohol, drug, psychological, social deviance, and admission status variables predict total number of DWI arrests?

In order to determine the extent to which a combination of the above predictor variables would be effective in predicting total number of DWI arrests over any one set of predictor variables alone, a standard multiple regression procedure was employed.

To evaluate whether a relatively large number of predictor variables could be summarized more concisely into a few underlying factors prior to regression analysis, a factor analytic procedure was employed. To facilitate the factor analysis, a correlation matrix of all predictor variables was examined, and only those predictor variables that correlated at 0.4 or above with at least one other predictor variable were included in the regression model (Nedderson, 1991). The continuous variables that met this criterion included ASI Alcohol Severity scores (Alcohol), Alcohol Dependence Scale scores (ADS), Drinks per Drinking Day (Drinks), ASI Drug Severity scores (Drugs), Drug Dependence (DAST), General Stress Index (GSI), ASI Family/Social severity scores (Fam/Soc), ASI Psychological severity scores (Psych), Crimes Against Persons (Person), and Crimes Against Property (Property).

A principal components analysis with VARIMAX rotation revealed the presence of 3 general factors. These included an alcohol factor comprised of 3 items, (i.e., Alcohol, ADS, and Drinks); a criminal offense factor composed of 2

items, (i.e., Person and Property); and a factor which combined the 2 drug-related, and the 3 psychological variables. The Cronbach's alpha reliability measure of internal consistency was .59 for the alcohol factor, .71 for the criminal offense factor, and .79 for the drug-related and psychological factor. The overall Cronbach's alpha reliability for all 10 items was .73. Due to this high Alpha level, a decision was made to keep the psychological and drug-related factors as separate predictors in the regression model. Keeping these two factors separate would improve predictability of DWI, and enhance the interpretation of results.

Each continuous predictor variable was standardized into Z scores, and composite predictor variables were then created from these standardized variables. The standard multiple regression procedure was employed using the newly created alcohol, crime, psychological, and drug factors as predictors, and the total number of DWI arrests as the outcome variable. Several demographic variables that correlated at the 0.4 level with at least one other variable were installed in the regression model as well. These included age, relationship status and employment stability. The latter two variables were entered into the regression model as dummy variables.

Table 13 provides a summary of the multiple regression analysis results. A total of 10 predictor variables were entered into the regression model, and four statistically significant predictors were identified.

The relative strength of each predictor variable as it related to the number of

DWI offenses is illustrated in the Beta column. Beta gives the standardized regression coefficients of change in DWI in standard deviations, which correspond to one unit change in the predictor variable.

TABLE 13
Multiple Regression Analysis Results for the Prediction of
Total Number of DWI Arrests

Predictors	B	B (Beta)	t-value	p-value
Age	.04	.17	3.15	.002**
Alcohol	.40	.17	3.43	.001**
Crime	.06	.04	.83	.41
Divorced	.02	.01	.10	.92
Drug	-.26	-.15	-2.90	.004**
Full-time	.24	.07	.72	.47
Admit Status	1.07	.32	6.78	.000***
Married	-.09	-.02	-.44	.66
Psych	-.18	-.09	-1.66	.10
Unemp.	-.05	-.01	-.13	.90
Part-time	-.23	-.05	-.61	.54
Overall $F=9.48$ $R^2=0.19$ $R=0.45$ $p\text{-value}=0.000$ Standard Error of the Estimate: 1.53				

* $p < .05$

** $p < .01$

*** $p < .001$

From Table 13 it can be seen that Admission Status ($B = .32$, $p < .001$), had the greatest effect on the number of DWI arrests. DWI arrests were .32 standard deviations higher for court-ordered participants than for voluntary participants.

With respect to the other predictor variables, Alcohol ($B = .17$, $p < .01$) had the next greatest influence on the number of DWI arrests, closely followed by Age ($B = .17$, $p < .01$). Drug also had a significant effect on DWI arrests, ($B = -.15$, $p < .01$).

The data revealed that one unit increase in the alcohol z-score corresponded to an increase of 0.17 standard deviations in the number of DWI arrests.

Similarly, one unit increase in age corresponded to an increase of 0.167 standard deviations in the number of DWI arrests. Drug had a negative effect on the number of DWI arrests. A one unit increase in the drug z-score corresponded to a decrease of 0.146 standard deviations in the number of DWI arrests.

All ten predictor variables entered into the regression equation resulted in a Multiple R of .435, and an R^2 of 0.19, with a standard error of 1.53. Thus, the full regression model accounted for approximately 19 percent of the total variance in the number of DWI arrests. The overall regression model was statistically significant ($F = 9.48$, $p < 0.01$).

Variables in the regression model which were not useful in predicting DWI arrests were crime ($B = .04$, $p > .05$), psychological ($B = -.09$, $p > .05$), divorced ($B = .01$, $p > .05$), married ($B = -.02$, $p > .05$), full-time ($B = .07$, $p > .05$), part-time ($B = -.05$, $p > .05$), and unemployed ($B = -.01$, $p > .05$).

CHAPTER 6

DISCUSSION

Introduction

The purpose of this study was to extend research aimed at identifying risk factors for repeat drinking-drivers. Historically, researchers attempting to identify risk factors for this behavior have combined participants with varying arrest histories into homogenous groups, thus blurring meaningful distinctions that may have held promise for determining an individual's recidivist potential, (Landrum & Windham, 1981, Maisto et al., 1979, Yoder & Moore, 1973; Zelhart, 1972).

Research suggests that only 30-40 percent of first-time DWI offenders will recidivate (Maisto et al., 1979). Thus, the first time a DWI offender is apprehended is the most critical time for reliably determining his/her recidivist potential. A first step toward achieving this goal is to determine whether significant differences actually exist between discrete groups of non-offenders, one-time offenders, and multiple offenders on empirically-established risk factor variables.

To date, a handful of investigators have attempted to separate DWI offenders into distinct subgroups based upon arrest status (Argeriou et al., 1986; Beerman et al., 1988; Lucker et al., 1991; MacDonald & Pederson, 1990). These studies have methodological problems as well, such as restricted and unrepresentative

samples, and constraints on variable representation.

The present investigation was an attempt to overcome some of these limitations by developing a prediction model based upon a more complete complement of risk factor domains, including demographic, alcohol-related, drug-related, psychosocial, and social deviance variables. Furthermore, a large and representative sample was employed to enhance the generalizability of the findings. In total, 859 male participants recruited from 37 randomly selected, publicly-funded treatment programs throughout Michigan were subdivided into four groups based upon their total number of lifetime DWI arrests (i.e., 0,1,2, 3-or-more lifetime arrests).

Summary of the Findings

For the present investigation, three research questions were posed and addressed, and their respective analyses followed a step-wise progression. This chapter briefly summarizes the results of each research question, and discusses probable reasons why some of the results may have differed from other reports in the literature. In addition, methodological limitations inherent in this and other DWI recidivist studies will be reviewed. Finally, treatment implications, and recommendations for future research will be presented.

Research Question 1

What is the strength of the relationship between DWI arrest status and respondent's demographic characteristics indicative of personal instability, indices of alcohol-related problems, indices of drug-related problems, indices of psychological distress, and indices of social deviance?

The first research question posed was aimed at determining whether or not hypothesized associations existed between increasing numbers of DWI arrests and individual predictor variables. Based upon a review of the literature, it was hypothesized that increasing numbers of DWI arrests would be associated with decreases in educational attainment, lower levels of employment and relational stability, greater alcohol- and drug-related problems, increased levels of psychological distress, and elevations in indices of social deviance.

Statistical analyses yielded generally mixed results with respect to finding support for these original hypotheses. In terms of demographic variables, age was found to be positively and significantly associated with DWI arrest status. The hypotheses which predicted significant negative associations between the numbers of DWI arrests and relationship stability, educational attainment, and employment status, were not supported by the data.

With respect to alcohol- and drug-related variables, only alcohol dependence was found to be significantly and positively associated with recidivism. Contrary to predictions, recidivist offenders were found to have significantly lower levels of drug dependence and drug-related problems than non- or low-level offenders. Similarly, significant negative relationships were observed between number of

DWI arrests and levels of general distress, ASI family/social problem severity, and ASI psychological problem severity.

Finally, with respect to social deviance variables, total number of lifetime moving violations was the only variable which was positively associated with DWI arrest status in a positive fashion. The other two social deviance variables, crimes against persons and crimes against property, were not significantly related to DWI arrest status.

While it was expected that discrepancies would emerge between this and other studies given differences in methodology and design, it was not expected that so many hypotheses would fail to be supported. Ultimately, these findings prompted a review of the data to determine whether or not some important items had been overlooked, and prompted renewed scrutiny of the methodological limitations inherent in this and other studies.

Research Question 2

Does the respondent's demographic characteristics indicative of personal instability, indices of alcohol-, and drug-related problems, indices of psychological distress, and indices of social deviance vary by the respondent's admission status?

A qualitative review of the data revealed that a large proportion of recidivist DWI offenders had been coerced into treatment, whereas a majority of non- and one-time offenders had voluntarily entered into treatment. In order to investigate whether or not findings obtained in the original series of analyses were due to

differences in admission status across groups, Research Question 2 was posed.

In addressing Research Question 2, attempts were also made to control for the potentially confounding effects of age, which was positively related to DWI arrest status.

Results of Research Question 2 revealed several important findings. First, controlling for the effects of age was useful in that certain relationships between predictor variables and DWI arrest status were clarified. In essence, ASI alcohol problem severity and drinks per drinking day joined alcohol dependence as variables that were positively associated with recidivism.

A second important finding was that, although court-ordered and voluntary participants were similar in terms of socio-demographic characteristics, voluntary participants obtained substantially higher severity scores on all alcohol-, drug-, and psychological- domain measures. In the case of the two crime-related variables, interactions between group membership and admission status were revealed.

A third finding to emerge was that, although levels of severity scores were found to differ between court-ordered and voluntary groups, the patterns of scores remained the same for the alcohol, drug, and psychological variables. In effect, some of the discrepancies described earlier with other reports in the literature remained after controlling for age and admission status. This finding suggested that methodological issues were most likely responsible for the differences observed. To further understand how a combination of factors may

relate to the number of DWI arrests, Research Question 3 was posed.

Research Question 3

To what extent does a combination of demographic, alcohol, drug, psychological, social deviance, and admission status variables predict total number of DWI arrests?

For this analysis, total number of DWI arrests was used as the dependent variable as opposed to the four discrete groups utilized throughout the rest of the study.

Results of this investigation were consistent with the findings of research questions 1 and 2. According to this analysis, increasing levels of alcohol-related problems, and decreasing levels of drug-related problems could increase the number of DWI arrests in a male, treatment-seeking population.

Although age was found to significantly predict DWI arrests as well, its importance was generally restricted to its potential confounding effects. Ultimately, researchers will want to control for age in future recidivist studies, as older individuals have more opportunity to be apprehended for driving while intoxicated due to greater driving exposure.

The strongest predictor of the number of DWI arrests was admission status. For this predictor, court-ordered participants were more likely than voluntary participants to be multiple, recidivist offenders. This finding illustrates the fact that alcohol treatment has become an established sanction for DWI offenders, (Weisner, 1991), and highlights the need to consider contingencies surrounding

admission status as important issues for future research, particularly as they relate to treatment goals and to treatment outcome.

Conclusions

Several conclusions may be drawn from the findings of the present investigation with respect to a treatment-seeking, male population.

- (1) Socio-demographic variables were not significant predictors of increasing numbers of DWI arrests.
- (2) Increasing numbers of DWI arrests were significantly associated with increasing levels of alcohol dependence, and increasing severity of alcohol-related problems.
- (3) Increasing numbers of DWI arrests were significantly associated with decreasing levels of drug dependence, and decreasing severity of drug-related problems.
- (4) Psychological variables reflecting the recent experience of distress were not significant predictors of DWI arrest status.
- (5) DWI arrests were not significantly predicted by self-reported history of person- and property-related crimes.
- (6) Individuals who voluntarily entered into treatment had significantly higher alcohol-, drug-, and psychological problem-severity scores than their court-ordered counterparts.

Discussion

Each of the these conclusions will now be addressed within the context of the literature, and probable reasons for differences obtained will be discussed.

With respect to socio-demographic issues, the hypotheses that multiple DWI

offenders would appear more socially unstable than non- or one-time offenders were not supported. Indeed, in the present study, multiple DWI offenders exhibited more stable employment histories than non- and one-time offenders.

Several possibilities exist to explain these discrepancies. First, operational definitions varied between studies. In the present investigation, employment stability was defined as a subject's most representative employment status for the 3-year period prior to his assessment. In other studies, employment stability was defined as employment status held at the time of a target arrest or shortly thereafter (Argeriou et al., 1986; Beerman et al., 1988). Unless controlled for, use of this latter definition leaves open the possibility that a target arrest may adversely affect a participant's employment status through restrictions on driving, etc.

In addition to definitional issues, both Argeriou et al., (1986), and Beerman et al., (1988), utilized large, state-maintained data bases that presumably contained data on a substantial number of incarcerated offenders. In the present investigation, a non-incarcerated, treatment population was employed. The incorporation of incarcerated populations, therefore, may partly explain the increased rates of social instability observed in the former studies when compared to the present investigation (Greenfeld, 1988).

With respect to psychological characteristics, present findings were inconsistent with other reports in the literature which indicated that recidivist DWI offenders tended to be more psychologically "disturbed" than non- or low-

level-offenders (Selzer & Barton, 1977; Donovan et al., 1985; McCord, 1984). A possible explanation for this inconsistency lies in the fact that we were unable to differentiate between state- and trait-related phenomena in the present study.

Perhaps more than any other set of indices, the measures utilized to assess psychological distress were restricted to a relatively recent time frame. The two ASI measures (i.e., psychological and family/social severity composite scores), reflected problems experienced within the past 30 days. Furthermore, the BSI captured severity of symptoms experienced within the past 7 days only.

While chronically afflicted individuals (e.g., anxious, depressed, etc.) would presumably have specific traits reflected in elevated scores on some or all of the psychological measures employed, individuals experiencing distress in reaction to a relatively transient phenomenon (e.g., arrest, probation, entry into treatment), may achieve identical scores on these same instruments, but for very different reasons. These measurement issues made it difficult to obtain definitive answers to Research Questions within this domain. Future researchers will want to use instruments that adequately measure psychological constructs of interest, but that also allow for the differentiation between trait- and state-related phenomena.

With respect to social deviance variables, results of the present investigation differed from other reports in the literature which have established prior criminal history as a fairly stable descriptor of DWI arrests (Argeriou et al., 1985; Beerman et al., 1988; Gould & MacKenzie, 1990; Hoffman et al., 1987; Lucker et

al., 1991; Waller, 1967).

It is noteworthy that most studies exploring associations between criminal history and DWI arrests have utilized official data bases, however. As discussed earlier, official data bases more adequately represent incarcerated DWI offenders than treatment samples do. Although it cannot be known for certain, sampling issues may once again be responsible for the discrepant findings that emerged in the present study. Ultimately, future research directed at investigating the association between criminal history and DWI arrest status should include a representative, subsample of incarcerated offenders for comparative purposes.

With respect to substance use issues, results of the present investigation did confirm a positive association between degree of alcohol-related problems and numbers of DWI arrests. A number of early studies reported that recidivist drinking drivers had more serious levels of alcohol-related problems than non-recidivists, but these findings were compromised by non-existent or vague definitions of the construct, and/or through use of measures that confounded increasing alcohol-related problems with DWI arrests, (Kelleher, 1971; Selzer et al., 1963; Yoder & Moore, 1973). In spite of this, the present findings lent support to these earlier studies, and further establish increasing severity of alcohol-related problems as an important risk factor for DWI recidivism.

With respect to drug abuse, results of the present investigation differed from other reports in the literature which indicated that multiple DWI offenders were

more prone to serious drug-related problems than non- or low-level offenders (Argeriou et al., 1986; Beerman et al., 1988; Selzer & Barton, 1977). In the present investigation, increasing DWI arrest status was associated with decreasing levels of drug abuse. Several issues appear to be relevant in attempting to reconcile these seemingly divergent results.

First, definitions of drug abuse for many studies reviewed in the literature are methodologically weak, ranging from simple use of drugs (Argeriou et al., 1986; Elliott, 1987; Selzer & Barton, 1977; Wilson & Jonah, 1988), to arrests for possession of a controlled substance (Beerman et al., 1988; Lucker et al., 1991). The fact that an individual is arrested N times for possession of a controlled substance may say more about his/her criminal proclivities than it does about personal drug use patterns and related problems. Furthermore, simple use/non-use definitions of "drug abuse" can be misleading, as they are not tied to any diagnostic or clinical criteria.

The convergence of evidence suggests that DWI offenders as a whole are more likely to "use" illicit drugs than general, licensed drivers. Although a general driving group was not utilized in the present investigation, the fact that the total population of DWI offenders in this study obtained a mean DAST score of approximately 5 indicates that they are indeed using illicit drugs. As far as simple use goes, therefore, results of the present investigation do not necessarily contradict the convergence of evidence in the literature.

On a more meaningful level, however, the present results do contradict the

suggestion that increasing levels of drug-related problems are associated with increasing numbers of DWI arrests, at least insofar as a treatment-seeking population is concerned. Ultimately, through using standardized and continuous measures of alcohol dependence and drug abuse, (i.e., ADS & DAST), the current investigation was better able to address the question of whether or not treatment-seeking DWI offenders had problems with alcohol and drugs, and, if so, to what extent and in what combination.

Skinner and Horn (1984) divided ADS scores into 4 quartiles --ranging from "no problems" to "severe problems" with alcohol dependence-- for interpretive purposes. In Skinner's (1982) original validation study, DAST scores effectively differentiated amongst three groups: Participants with primary alcohol problems, participants with primary drug problems, and participants with a combination of drug and alcohol problems. Most participants with primary alcohol problems scored 5 or below on the DAST, whereas the majority of clients with drug or mixed drug/alcohol problems scored 6 or above (Skinner, 1982).

In light of Skinner's research --and in conjunction with obtained ADS and DAST scores-- results of the present investigation suggested that recidivist DWI offenders who were court-ordered into treatment had primary alcohol-related problems which were moderate in severity, and, as Skinner suggested, these participants may be more amenable to controlled drinking strategies. The most extreme voluntary recidivist group also appeared to have primary alcohol-related problems, but these problems were clinically more extreme, and possibly less

likely to benefit from a controlled drinking program (Skinner & Horn, 1984). The two other voluntary offender subgroups appeared to have mixed alcohol/drug problems, both of which were substantial from a clinical perspective. Finally, the two non-offender subgroups had severe levels of drug-related problems, but less serious problems with alcohol.

Ultimately, these findings suggest that different "types" of individuals may be presenting to structured treatment programs. One of the implications of this suggestion is that some treatment-seeking individuals may not be adequately served due to a mismatch between problem severity and treatment. A "mismatch" between treatment-seeking individuals and established treatment programs has been proposed as one reason why many attempts to reduce DWI recidivism through substance abuse treatment have failed (Foon, 1988).

The effects of mismatching clients to treatment was illustrated in an early study of socially stable problem drinkers by Sanchez-Craig (1980). She found that participants who had been randomly assigned to an abstinence goal drank considerably more during treatment than individuals who had been assigned to a controlled-drinking goal. The high rate of rejection of total abstinence suggested that this was not an acceptable treatment goal in a population of socially stable problem drinkers.

Sanchez-Craig's (1980) results with an outpatient "alcoholic" population cannot be directly generalized to a treatment-seeking DWI-offender population. However, some parallels may be drawn in that DWI offenders who meet criteria

for moderate or even lower levels of alcohol-related problems may be enrolled in the same treatment programs -- and presumably exposed to the same treatment goals-- as DWI offenders with severe levels of alcohol-related problems. The effect of this practice on treatment outcome would appear to be quite important, and, ultimately, requires additional research.

In addition to matching clients to treatment on substance-related issues, Weisner (1991) contends that treatment programs should also pay attention to differences in contingencies surrounding an individual's entry into treatment. She postulates that issues such as duration, immediacy, strength, enforceability, and consistency of contingencies differentially affect a client's experience of, and involvement in treatment.

Although contingencies surrounding entry into treatment were not a direct part of the present investigation, important differences did emerge when participants were differentiated by admission status. In essence, voluntary participants reported substantially higher levels of problem severity on all alcohol-related, drug-related, and psychologically-related problem measures.

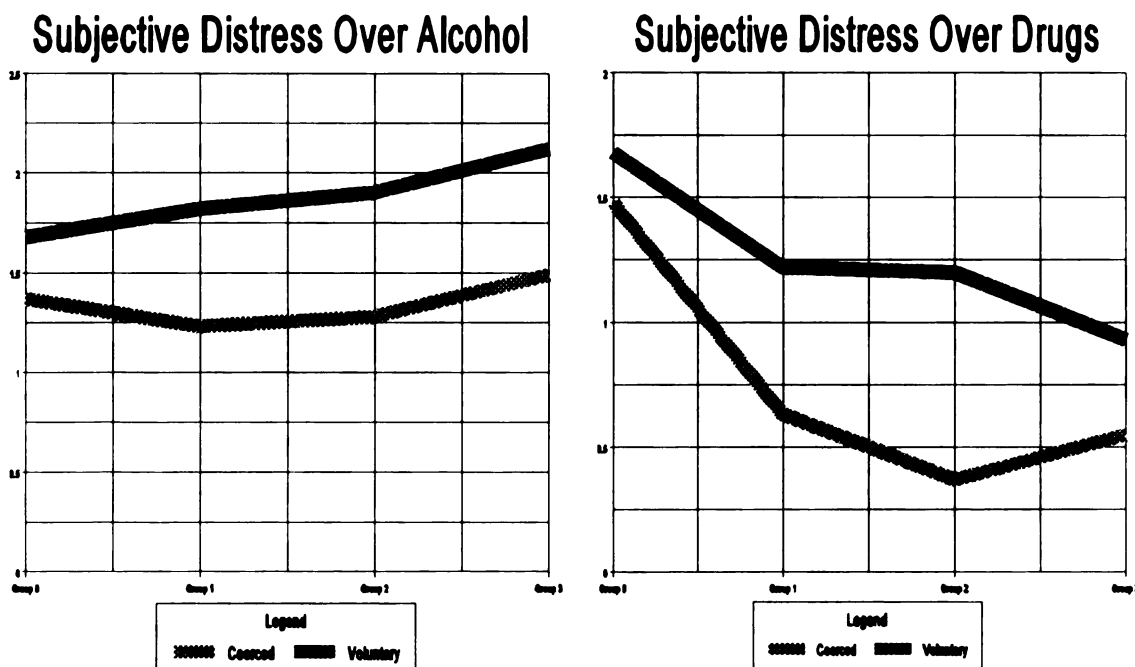
Future research is needed to adequately address the implications of these findings. For the present, groundwork may be laid by speculating about contingencies that may have contributed to the substantial differences between court-ordered and voluntary groups in the present study.

First, court-ordered participants may simply have had fewer problems than their voluntary counterparts in most domains of life functioning. On the surface,

this would appear to be a reasonable hypothesis, particularly if one believes that there had to be some compelling motive(s) for voluntary participants to seek treatment. In effect, an individual who voluntarily enters into treatment is most likely experiencing a degree of subjective distress strong enough to drive him/her to seek professional help.

This general hypothesis is supported by an analysis of each group's level of subjective distress over substance-related problems. As part of their initial assessment for the HCSP, all participants were asked to rate their subjective degree of distress over alcohol- and drug-related problems on a scale ranging from 0 (not at all distressed), to 4 (extremely distressed).

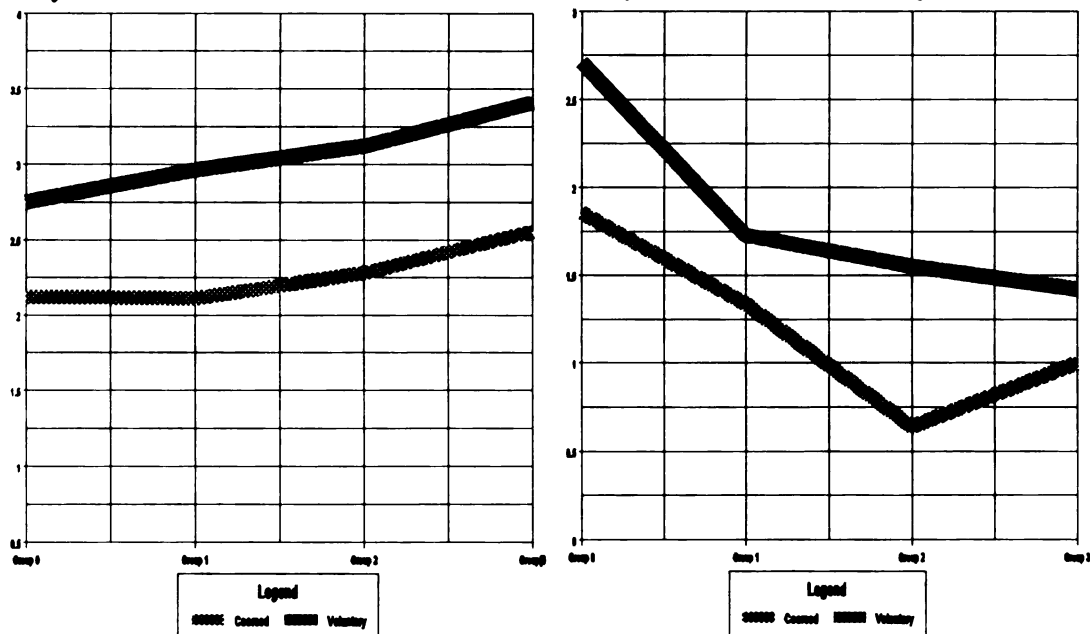
Figure 18



As can be seen in Figure 18, voluntary participants reported levels of distress that were substantially higher than their court-ordered counterparts. Similar findings were revealed for subjective reports of "need for treatment." All participants were asked to rate their subjective need for treatment based upon a 4-point scale ranging from 0 (treatment not at all important), to 4 (treatment is extremely important). As can be seen in Figure 19, voluntary participants rated their need for alcohol- and drug-related treatment as being substantially higher than their court-ordered counterparts.

Figure 19

Subjective Need for Alcohol Treatment Subjective Need for Drug Treatment



Although subjective levels of distress and motivation for treatment were higher for voluntary clients, the possibility that various contingencies

surrounding entry into treatment may have contributed to these differences remains a possibility. For instance, court-ordered participants may have been more likely to minimize and/or deny subjective problems in a treatment setting because of fears related to confidentiality, probationary status, or other agency-related strictures.

While minimization and denial were not investigated directly and/or adequately in the present study, indirect evidence suggests that this possibility is not strongly supported. In essence, non-DWI-offending, court-ordered participants reported the same high levels of drug abuse as their voluntary counterparts. It seems unlikely that court-ordered offenders would be forthcoming about use of illicit drugs and associated problems, and yet minimize or deny problems in other domains of life functioning.

Another possibility for the striking differences observed between subjects who were court-ordered into treatment and those who entered voluntarily is that the threat imposed by legal involvement may have served to reduce abuse and/or consumption of substances prior to treatment and, thus, indirectly reduced problems associated with substance abuse. This possibility is consistent with the finding that a majority of participants in the HCSP presumably altered their "typical" style of drinking, at least for the 30 days prior to their assessment. Nevertheless, proportional numbers of voluntary and court-ordered participants seemingly refrained from drinking in each of the 4 groups, and, thus, this issue in and of itself does not appear to fully explain the differences in

severity scores.

Ultimately, the identification of admission status as a masking variable in the present study was an important finding. It remains for future research to explore the effects of various contingencies surrounding entry into treatment, and treatment outcome.

Before turning to a discussion of the treatment and research implications stemming from the present investigation, a brief overview of methodological limitations and delimitations inherent in this study will be presented. This discussion will also address a number of general methodological issues that are likely to impact upon any study directed at understanding risk factors associated with DWI recidivism.

Methodological Limitations

A primary delimitation of the present investigation concerned the sample employed, and the generalizeability of the findings. In this study, voluntary, male participants recruited from 37 publicly-funded treatment programs were utilized. Results and policy implications, therefore, should not be generalized beyond these parameters (i.e., females, incarcerated individuals, relatively light drinkers in the general population, etc.).

An important limitation of the present study concerned the measure of quantity and frequency of alcohol consumption. This measure sought self-reported information regarding alcohol consumed within the past 30 days only.

Information regarding typical, long-term drinking patterns –that may have been altered due to internal and/or external contingencies surrounding entry into treatment-- was not available for this study, therefore.

A related issue revolves around the limited time-frame captured by the instruments used to measure psychological distress. The two ASI measures (i.e., psychological and family/social severity composite scores), reflected problems experienced within the past 30 days. Furthermore, the BSI captured information about one's experience of distress within the past 7 days only. Ultimately, the limited time frame employed in this study made it impossible to distinguish between state- and trait-related phenomena.

A number of general methodological problems inherent in drinking-driving research should also be addressed. First, DWI arrests are subject to several sources of variability which could impact upon a particular subject's actual DWI arrest status. Factors such as geographical residence, for instance, may be related to whether an individual is arrested for DWI. Furthermore, enforcement practices vary across regions due to police discretion, varied practices in dealing with inebriated drivers, local funding, and community interest (Vingilis, 1983). These sources of variation suggest that a given individual may have been classified differently with respect to recidivist status had s/he encountered different circumstances. To this extent, DWI arrests are not an accurate measure of DWI.

Furthermore, the number of DWI arrests an individual has is related to the

point in time when a particular study is conducted. In effect, participants with zero or one arrest may receive an additional DWI arrest at a later date, and thus, would be categorized differently at another point in time.

The issue of plea bargaining presents problems for accurately placing individuals in specific subgroups based upon their total number of lifetime DWI arrests as well. For instance, a third DWI offense may be plea bargained down to a second offense, or a first offense may be plea bargained down to reckless driving. Ultimately, these "bargained" convictions appear on one's official records. The dynamic way in which records are kept also presents a problem for researchers, particularly for those who rely solely on official records for their data. Various convictions are dropped from official data bases after a certain period of time, and this period varies from state to state.

Further complicating matters is the fact that an increased number of arrests for DWI are accompanied by increasingly severe legal sanctions designed to prohibit or greatly curtail driving privileges.

Any one or a combination of these methodological issues can influence the outcome of a study. Future researchers should be aware of these issues, and work to minimize their potential impact when possible.

Based upon results of the present investigation, implications for treatment providers and implications for future research may be suggested. What follows is a brief outline of such implications.

Implications for Treatment Providers

- (1) At intake, treatment providers should utilize standardized instruments, with established construct validity, to accurately measure the nature and extent of clients' substance abuse problems.**
- (2) Treatment providers should be aware of the various contingencies surrounding a client's entry into treatment, and should make attempts to understand the relationship(s) between contingencies and a client's need, readiness, and motivation for treatment.**
- (3) Ongoing treatment-outcome studies should be conducted at the treatment agency level to determine the efficacy of differential treatment programs for DWI offenders, particularly as they relate to the nature and extent of substance abuse problems, the degree of a client's subjective distress, and various contingencies surrounding a client's entry into treatment.**

Implications for Future Research

- (1) Researchers attempting to identify risk factors for DWI recidivism should take care in operationally defining constructs, (e.g., drug abuse), and should utilize standardized instruments capable of adequately measuring these constructs.**
- (2) In measuring psychological constructs, reliable instruments capable of adequately measuring trait-related phenomena that have been implicated in increased risk for recidivism, (e.g., depression, hostility, self-esteem), should be employed. Furthermore, these instruments should be able to distinguish personality traits from state-related phenomena (e.g., adjustment reactions, reactive depression).**
- (3) Future research should be directed to a more careful examination of whether or not current treatment approaches actually work for groups of coerced DWI offenders, and if so, what factors (i.e., nature and extent of contingencies surrounding entry into treatment, degree of subjective distress, client motivation for treatment, etc.) account for differences in outcome.**

- (4) Replication of this study with a large, representative group of general, licensed drivers is recommended. such a study would allow for broader generalization of findings, and promote further understanding of the distinctive features of DWI offenders who are arrested and who subsequently present for treatment.**
- (5) Replication of this study should also be conducted with an incarcerated population to determine if the same risk factors that apply in treatment settings are useful in predicting recidivism in a more deviant population, and/or if other risk factors (e.g., criminal, drug, social instability) become more prominent.**
- (6) Further research should also be directed at investigating the relationship(s) between admission status, criminal behavior, substance abuse, and recidivism to better understand the strong interactions on crime-related variables that were obtained in the present investigation, and their implications.**
- (7) A meta-analysis of the risk factor literature is recommended to help resolve some of the conflicts which continue to exist, and illuminate directions for future research.**

APPENDICES

APPENDIX A

**Means and Standard Deviations of Major Variables by Total Sample,
Combined DWI's, and by DWI Arrest Groups**

**Means and Standard Deviations of Major Variables by Total Sample,
Combined DWI's, and by DWI Arrest Groups**

Variables	Tot. Sam. N=969	DWI S's N=612	Group 0 N=257	Group 1 N=197	Group 2 N=194	Group 3 N=221
Age	31.64	32.04	30.69	30.89	31.29	33.72
St. Dev.	8.46	8.51	8.25	8.30	8.61	8.38
Education	142.1	141.68	143.12	141.76	143.4	140.09
St. Dev.	20.26	19.95	20.99	19.19	20.15	20.39
Employ. Stab.	5.56	5.53	5.63	5.68	5.45	5.48
St. Dev.	1.2	1.22	1.15	1.21	1.30	1.16
ASI Alc.	0.37	0.37	0.37	0.36	0.34	0.40
St. Dev.	0.26	0.26	0.26	0.25	0.25	0.27
ADS	20.76	21.57	18.82	21.12	20.94	22.51
St. Dev.	14.75	14.88	14.28	14.85	14.54	15.21
Drinks	5.88	5.98	5.63	6.12	5.52	6.25
St. Dev.	2.21	2.17	2.30	2.05	2.33	2.12
ASI Drug	0.11	0.08	0.17	0.10	0.07	0.08
St. Dev.	0.13	0.11	0.15	0.11	0.10	0.12
DAST	6.57	5.34	9.16	6.98	4.27	4.69
St. Dev.	6.6	6.32	6.44	6.53	6.07	6.05
Mov. Viol.	3.33	3.65	2.63	3.17	3.19	4.48
St. Dev.	5.79	6.26	4.49	6	4.68	7.53
Minor	1.57	1.61	1.49	1.45	1.23	2.08
St. Dev.	5.97	5.69	6.55	4.84	3.65	7.56
Major	1.34	1.37	1.26	1.26	1.45	1.40
St. Dev.	5.23	6.08	2.43	2.54	8.42	5.84
ASI Fam.	0.23	0.21	0.3	0.22	0.17	0.22
St. Dev.	0.23	0.22	0.24	0.23	0.2	0.22
ASI Psych.	0.24	0.22	0.28	0.25	0.18	0.22
St. Dev.	0.21	0.20	0.23	0.22	0.19	0.19
GSI	0.87	0.82	0.98	0.88	0.74	0.84
St. Dev.	0.72	0.70	0.76	0.72	0.72	0.65

APPENDIX B
Means and Standard Deviations of Major Variables by Group and by
Voluntary and Non-voluntary Admission Status

**Means and Standard Deviations of Major Variables by Group and by
Voluntary and Non-voluntary Admission Status**

Variables	Grp. 0 Volun.	Grp. 0 Non-vol.	Grp. 1 Volun.	Grp. 1 Non-vol.	Grp. 2 Volun.	Grp. 2 Non-vol.	Grp. 3 Volun.	Grp. 3 Non-vol.
Age	31.74	27.77	32.09	29.56	33.45	29.87	33.42	33.90
St. Dev.	8.47	6.76	7.90	8.60	8.84	8.19	8.05	8.68
Educ.	145.04	137.29	143.45	139.60	142.81	143.79	139.43	140.36
St. Dev.	22.06	16.42	17.55	20.91	23.63	17.58	18.87	21.45
ASI Alc.	.40	.30	.41	.30	.40	.30	.50	.34
St. Dev.	.27	.21	.26	.23	.25	.23	.28	.25
ADS	20.01	15.27	25.90	15.47	25.46	17.82	28.31	18.45
St. Dev.	14.47	13.33	15.24	12.34	13.35	14.57	15.20	14.02
Drinks	5.58	5.94	6.29	5.87	5.82	5.33	7.12	5.66
St. Dev.	2.33	2.13	2.27	1.79	2.15	2.45	1.42	2.31
Quantity	56.61	46.51	60.65	43.27	45.46	32.57	62.37	40.17
St. Dev.	63.51	59.09	67.67	58.90	51.43	48.67	68.10	58.47
ASI Drug	.18	.14	.11	.09	.10	.05	.09	.07
St. Dev.	.15	.13	.12	.10	.12	.08	.14	.11
DAST	9.19	8.86	8.36	5.59	6.74	2.69	5.42	4.33
St. Dev.	6.35	6.75	6.76	6.04	7.43	4.37	6.51	5.81
ASI Legal	.12	.26	.14	.18	.17	.23	.29	.23
St. Dev.	.19	.22	.20	.21	.21	.21	.25	.19
Mov.Viol.	2.81	2.05	2.57	3.95	2.92	3.36	3.12	5.33
St. Dev.	4.58	4.21	4.92	7.09	4.93	4.53	4.14	9.04
Minor	1.48	1.54	1.37	1.55	1.43	1.12	3.35	1.24
St. Dev.	7.23	4.05	5.56	3.88	3.92	3.49	11.61	2.48
Major	.90	2.34	.73	1.90	2.54	.77	2.44	.71
St. Dev.	2.01	3.16	1.46	3.30	13.48	1.39	9.06	1.59
ASI Fam.	.31	.26	.28	.14	.26	.12	.26	.20
St. Dev.	.24	.24	.23	.21	.23	.16	.23	.20
ASI Pay..	.30	.22	.31	.18	.27	.12	.28	.18
St. Dev.	.23	.21	.22	.20	.22	.15	.20	.17
GSI	1.02	.83	1.13	.60	1.09	.51	1.03	.70
St. Dev.	.75	.74	.74	.58	.76	.59	.70	.57

LIST OF REFERENCES

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- Argeriou, M., & Manohar, V. (1977). Treating the problem drinking driver: Some notes on the time required to achieve impact. British Journal of Addiction, 72, 331-338.
- Argeriou, M., McCarty, D., & Blacker, E. (1985). Criminality among individuals arraigned for drinking and driving in Massachusetts. Journal of Studies on Alcohol, 46, 525-530.
- Argeriou, M., McCarthy, D., Potter, D., & Holt, L. (1986). Characteristics of men and women arrested for drinking under the influence of liquor. Alcoholism Treatment Quarterly, 3, 127-137.
- Arstein-Kerslake, G., & Peck, R. (1985). A Typological Analysis of California DUI Offenders and DUI Recidivism Correlates. Technical Report. Washington, DC: National Highway Traffic Safety Administration.
- Beck, A. (1967). Depression: clinical, experimental, and theoretical aspects. New York: Harper & Row.
- Beck, A., Ward, C., Mendelson, J., et al. (1961). An inventory for measuring depression. Archives of General Psychiatry, 4, 561-573.
- Beerman, K., Smith, M., & Hall, R. (1988). Predictors of recidivism in DUIs. Journal of Studies on Alcohol, 49, 443-449.
- Brophy, C., Norvell, N., & Kiluk, D. (1988). An examination of the factor structure and convergent and discriminant validity of the SCL-90R in an outpatient clinic population. Journal of Personality Assessment, 52, 334-340.
- Campbell, D., & Fiske, D. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. Psychol. Bulletin, 56, 81-105.
- Charney, E. (1991). History and substance of the 1991 drunk driving legislation. Colleague, 4, 1-17.
- Clay, M. (1972). Which drunks shall we dodge? In: Alcohol and Drug Problems Association of North America. Selected papers presented at the general sessions, twenty-third annual meeting, 10-15 Sept., 1972, Atlanta, GA.: Washington, D.C., pp. 42-46.

- Cohen, M., and Klein, D. (1971). A measure of severity of multi-drug use among psychiatric patients. International Journal of Pharmacopsychiatry, 6, 83-89.
- Cyr, J., McKenna-Foley, J., & Peacock, E. (1985). Factor structure of the SCL-90-R: Is there one? Journal of Personality Assessment, 49, 571-578.
- Derogatis, L. (1973). SCL-90: An outpatient psychiatric rating scale. Psychopharmacology Bulletin, 9, 13-28.
- Derogatis, L., & Cleary, P. (1977). Confirmation of the dimensional structure of the SCL-90: A study in construct validation. Journal of Clinical Psychology, 33, 981-989.
- Derogatis, L., Lipman, R., & Covi, L. (1973). SCL-90: An outpatient psychiatric rating scale. Psychopharmacology Bulletin, 9, 13-28.
- Derogatis, L., Lipman, R., and Rickels, K. (1974). The Hopkins symptom Checklist (HSCL): A self-report symptom inventory. Behavioral Science, 19, 1-16.
- Derogatis, L., & Melisaratos, N. (1983). The brief symptom inventory: An introductory report. Psychological Medicine, 13, 595-605.
- Derogatis, L., Rickels, K., & Rock, A. (1976). The SCL-90 and the MMPI: A step in the validation of a new self-report scale. British Journal of Psychiatry, 128, 280-289.
- Donovan, D., & Marlatt, G. (1982). Personality subtypes among driving-while-intoxicated offenders: Relationship to drinking behavior and driving risk. Journal of Consulting and Clinical Psychology, 50, 241-249.
- Donovan, D., Marlatt, G., & Salzberg, P. (1983). Drinking behavior, personality factors, and high-risk driving. Journal of Studies on Alcohol, 44, 395-428.
- Donovan, D., Queisser, H., Salzberg, P., & Umlauf, R. (1985). Intoxicated and bad drivers: Subgroups within the same population of high-risk men drivers. Journal of Studies on Alcohol, 46, 375-382.
- Dudley, D. (1976). The Cornell Medical Index as an adjunct to paraprofessional analysis of alcohol addiction. Journal of Studies on Alcohol, 37, 97-103.
- Elliott, D. (1987). Self-reported driving while under the influence of alcohol/drugs and the risk of alcohol/drug related accidents. Alcohol, Drugs, and Driving, 3, 31-44.

- Estes, R. (1976). The Employability Index: A prognostic index of employment potential. Paper presented at the Annual Meeting of the American Psychological Association, Boston.
- Fagan, J. (1993). Interactions among drugs, alcohol, and violence. Health Affairs, Winter, 65-79.
- Farrow, J. (1985). Drinking and driving behaviors of 16 to 19 year olds. Journal of Studies of Alcohol, 46, 369-374.
- Fell, J. (1990). Drinking and driving in America: Disturbing facts - encouraging reductions. Alcohol Health and Research World, 14, 18-25.
- Filkins, L., Mortimer, R., Post, & Chapman, M. (1973) Field evaluation of court procedures for identifying problems drinkers. (Contract No. DOT-hs-031-2-303). Washington, D.C.: National Highway and Traffic Safety Administration.
- Fine, E., Scoles, P., & Mulligan, M. (1975). Under the influence: Characteristics and drinking practices of persons arrested the first time for drunk driving, with treatment implications. Public Health Reports, 90, 424-429.
- Foon, A. (1988). The effectiveness of drinking-driving treatment programs: A critical review. The International Journal of the Addictions, 23, 151-174.
- Gould, L., & MacKenzie, D. (1990). DWI: An isolated incident of a continuous pattern of criminal activity? In R. Weisheit (Ed.), Drugs, crime and the criminal justice system. Cincinnati, OH.: Anderson Publishing Co.
- Greenfeld, L. (1988). Drunk driving. Bureau of Justice Statistics Special Report. Washington, D.C.: U.S. Department of Justice.
- Gruenwald, P., Stewart, K., Klitzner, M. (1990). Alcohol use and the appearance of alcohol problems among 1st offender drunk drivers. British Journal of Addiction, 85, 107-117.
- Gunderson, E., Russell, J., and Nail, R. (1973). A drug involvement scale for classification of drug abusers. Journal of Comprehensive Psychology, 1, 399-403.
- Hagen, R., Williams, R., & McConnell, E. (1979). The traffic safety impact of alcohol abuse treatment as an alternative to mandated licensing controls. Accident Analysis and Prevention, 11, 275-292.

- Hayashida, M. (1981). Quantitative inventory of drinking behavior scale. Paper presented at Sixth Annual Meeting of the Coatesville Conference on Addiction. Coatesville, PA, 1981.
- Hilton, M. (1987). Drinking patterns and drinking problems in 1984: Results from a general population survey. Alcoholism: Clinical and Experimental Research, 11, 167-175.
- Hoffman, N., Ninonuevo, F., Mozey, J., & Luxenberg, M. (1987). Comparison of court-referred DWI arrestees with other outpatients in substance abuse treatment. Journal of Studies on Alcohol, 48, 591-594.
- Hunter, J. (1991). F to r: Program FTOR.BAS – A program to convert F to r. Unpublished Manuscript, East Lansing, MI.: Michigan State University.
- Hurst, P. (1973). Epidemiological aspects of alcohol in driver crashes and citations. Journal of Safety Research, 5, 130-148.
- Jacobs, J. (1989). Drunk Driving: An American Dilemma. Chicago: The University of Chicago Press.
- Jonah, B. (1990). Psychosocial characteristics of impaired drivers: An integrated review in relation to problem behavior theory. In J. Wilson & R. Mann (Eds.), Drinking and Driving: Advances in Research and Prevention. New York: Guilford Press.
- Jonah, B., & Wilson, R. (1986). Impaired drivers who have never been caught: Are they different from convicted impaired drivers? (Technical Paper Series, No. 860195). Warrendale, PA: Society of Automotive Engineers.
- Kelleher, E. (1971). A diagnostic evaluation of 400 drinking drivers. Journal of Safety Research, 3, 52-55.
- Keppel, G. (1982). Design and analysis: A researcher's handbook. New Jersey: Prentice-Hall, Inc.
- Kivlahan, D., Sher, K., & Donovan, D. (1989). The alcohol dependence scale: A validation study among inpatient alcoholics. Journal of Studies on Alcohol, 50, 170-175.
- Knopfer, G. (1984). The risks of drunkenness (or, Ebrietas Resurrecta). A comparison of frequency of intoxication indices and or population subgroups as to problem risks. British Journal of Addiction, 79, 185-196.

- Landrum, J. & Windham, G. (1981). A comparison of DWI repeaters and non-repeaters who attended a level I rehabilitation program. Journal of Alcohol and Drug Education, 26, 11-23.
- Lipman, R., Covi, L., & Shapiro, A. (1979). The Hopkins Symptom Checklist (HSCL): Factors derived from the HSCL-90. Journal of Affective Disorders, 1, 9-24.
- Lipsey, M., & Wilson, D. (1993). The efficacy of psychological, educational, and behavioral treatment: Confirmation from meta-analysis, American Psychologist, 48, 1181-1209.
- Lucker, B., Kruzich, D., Holt, M., & Gold, J. (1991). The prevalence of antisocial behavior among U.S. army DWI offenders. Journal of Studies on Alcohol, 52, 318-320.
- MacDonald, S., & Pederson, L. (1990). The characteristics of alcoholics in treatment arrested for driving while impaired. British Journal of Addiction, 85, 97-105.
- Maisto, S., Sobell, L., Zelhart, P., Connors, G., & Cooper, T. (1979). Driving records of persons convicted of driving under the influence of alcohol. Journal of Studies on Alcohol, 40, 70-77.
- Mann, R., Leigh, G., Vingilis, E., & DeGenova, K. (1983). A critical review on the effectiveness of drinking-driving rehabilitation programs. Accident Analysis and Prevention, 15, 441-461.
- Mann, R., Vingilis, E., & Stewart, K. (1988). Programs to change individual behavior: Education and rehabilitation in the prevention of drinking and driving. In M. Laurence, J. Snortum, & F. Zimring (Ed's.), Social control of the drinking driver. Chicago: University of Chicago Press.
- Mattsson, N., Williams, H., Rickels, K., Lipman, R., & Uhlenhuth, E. (1969). Dimensions of symptom distress in anxious neurotic outpatients. Psychopharmacology Bulletin, 5, 19-32.
- McGahan, P., Griffith, J., Parente, T., & McLellan, T. (1986). Composite scores from the Addiction Severity Index. Unpublished manuscript. Substance Abuse Treatment Unit, Philadelphia Veterans Administration Medical Center.

- McLellan, T., Luborsky, L., Cacciola, J., Griffith, J., Evans, F., Barr, H., & O'Brien, C. (1985). New data from the Addiction Severity Index: Reliability and validity in three centers. The Journal of Nervous and Mental Disease, 173, 412-423.
- McLellan, T., Luborsky, L., Woody, G., & O'Brien, C. (1980). An improved diagnostic evaluation instrument for substance abuse patients. The Journal of Nervous and Mental Disease, 168, 26-33.
- Miller, B., & Windle, M. (1990). Alcoholism, problem drinking, and driving while impaired. In: J. Wilson & R. Mann (Eds.), Drinking and Driving: Advances in Research and Prevention. New York: The Guilford Press.
- Moskowitz, H. (1987). Youth at risk for traffic accidents. Proceedings of an International symposium held in Santa Monica, CA, May 29-31, 1987. Alcohol, Drugs, and Driving, 3, 1-124.
- Moskowitz, H., & Robinson, C. (1987). Driving-related skills impairment at low blood alcohol levels. In P. Noordziz and R. Rozback (Eds.), Alcohol, drugs, and traffic safety - T-86. Amsterdam, Netherlands: Excerpta Medical Elsevier Science Publisher.
- National Center for Statistics and Analysis (1988). Traffic Fatality Facts. Washington, D.C.: National Highway Traffic Safety Administration.
- Nedderson, J. (1991). SPSS+ made simple. Belmont, CA: Wadsworth Publisher.
- Nichols, J., Weinstein, E., Ellingstad, V., Struckman-Johnson, D., & Reis, R. (1980). The effectiveness of education and treatment programs for drinking drivers: A decade of evaluation. In L. Goldberg (Ed.), Alcohol, drugs, and traffic safety: Volume 3. Stockholm, Sweden: Almqvist & Wiskell International.
- Nie, N. Hull, C., Jenkins, J., Steinbrenner, K., & Bent, D. (1975). SPSS: Statistical package for the Social Sciences, Second Edition. New York: McGraw-Hill Book Co.
- O'Malley, P., & Wagenaar, A. (1991). Effects of minimum drinking age laws on alcohol use, related behaviors and traffic crash involvement among American youth: 1976-1987. Journal of Studies on Alcohol, 52, 478-491.
- Perrine, M. (1970). Identification of personality, attitudinal, and biographical characteristics of drinking drivers. Behavioral Research and Highway Safety, 2, 207-226.

- Perrine, M. (1975). The Vermont driver profile: A psychometric approach to early identification of potential high-risk drinking drivers. In S. Israelstam & S. Lambert (Eds.), Proceedings of the Sixth International Conference on Alcohol, Drugs, and Traffic Safety. Toronto: Addiction Research Foundation of Ontario.
- Perrine, M. (1987). Varieties of drunken and of drinking drivers: A review, a research program, and a model. In P. Noordzij, & R. Roszbach (Eds.), Proceedings of the 10th International Conference on Alcohol, Drugs and Traffic Safety. Amsterdam: Excerpta Medica.
- Perrine, M., Peck, R., & Fell, J. (1989). Epidemiologic perspectives on drunk driving. Surgeon General's Workshop on Drunk Driving. Rockville, MD.: USDHHS.
- Polich, J. (1982). The validity of self-reports in alcoholism research. Addictive Behaviors, 7, 123-132.
- Popkin, C., Rudisill, L., Waller, P., & Beissinger, S. (1988). Female drinking and driving: Recent trends in N. Carolina. Accident Analysis and Prevention, 20, 219-225.
- Randall, T. (1992). Driving while under the influence of alcohol remains major cause of traffic violence. JAMA, 268, 7.
- Robins, L., Helzer, J., Croughan, J., & Ratcliff, K. (1981). National Institute of Mental Health Diagnostic Interview Schedule: History, characteristics, and validity. Archives of General Psychiatry, 38, 381-389.
- Ross, H., Gavin, D., & Skinner, H. (1990). Diagnostic validity of the MAST and the Alcohol Dependence Scale in the assessment of DSM-III alcohol disorders. Journal of Studies on Alcohol, 51, 506-513.
- Scoles, P., & Fine, E. (1978). Polydrug use patterns, race, and the problem drinking driver: Implications for treatment. Alcoholism: Clinical and Experimental Research, 2, 295-301.
- Selzer, M. (1971). The Michigan Alcoholism Screening Test: The quest for a new diagnostic instrument. American Journal of Psychiatry, 127, 1653-1658.
- Selzer, M., & Barton, E. (1977). The drunken driver: A psychosocial study. Drug and Alcohol Dependence, 2, 239-253.

- Selzer, M., Payne, C., Gifford, J., & Kelly, W. (1963). Alcoholism, mental illness and the "drunk driver." American Journal of Psychiatry, 120, 326-331.
- Selzer, M., Vanosdall, F., & Chapman, M. (1971). Alcoholism in a problem driver group: A field trial of the Michigan Alcoholism Screening Test (MAST). Journal of Safety Research, 3, 176-182.
- Selzer, M., Vinokur, A., & Wilson, T. (1977). A psychosocial comparison of drunken drivers and alcoholics. Journal of Studies on Alcohol, 38, 1294-1312.
- Skinner, H. (1982). The Drug Abuse Screening Test. Addictive Behaviors, 7, 363-371.
- Skinner, H., & Allen, B. (1982). Alcohol dependence syndrome: Measurement and validation. Journal of Abnormal Psychology, 91, 199-209.
- Skinner, H., & Horn, J. (1984). Alcohol Dependence Scale: Users Guide. Toronto: Addiction Research Foundation.
- Snowden, L., & Campbell, D. (1986). Validity of an MMPI classification of problem drinker-drivers. Journal of Studies on Alcohol, 47, 344-347.
- Sobell, L., & Sobell, M. (1978). Validity of self-reports in three populations of alcoholics. Journal of Consulting and Clinical Psychology, 46, 901-907.
- Spence, J., Cotton, J., Underwood, B., & Duncan, C. (1976). Elementary Statistics. N.J.: Prentice-Hall.
- Steer, R., Fine, E., & Scoles, P. (1979). Classification of men arrested for driving while intoxicated, and treatment implications. Journal of Studies on Alcohol, 40, 222-229.
- Sutker, P., Brantley, P., & Allain, A. (1980). MMPI response patterns and alcohol consumption in DUI offenders. Journal of Consulting and Clinical Psychology, 48, 350-355.
- Tashima, H., & Peck, R. (1986). An evaluation of the specific deterrent effects of alternative sanctions for first and repeat DWI offenders. Technical Report CAL-DMV-RSS-86-95. Sacramento, CA: California Department of Motor Vehicles.

- U.S. Department of Health and Human Services. (1989). Surgeon General's Workshop on Drunk Driving: Background Papers. Rockville, MD.: USDHHS.
- Vingilis, E. (1983). Drinking drivers and alcoholics: Are they from the same population? In R. Smart, F. Glaser, Y. Israel, H. Galant, R. Popham, & W. Schmidt (Eds.), Research Advances in Alcohol and Drug Problems, Vol.7. New York: Plenum.
- Waller, J. (1967). Identification of problem drinking among drunk drivers. JAMA, 200, 124-130.
- Watson, C., Tilleskjor, B., Hoodecheck-Schow, B., Pucel, J., & Jacobs, L. (1984). Do alcoholics give valid self-reports. Journal of Studies on Alcoholism, 45, 344-348.
- Weissman, M., and Bothwell, S. (1976). Assessment of social adjustment by patient self-report. Archives of General Psychiatry, 33, 111-118.
- Wells-Parker, E., Cosby, P., & Landrum, J. (1986). A typology for drinking driving offenders: Methods for classification and policy implications. Accident Analysis and Prevention, 18, 443-453.
- Wells-Parker, E., Landrum, J., & Topping, J. (1990). Matching the DWI offender to an effective intervention strategy: An emerging research agenda. In J. Wilson & R. Mann (Eds.), Drinking and Driving: Advances in Research and Prevention. New York: The Guilford Press.
- Wilson, R., & Jonah, B. (1985). Identifying impaired drivers among the general driving population. Journal of Studies on Alcohol, 46, 531-537.
- Wilson, R., & Jonah, B. (1988). The application of problem behavior theory to the understanding of risky driving. Alcohol, Drugs, and Driving, 4, 173-191.
- Yoder, R. (1975). Prearrest behavior of persons convicted of driving while intoxicated. Journal of Studies on Alcohol, 36, 1573-1577.
- Yoder, R., & Moore, R. (1973). Characteristics of convicted drunken drivers. Quarterly Journal of Studies on Alcohol, 34, 927-936.
- Yu, J., & Williford, W., (1991). Calculation of DWI recidivism with limited data: Using state driver license file for drinking and driving research. Journal of Drug Education, 21, 285-292.

Zelhart, P. (1972). Types of alcoholics and their relationship to traffic violations. Quarterly Journal of Studies on Alcohol, 33, 811-813.

Zylman, R. (1974). overemphasis on alcohol may be costing lives. The Police Chief, 41, 64-67.

Zylman, R. (1975). Drinking-driving and fatal crashes: A new perspective. Journal of Alcohol and Drug Education, 21, 1-11.

Zylman, R. (1976). All alcoholics are high-risk drivers: A myth. Journal of Traffic Safety Education, 23, 7-10.

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